UC Berkeley Archaeobotany Laboratory Report #85: Tuber Identification
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Fall 2016
Date: December 16, 2016

Tuber Reference Collection Methodology

Taxon	Family	Common Name	Stained	Fresh	Charred
Daucus carota	Apiaceae	Carrot	✓		
Ipomoea batatas	Convulvulaceae	Sweet	✓	✓	✓
Lepidium meyenii	Brassicaceae	Maca		✓	✓
Manihot esculenta	Euphorbiaceae	Manioc	✓	✓	✓
Oxalis tuberosa	Oxalidaceae	Oca	✓	✓	✓
Pachyrhizus erosus	Fabaceae	Jicama	✓	✓	✓
Smallanthus sonchifolius	Asteraceae	Yacón	✓	✓	✓
Solanum	Solanceae	Potato	✓	✓	✓
Tropaeolum tuberosum	Tropaolaceae	Mashua		✓	✓
Ullucus tuberosus	Basellaceae	Papalisa		✓	✓

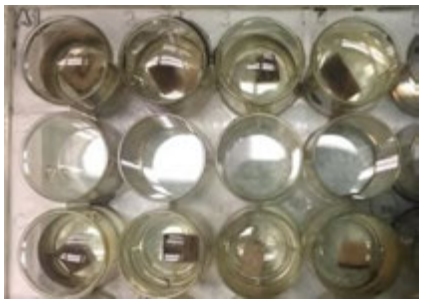
All stained samples were prepared by Katherine Chiou.

Fresh Samples Total= 45 samples

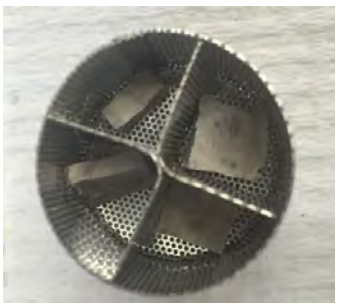
Fresh samples were cut into small sections displaying the transverse, tangential, and radial cross-sections, with attention given to both the edge of the specimen and the center of the specimen. Pieces were about 1.0 cm in length, 1.0 cm in width, and between .2 and .4 cm in thickness, in order to fit the Scanning Electron Microscope (SEM) mounting stubs.

All fresh samples underwent the generic processing protocol provided by the Electron Microscope Laboratory at UC Berkeley, which included:

1) Fixation (1 hour) - 2% glutaraldehyde in 0.1M Sodium cacodylate buffer, pH 7.2
2) Rinse (3 X 10 min) - 0.1M sodium cacodylate buffer, pH 7.2
3) Post-Fix (1 hour) - 1% Osmium tetroxide in 0.1M sodium cacodylate buffer, pH 7.2
4) Rinse (3 X 5 min) - 0.1M sodium cacodylate buffer, pH 7.2
5) Dehydrate in a series of ETOH (35%, 50%, 70%, 80%, 95%, 100%, and 100%) for 10 min each (70 min total).



6) Critical Point Dry (4 samples at a time) using the Tousimis AutoSamdri 815 Critical Point Dryer (45 min)



All specimens were then stored in sample vials labeled with their sample number (See complete list of sample numbers).

Charred Samples

Sections of the remaining tubers were cut into larger pieces designated for carbonization. These pieces were approximately 4-5 cm in length, width, and depth (varying based on size of tuber's actual width). When possible, two samples were created for each cross-section (transverse, tangential, and radial) to allow for two different lengths of time within the furnace. All specimens were wrapped in aluminum foil, labeled, buried in sand, and then placed in a furnace for either 2.5 or 3.5 hours at 250 °F. See complete sample list for exact times for each sample.

Once cooled, one of each cross-section for each species was fractured in order to view anatomical features using the SEM. Many samples were quite brittle, so clean fractures were not always possible. Additionally, a section showing the exterior surface after charring was obtained for each species.

Total= 48 samples

Scanning Electron Microscopy (SEM)

Both the processed fresh samples and fractured carbonized samples were imaged using a TM-1000 Scanning Electron Microscope at the Electron Microscope Laboratory at UC Berkeley. Specimen were mounted onto 0.5" aluminum holders temporarily using carbon tape. The cross-sections were cleaned using compressed air to remove any broken fragments that could obstruct the identifiable features during future analysis.

Initially, specimens were coated with a thin layer of conductive material (gold) using the Tousimis Sputter Coater before SEM analysis. This step was then stopped since the material was not over-powering in charging on its own and the TM-1000 does not require this step.
Below are those samples which <u>were</u> sputter coated. All others were not.

01-Lm-TransC	03-Lm-TangC	05-Lm-Rad	07-Ot-TransE	09-Ot-TangE	11-Pe-TransC	13-Pe-TangC
02-Lm-TransE	04-Lm-TangE	06-Ot-TransC	08-Ot-TangC	10-Ot-Rad	12-Pe-TransE	

After the specimen chamber was vented, the aluminum mounts were secured on the microscope's stage one at a time, the chamber was closed, and a vacuum pump removed air from the chamber. Images of the various cross-sections were taken at multiple magnifications, usually 50x, 100x, 200x, 500x, and 1000x. The micrographs were focused on vascular bundle arrangement, xylem wall pitting, periderm thickness, and exterior surface texture.

Specimen ID	Common name	Sample type	Stem/ Root	Orientation	Box #/ Stub #	Date Prepped	Date Processed in ELM	Date Imaged on SEM	Temp (Deg.)	Furnace Time (Hours)	Sputter Coated
01-Lm-TransC	Maca	Wet/fresh	Root	Transverse Center	1-1	15 Sep 2016	16 Sep 2016	14 Oct 2016			Yes
02-Lm-TransE	Maca	Wet/fresh	Root	Transverse Edge	1-2	15 Sep 2016	16 Sep 2016	14 Oct 2016			Yes
03-Lm-TangC	Maca	Wet/fresh	Root	Tangential Center	1-3	15 Sep 2016	16 Sep 2016	14 Oct 2016			Yes
04-Lm-TangE	Maca	Wet/fresh	Root	Tangential Edge	1-4	15 Sep 2016	16 Sep 2016	21 Oct 2016			Yes
05-Lm-Rad	Maca	Wet/fresh	Root	Radial	1-5	15 Sep 2016	23 Sep 2016	21 Oct 2016			Yes
06-Ot-TransC	Oca	Wet/fresh	Stem	Transverse Center	1-6	15 Sep 2016	23 Sep 2016	21 Oct 2016			Yes
07-Ot-TransE	Oca	Wet/fresh	Stem	Transverse Edge	1-7	15 Sep 2016	23 Sep 2016	21 Oct 2016			Yes
08-Ot-TangC	Oca	Wet/fresh	Stem	Tangential Center	1-8	15 Sep 2016	23 Sep 2016	21 Oct 2016			Yes
09-Ot-TangE	Oca	Wet/fresh	Stem	Tangential Edge	1-9	15 Sep 2016	23 Sep 2016	21 Oct 2016			Yes
10-Ot-Rad	Oca	Wet/fresh	Stem	Radial	1-10	15 Sep 2016	23 Sep 2016	30 Nov 2016			Yes
11-Pe-TransC	Jicama	Wet/fresh	Root	Transverse Center	1-11	15 Sep 2016	23 Sep 2016	30 Nov 2016			Yes
12-Pe-TransE	Jicama	Wet/fresh	Root	Transverse Edge	1-12	15 Sep 2016	23 Sep 2016	30 Nov 2016			Yes
13-Pe-TangC	Jicama	Wet/fresh	Root	Tangential Center		15 Sep 2016	30 Sep 2016	2 Dec 2016			
14-Pe-TangE	Jicama	Wet/fresh	Root	Tangential Edge		15 Sep 2016	30 Sep 2016	30 Nov 2016			
15-Pe-Rad	Jicama	Wet/fresh	Root	Radial		15 Sep 2016	30 Sep 2016	30 Nov 2016			
16-Ss-TransC	Yacon	Wet/fresh	Root	Transverse Center		15 Sep 2016	30 Sep 2016	30 Nov 2016			
17-Ss-TransE	Yacon	Wet/fresh	Root	Transverse Edge		15 Sep 2016	28 Oct 2016	30 Nov 2016			
18-Ss-TangC	Yacon	Wet/fresh	Root	Tangential Center		15 Sep 2016	28 Oct 2016	30 Nov 2016			
19-Ss-TangE	Yacon	Wet/fresh	Root	Tangential Edge		15 Sep 2016	28 Oct 2016	2 Dec 2016			
20-Ss-Rad	Yacon	Wet/fresh	Root	Radial		15 Sep 2016	28 Oct 2016	2 Dec 2016			
21-Sa-TransC	Papa	Wet/fresh	Stem	Transverse Center		14 Oct 2016	4 Nov 2016	2 Dec 2016			
22-Sa-TransE	Papa	Wet/fresh	Stem	Transverse Edge		14 Oct 2016	4 Nov 2016	2 Dec 2016			
23-Sa-TangC	Papa	Wet/fresh	Stem	Tangential Center		14 Oct 2016	4 Nov 2016	2 Dec 2016			
24-Sa-TangE	Papa	Wet/fresh	Stem	Tangential Edge		14 Oct 2016	4 Nov 2016	2 Dec 2016			
25-Sa-Rad	Papa	Wet/fresh	Stem	Radial		14 Oct 2016	4 Nov 2016	2 Dec 2016			
26-Tt-TransC	Mashua	Wet/fresh	Root	Transverse Center		14 Oct 2016	4 Nov 2016	2 Dec 2016			
27-Tt-TransE	Mashua	Wet/fresh	Root	Transverse Edge		14 Oct 2016	4 Nov 2016	2 Dec 2016			
28-Tt-TangC	Mashua	Wet/fresh	Root	Tangential Center		14 Oct 2016	4 Nov 2016	2 Dec 2016			
29-Tt-TangE	Mashua	Wet/fresh	Root	Tangential Edge		14 Oct 2016	18 Nov 2016	2 Dec 2016			
30-Tt-Rad	Mashua	Wet/fresh	Root	Radial		14 Oct 2016	18 Nov 2016	2 Dec 2016			
31-Ut-TransC	Papalisa	Wet/fresh	Root	Transverse Center		14 Oct 2016	18 Nov 2016	6 Dec 2016			

Specimen ID	Common name	Sample type	Stem/ Root	Orientation	Box #/ Stub #	Date Prepped	Date Processed in ELM	Date Imaged on SEM	Temp (Deg.)	Furnace Time (Hours)	Sputter Coated
32-Ut-TransE	Papalisa	Wet/fresh	Root	Transverse Edge		14 Oct 2016	18 Nov 2016	6 Dec 2016			
33-Ut-TangC	Papalisa	Wet/fresh	Root	Tangential Center		14 Oct 2016	18 Nov 2016	6 Dec 2016			
34-Ut-TangE	Papalisa	Wet/fresh	Root	Tangential Edge		14 Oct 2016	18 Nov 2016	6 Dec 2016			
35-Ut-Rad	Papalisa	Wet/fresh	Root	Radial		14 Oct 2016	18 Nov 2016	6 Dec 2016			
36-Lm-Trans1	Maca	Carbonized	Root	Transverse		21 Oct 2016		6 Dec 2016	250	2.5	
37-Lm-Trans2	Maca	Carbonized	Root	Transverse		21 Oct 2016			250	3.5	
38-Lm-Tang1	Maca	Carbonized	Root	Tangential		21 Oct 2016		6 Dec 2016	250	2.5	
39-Lm-Tang2	Maca	Carbonized	Root	Tangential		21 Oct 2016			250	3.5	
40-Lm-Rad1	Maca	Carbonized	Root	Radial		21 Oct 2016			250	2.5	
41-Lm-Rad2	Maca	Carbonized	Root	Radial		21 Oct 2016			250	3.5	
42-Ot-Tang1	Oca	Carbonized	Stem	Tangential		21 Oct 2016			250	2.5	
43-Ot-Tang2	Oca	Carbonized	Stem	Tangential		21 Oct 2016			250	3.5	
44-Ot-Trans1	Oca	Carbonized	Stem	Transverse		21 Oct 2016			250	2.5	
45-Ot-Trans2	Oca	Carbonized	Stem	Transverse		21 Oct 2016			250	3.5	
46-Ot-Rad1	Oca	Carbonized	Stem	Radial		21 Oct 2016		8 Dec 2016	250	2.5	
47-Ot-Rad2	Oca	Carbonized	Stem	Radial		21 Oct 2016			250	3.5	
48-Pe-Trans1	Jicama	Carbonized	Root	Transverse		21 Oct 2016			250	2.5	
49-Pe-Trans2	Jicama	Carbonized	Root	Transverse		21 Oct 2016			250	3.5	
50-Pe-Tang1	Jicama	Carbonized	Root	Tangential		21 Oct 2016		8 Dec 2016	250	2.5	
51-Pe-Tang2	Jicama	Carbonized	Root	Tangential		21 Oct 2016			250	3.5	
52-Ss-Trans1	Yacon	Carbonized	Root	Transverse		21 Oct 2016			250	2.5	
53-Ss-Trans2	Yacon	Carbonized	Root	Transverse		21 Oct 2016			250	3.5	
54-Ss-Tang1	Yacon	Carbonized	Root	Tangential		21 Oct 2016		8 Dec 2016	250	2.5	
55-Ss-Tang2	Yacon	Carbonized	Root	Tangential		21 Oct 2016			250	3.5	
56-Sa-Trans1	Papa	Carbonized	Stem	Transverse		21 Oct 2016		8 Dec 2016	250	2.5	
57-Sa-Trans2	Papa	Carbonized	Stem	Transverse		21 Oct 2016			250	3.5	
58-Sa-Tang1	Papa	Carbonized	Stem	Tangential		21 Oct 2016		8 Dec 2016	250	2.5	
59-Sa-Tang2	Papa	Carbonized	Stem	Tangential		21 Oct 2016			250	3.5	
60-Sa-Rad1	Papa	Carbonized	Stem	Radial		21 Oct 2016			250	2.5	
61-Sa-Rad2	Papa	Carbonized	Stem	Radial		21 Oct 2016			250	3.5	
62-Tt-Trans1	Mashua	Carbonized	Root	Transverse		21 Oct 2016		8 Dec 2016	250	2.5	
63-Tt-Trans2	Mashua	Carbonized	Root	Transverse		21 Oct 2016			250	3.5	

Specimen ID	Common name	Sample type	Stem/ Root	Orientation	Box #/ Stub #	Date Prepped	Date Processed in ELM	Date Imaged on SEM	Temp (Deg.)	Furnace Time (Hours)	Sputter Coated
64-Tt-Tang1	Mashua	Carbonized	Root	Tangential		21 Oct 2016		8 Dec 2016	250	2.5	
65-Tt-Tang2	Mashua	Carbonized	Root	Tangential		21 Oct 2016			250	3.5	
66-Tt-Rad1	Mashua	Carbonized	Root	Radial		21 Oct 2016			250	2.5	
67-Tt-Rad2	mashua	Carbonized	Root	Radial		21 Oct 2016			250	3.5	
68-Ut-Trans1	Papalisa	Carbonized	Root	Transverse		21 Oct 2016		8 Dec 2016	250	2.5	
69-Ut-Trans2	Papalisa	Carbonized	Root	Transverse		21 Oct 2016			250	3.5	
70-Ut-Tang1	Papalisa	Carbonized	Root	Tangential		21 Oct 2016			250	2.5	
71-Ut-Tang2	Papalisa	Carbonized	Root	Tangential		21 Oct 2016			250	3.5	
72-Me-TransEdge	Manioc	Wet/fresh	Stem	Transverse Edge		12 Dec 2016	13 Dec 2016	14 Dec 2016			
73-Me-TransCenter	Manioc	Wet/fresh	Stem	Transverse Center		12 Dec 2016	13 Dec 2016	14 Dec 2016			
74-Me-TangEdge	Manioc	Wet/fresh	Stem	Tangential Edge		12 Dec 2016	13 Dec 2016	14 Dec 2016			
75-MeTangCenter	Manioc	Wet/fresh	Stem	Tangential Center		12 Dec 2016	13 Dec 2016	14 Dec 2016			
76-Me-Radial	Manioc	Wet/fresh	Stem	Radial		12 Dec 2016	13 Dec 2016	14 Dec 2016			
77-Me-Trans Edge	Manioc	Carbonized	Stem	Transverse		12 Dec 2016		20 Dec 2016	250	2.5	
78-Me-Trans Edge 2	Manioc	Carbonized	Stem	Transverse		12 Dec 2016			250	3.5	
79-Me-Tang Edge	Manioc	Carbonized	Stem	Tangential		12 Dec 2016			250	3.5	
80-Me-Tang Edge 2	Manioc	Carbonized	Stem	Tangential		12 Dec 2016			250	3.5	
81-Me-Radial	Manioc	Carbonized	Stem	Radial		12 Dec 2016			250	3.5	
82-Me-Radial 2	Manioc	Carbonized	Stem	Radial		12 Dec 2016			250	2.5	
83-Ip-TransCenter	Sweet Potato	Wet/fresh	Root	Transverse Center		12 Dec 2016	13 Dec 2016	14 Dec 2016			
84-Ip-TransEdge	Sweet Potato	Wet/fresh	Root	Transverse Edge		12 Dec 2016	13 Dec 2016	14 Dec 2016			
85-Ip-TangCenter	Sweet Potato	Wet/fresh	Root	Tangential Center		12 Dec 2016	13 Dec 2016	14 Dec 2016			
86-Ip-TangEdge	Sweet Potato	Wet/fresh	Root	Tangential Edge		12 Dec 2016	13 Dec 2016	14 Dec 2016			
87-Ip-Radial	Sweet Potato	Wet/fresh	Root	Radial		12 Dec 2016	13 Dec 2016	14 Dec 2016			
88-Ip-Trans	Sweet Potato	Carbonized	Root	Transverse		12 Dec 2016		20 Dec 2016	250	2.5	
89-Ip-Trans 2	Sweet Potato	Carbonized	Root	Transverse		12 Dec 2016			250	2.5	
90-Ip-Tang	Sweet Potato	Carbonized	Root	Tangential		12 Dec 2016		20 Dec 2016	250	2.5	
91-Ip-Tang 2	Sweet Potato	Carbonized	Root	Tangential		12 Dec 2016			250	3.5	
92-Ip-Radial	Sweet Potato	Carbonized	Root	Radial		12 Dec 2016			250	2.5	

Ip=Ipomoea batatas (CONVULVULACEAE)
Ot=Oxalis tuberosa (OXALIDACEAE)
Lm=Lepidium meyenii (BRASSICACEAE)
Me=Manihot esculenta (EUPHORBIACEAE)
Pe=Pachyrzus erosus (FABACEAE)
Ss=Smallanthus sonchifolius (ASTERACEAE)
Sa=Solanum (SOLANACEAE)
Tt=Tropaeolum tuberosum (TROPAEOLACEAE)
Ut=Ullucus tuberosus (BASELLACEAE)
Trans=Tangential
Tang=Tangential
Rad=Radial
C=Center of specimen
E=Edge of specimen (contains periderm)

Lepidium meyenii

2 cm

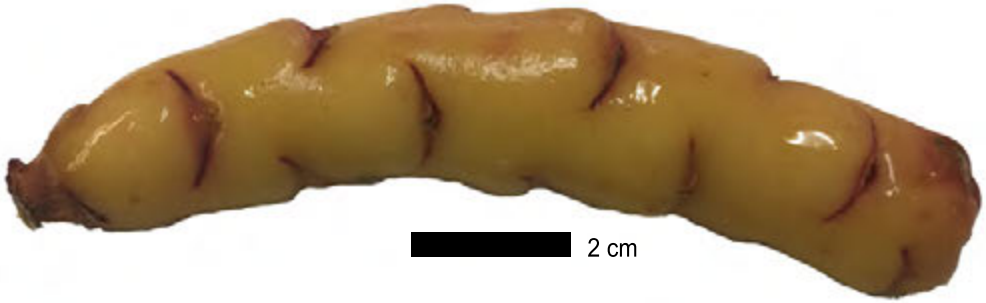
Solanum

2 cm

Pachyrhizus erosus

2 cm

Oxalis tuberosa



2 cm

Ullucus tuberosus

2 cm

Smallanthus sonchifolius

2 cm

Tropaeolum tuberosum

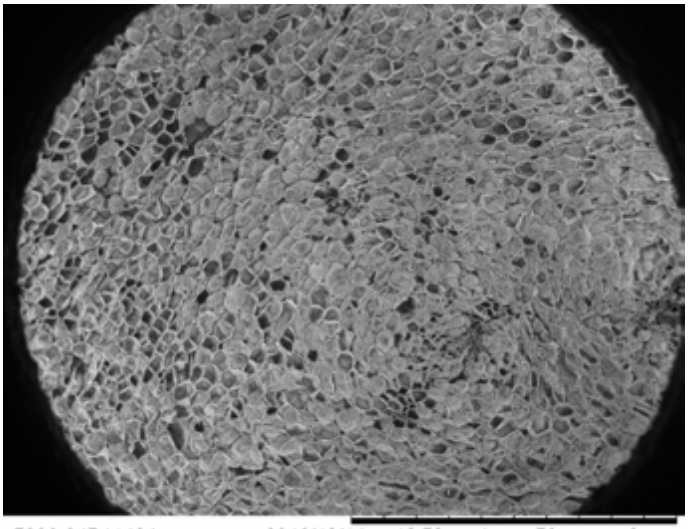
2 cm

Fresh Specimen

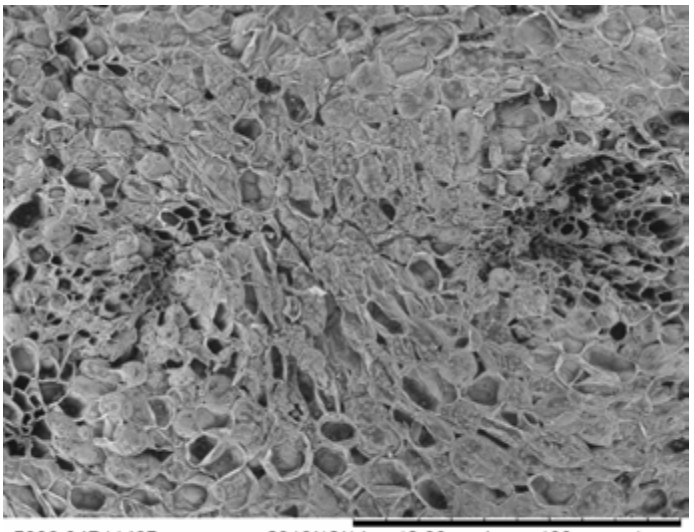
Ipomoea batatas
CONVULVULACEAE

Common Name: Sweet Potato
Sample Type: Wet/Fresh

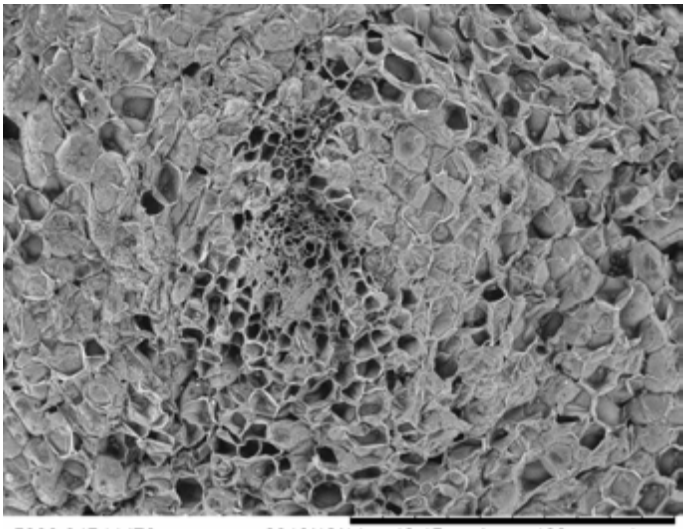
Transverse Center



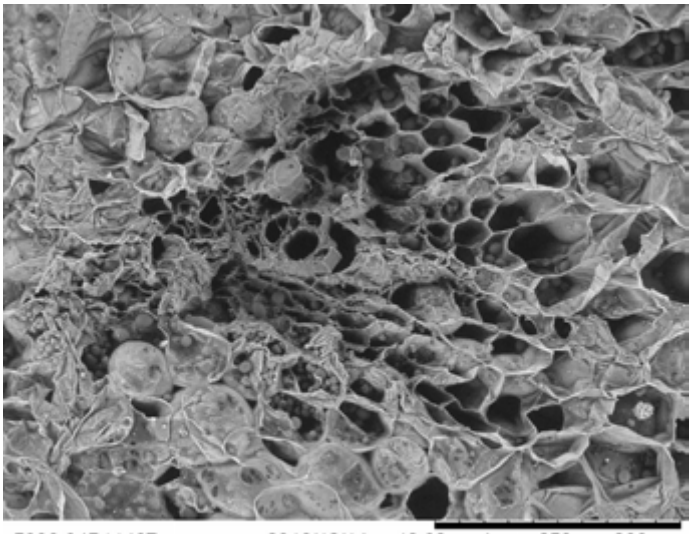
5006-04P11464 2016/12/14 12:59 L x50 2 mm



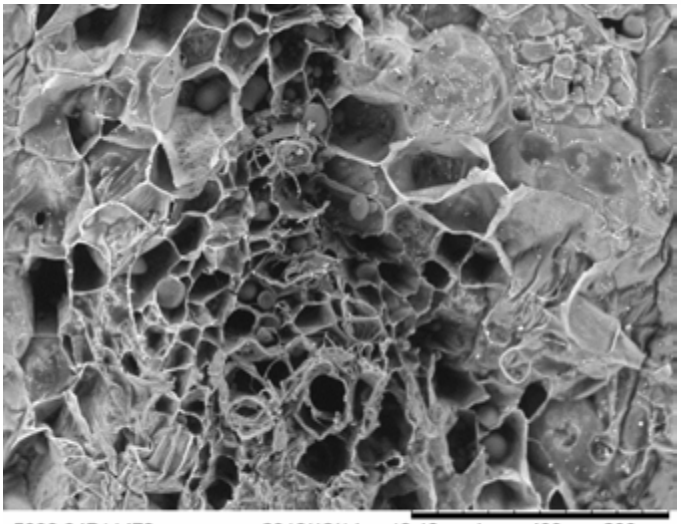
5006-04P11465 2016/12/14 13:00 L x100 1 mm



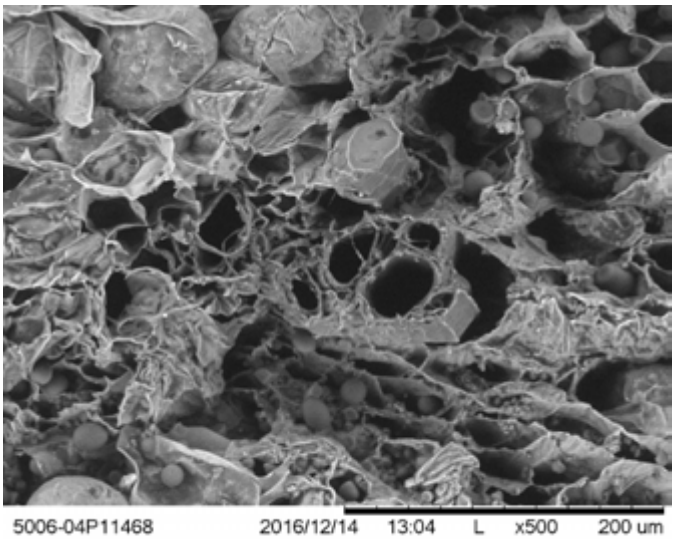
5006-04P11476 2016/12/14 13:15 L x100 1 mm



5006-04P11467 2016/12/14 13:03 L x250 300 um



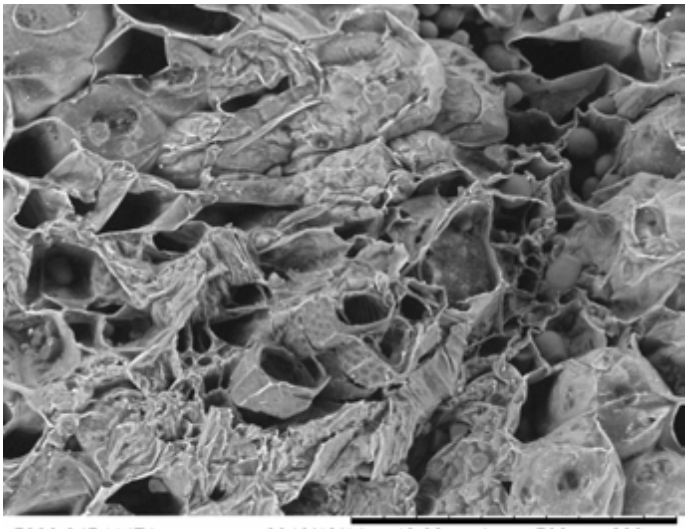
5006-04P11479 2016/12/14 13:19 L x400 200 um



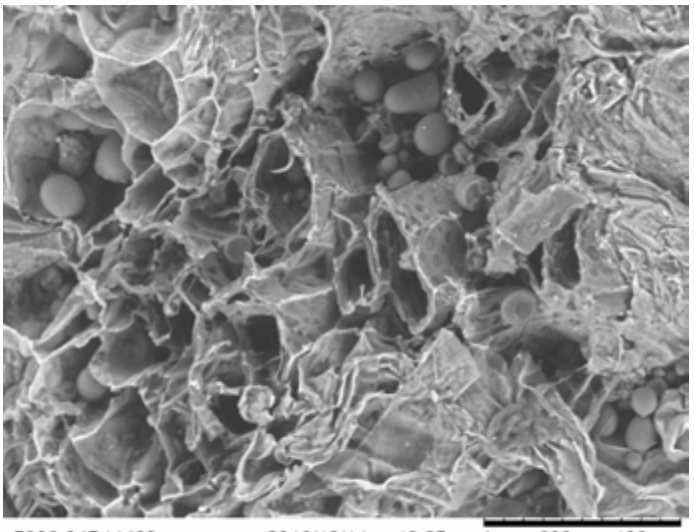
5006-04P11468 2016/12/14 13:04 L x500 200 um

Ipomoea batatas
CONVULVULACEAE

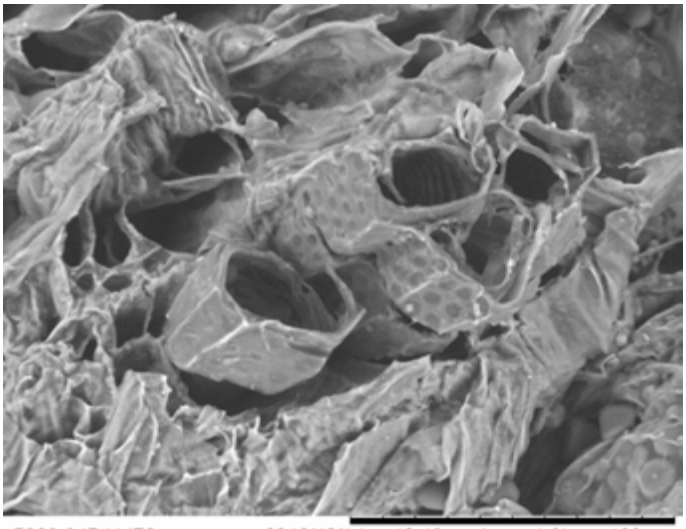
Common Name: Sweet Potato
Sample Type: Wet/Fresh



5006-04P11471 2016/12/14 13:08 L x500 200 um



5006-04P11483 2016/12/14 13:25 L x600 100 um



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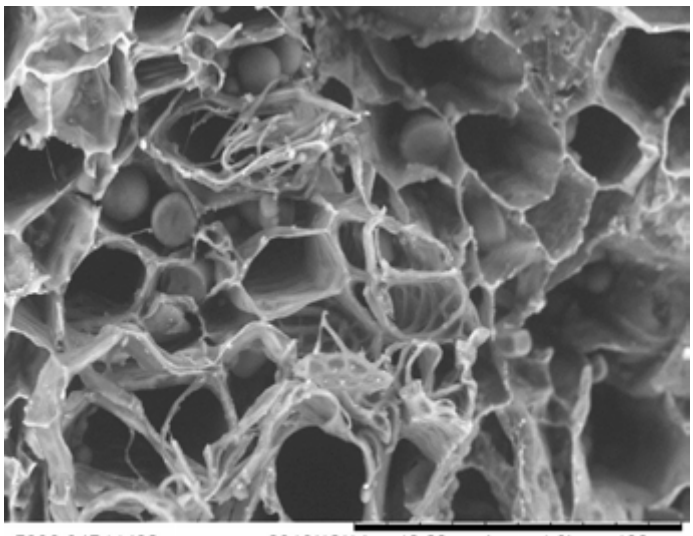

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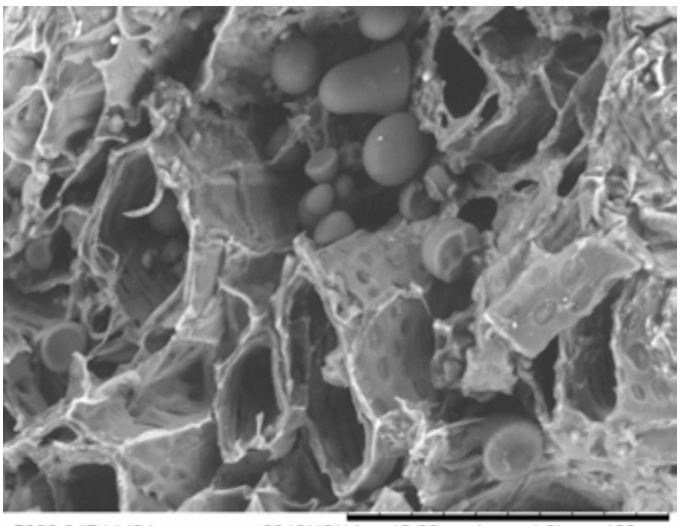
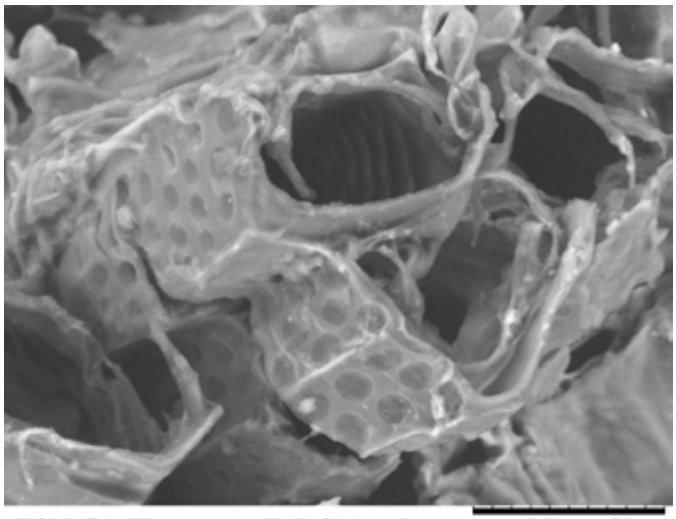


5006-04P11484 2016/12/14 13:26 L x1.0k 100 um

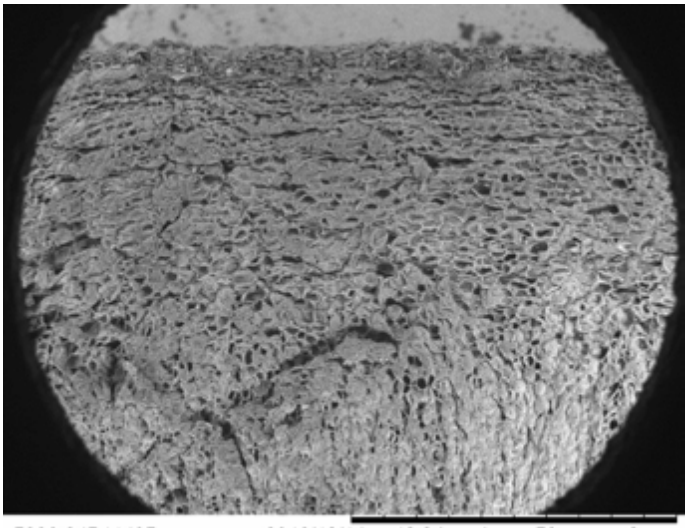


5006-04P11473 2016/12/14 13:11 L x2.0k 30 um

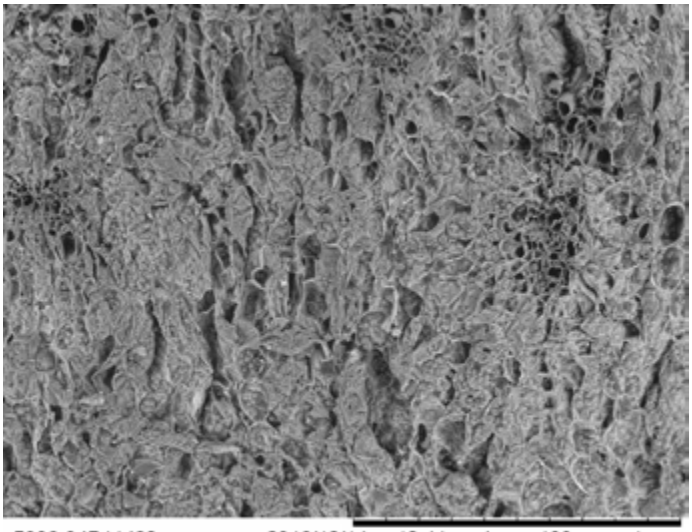
Ipomoea batatas
CONVULVULACEAE

Common Name: Sweet Potato
Sample Type: Wet/Fresh

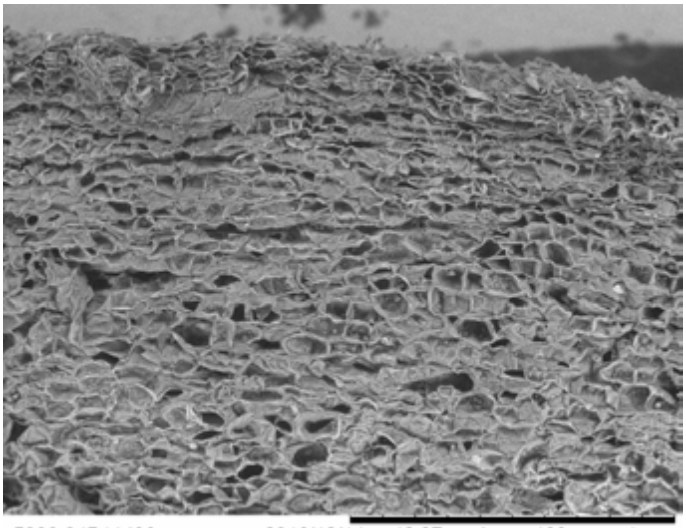
Transverse Edge



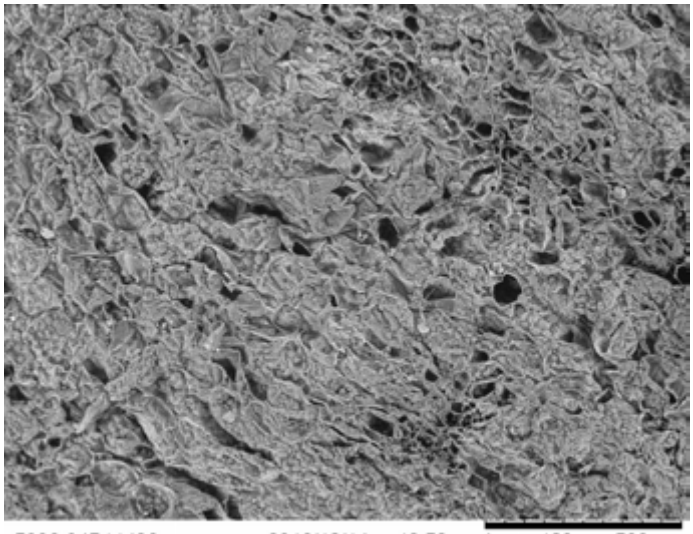
5006-04P11485 2016/12/14 13:34 L x50 2 mm



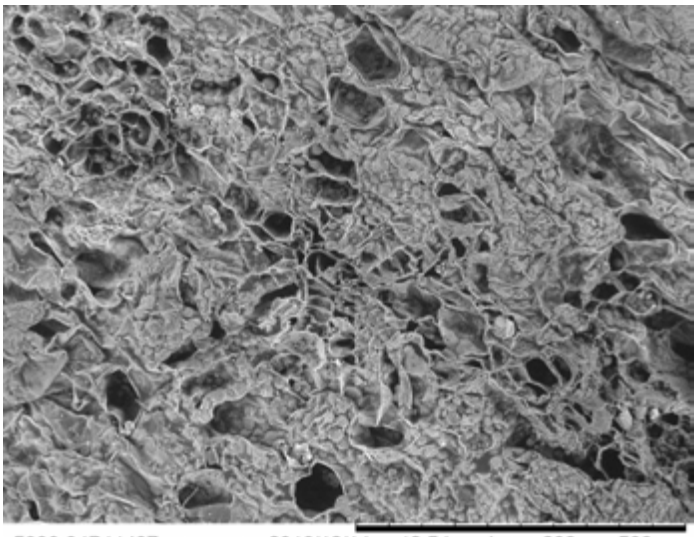
5006-04P11489 2016/12/14 13:41 L x100 1 mm



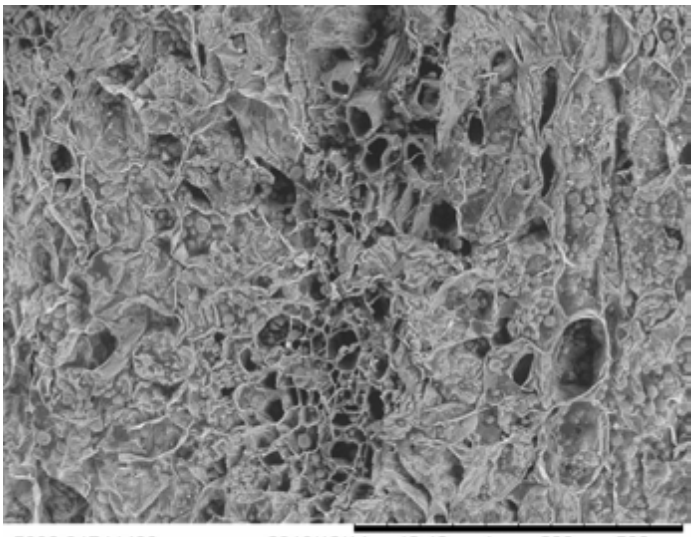
5006-04P11486 2016/12/14 13:37 L x100 1 mm



5006-04P11496 2016/12/14 13:53 L x120 500 um



5006-04P11497 2016/12/14 13:54 L x200 500 um

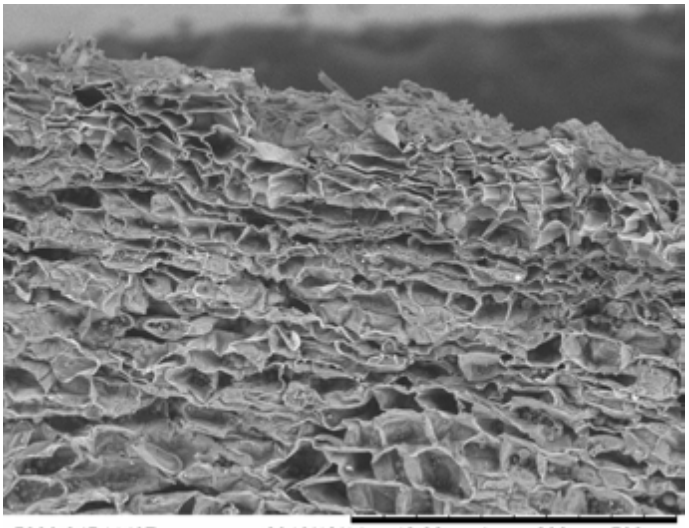


5006-04P11490 2016/12/14 13:42 L x200 500 um

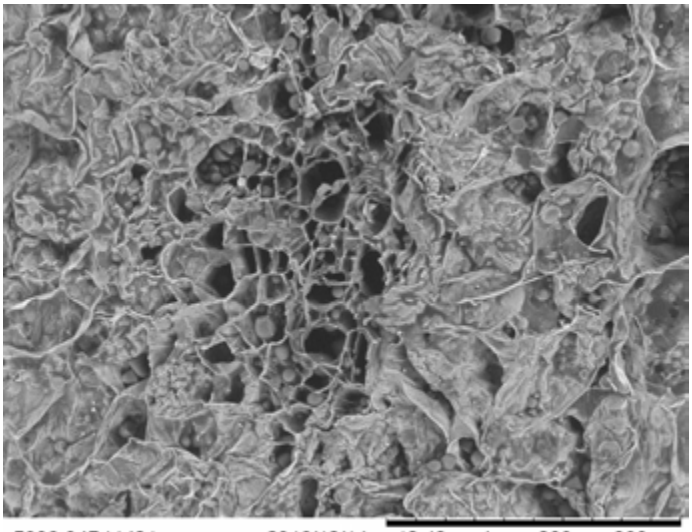
Ipomoea batatas
CONVULVULACEAE

Common Name: Sweet Potato
Sample Type: Wet/Fresh

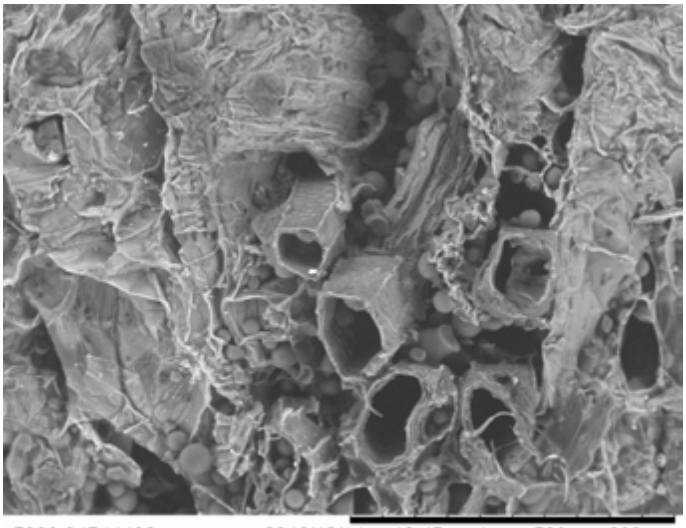
Transverse Edge (Continued)



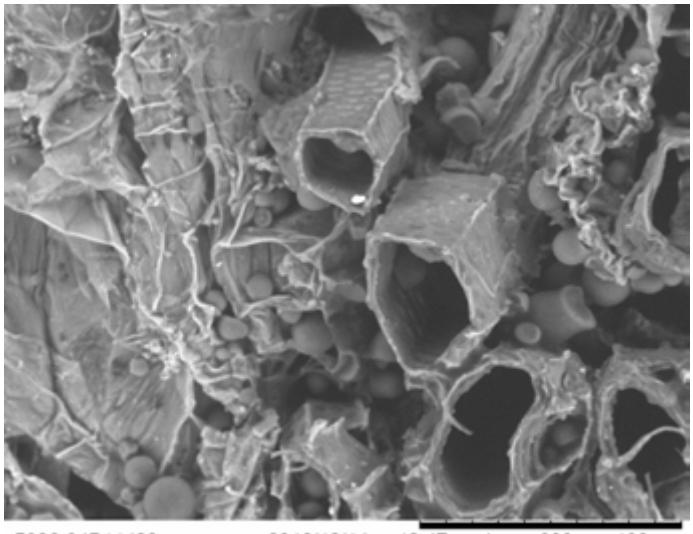
5006-04P11487 2016/12/14 13:38 L x200 500 um



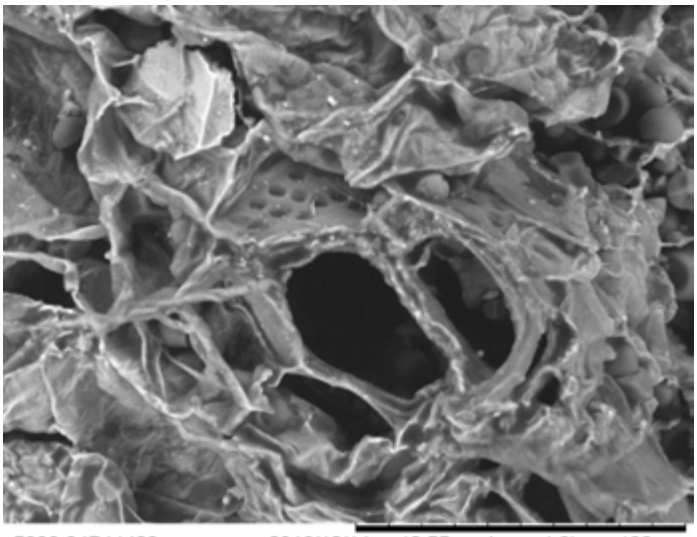
5006-04P11491 2016/12/14 13:43 L x300 300 um



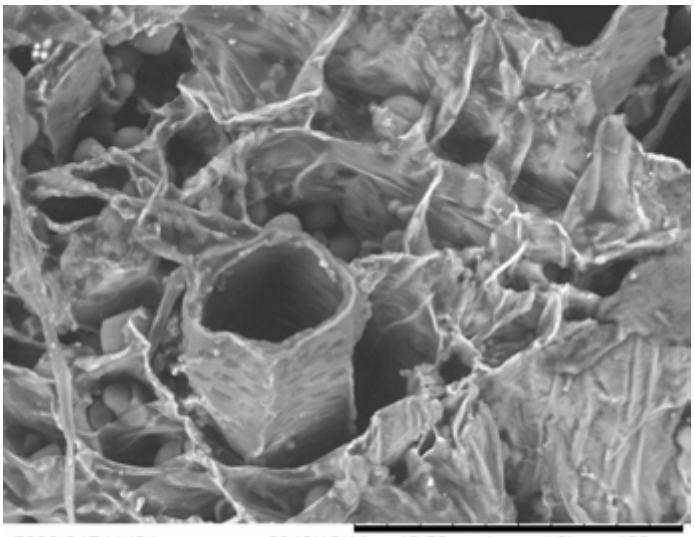
5006-04P11492 2016/12/14 13:45 L x500 200 um



5006-04P11493 2016/12/14 13:47 L x800 100 um

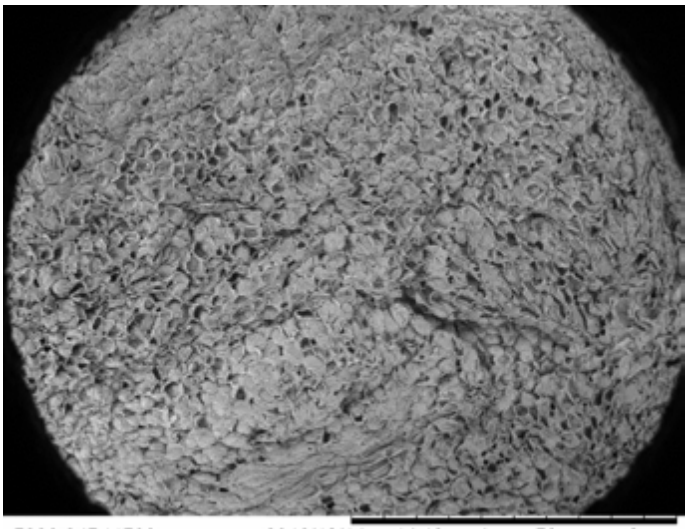


5006-04P11498 2016/12/14 13:55 L x1.0k 100 um

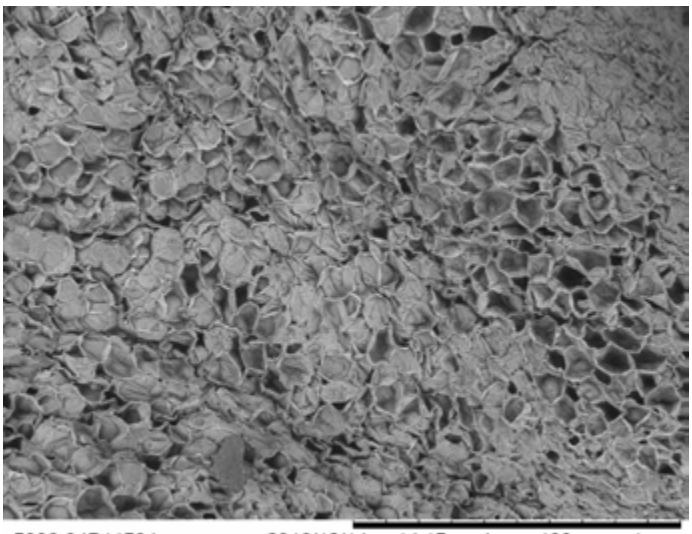


5006-04P11494 2016/12/14 13:50 L x1.0k 100 um

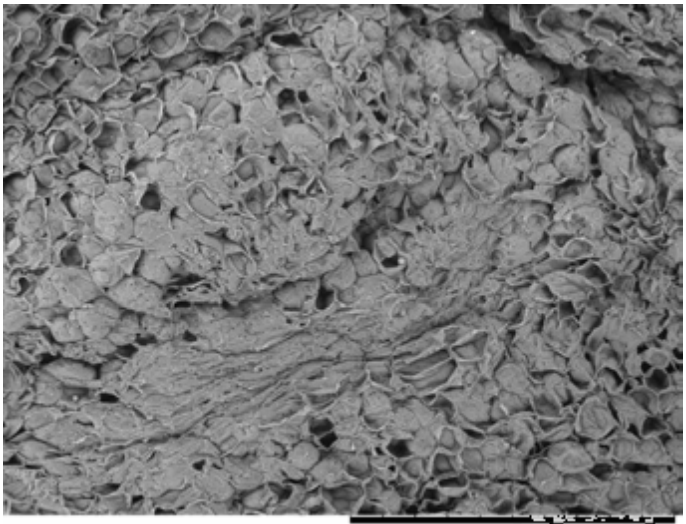
Ipomoea batatas Common Name: Sweet Potato Tangential Center
CONVULVULACEAE Sample Type: Wet/Fresh



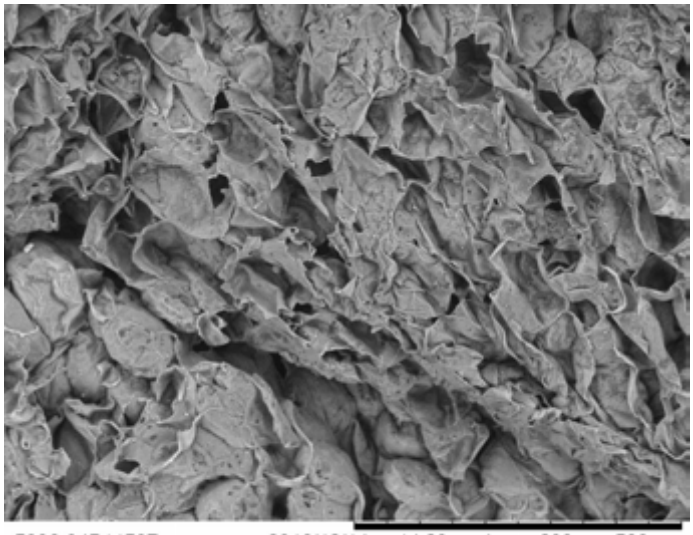
5006-04P11500 2016/12/14 14:10 L x50 2 mm



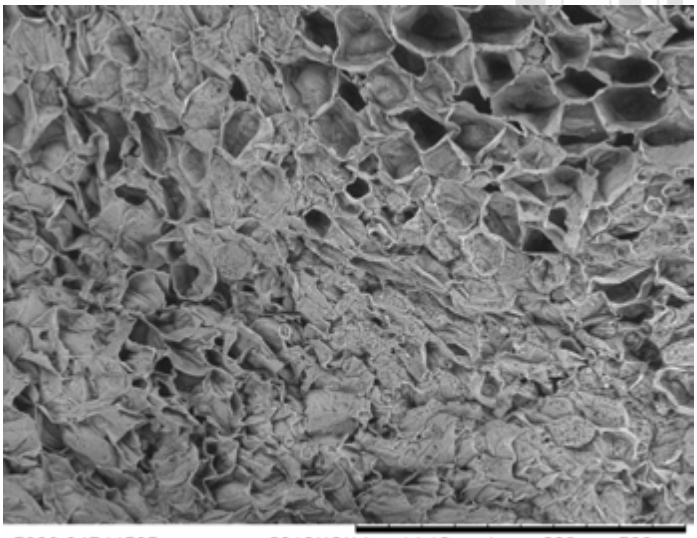
5006-04P11504 2016/12/14 14:15 L x100 1 mm



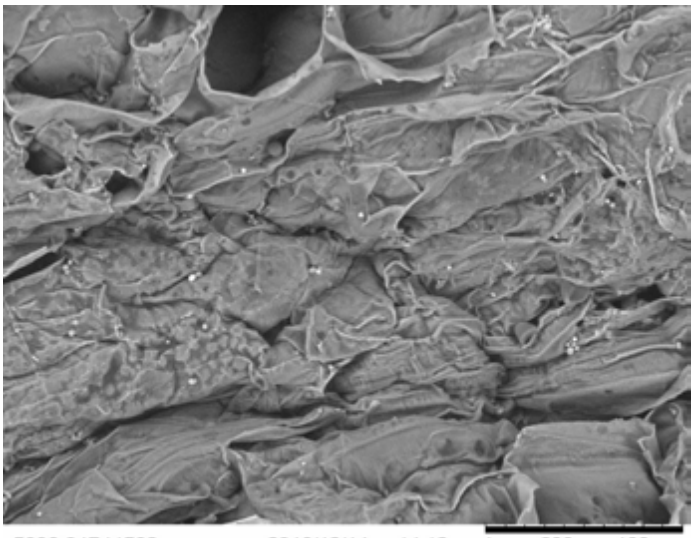
5006-04P11501 2016/12/14 14:11 L x100 1 mm



5006-04P11507 2016/12/14 14:20 L x200 500 um



5006-04P11505 2016/12/14 14:16 L x200 500 um

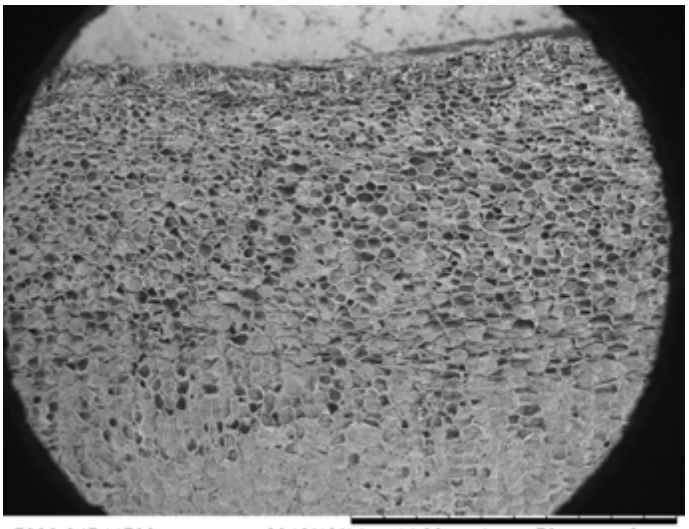


5006-04P11502 2016/12/14 14:12 L x600 100 um

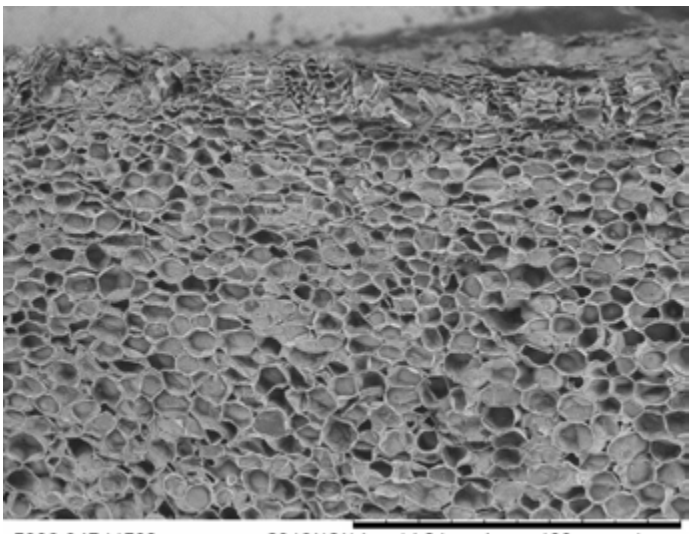
Ipomoea batatas
CONVULVULACEAE

Common Name: Sweet Potato
Sample Type: Wet/Fresh

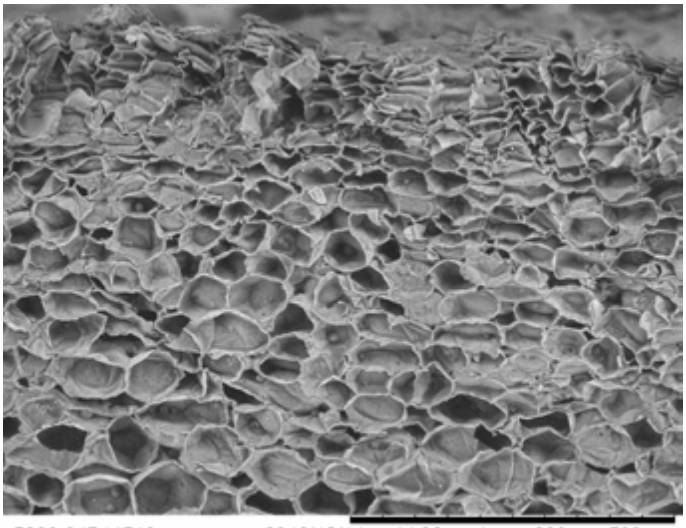
Tangential Edge



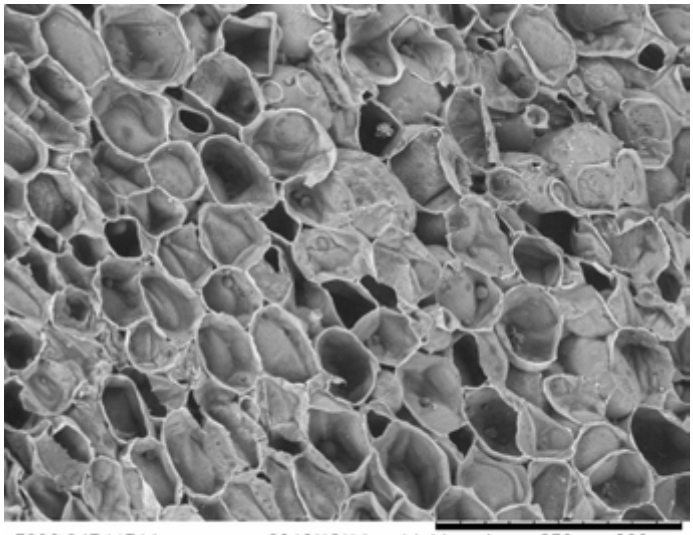
5006-04P11508 2016/12/14 14:30 L x50 2 mm



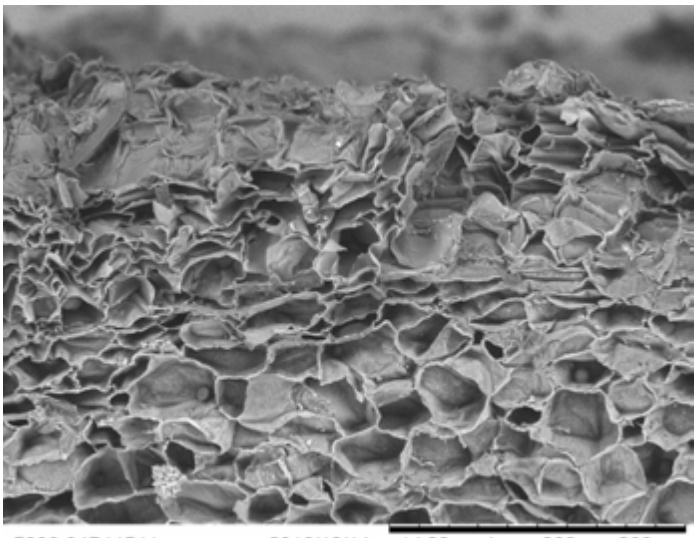
5006-04P11509 2016/12/14 14:31 L x100 1 mm



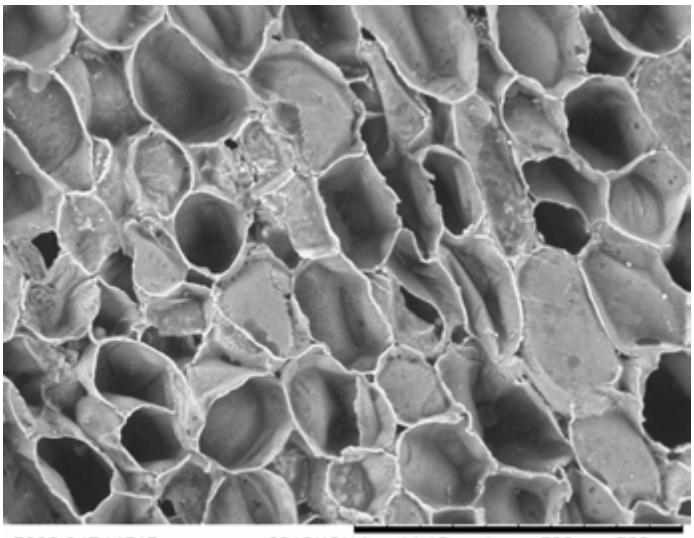
5006-04P11510 2016/12/14 14:32 L x200 500 um



5006-04P11514 2016/12/14 14:44 L x250 300 um

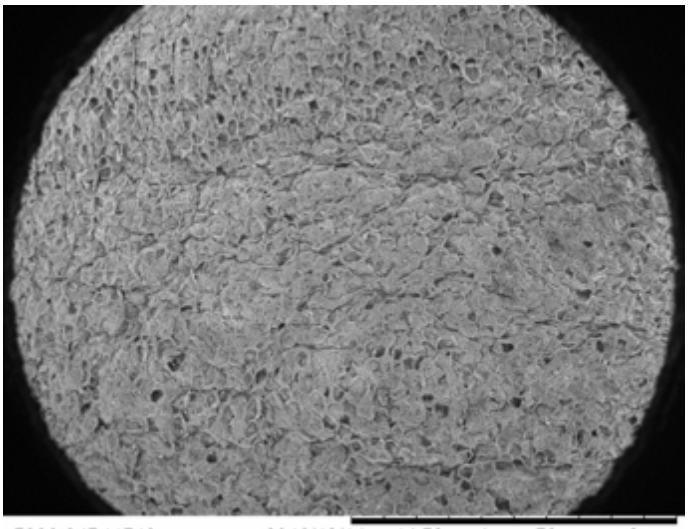


5006-04P11511 2016/12/14 14:33 L x300 300 um

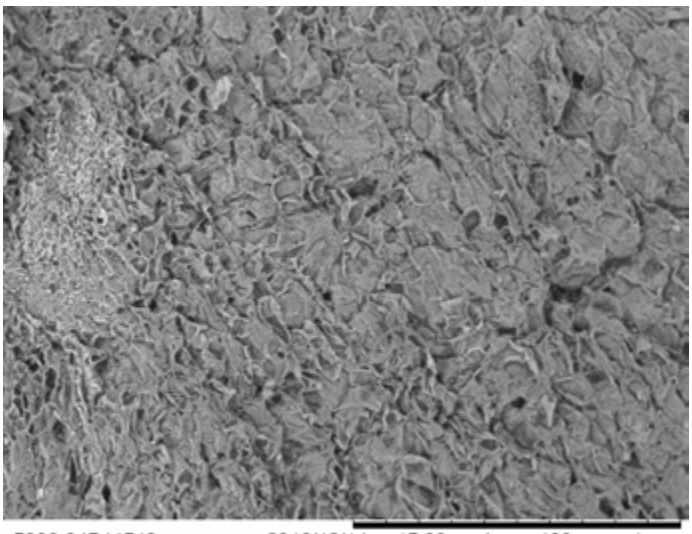


5006-04P11515 2016/12/14 14:46 L x500 200 um

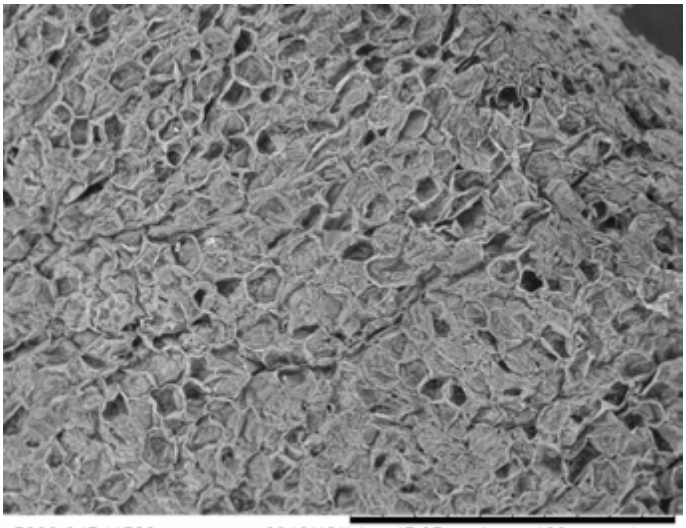
Ipomoea batatas Common Name: Sweet Potato Radial
CONVULVULACEAE Sample Type: Wet/Fresh



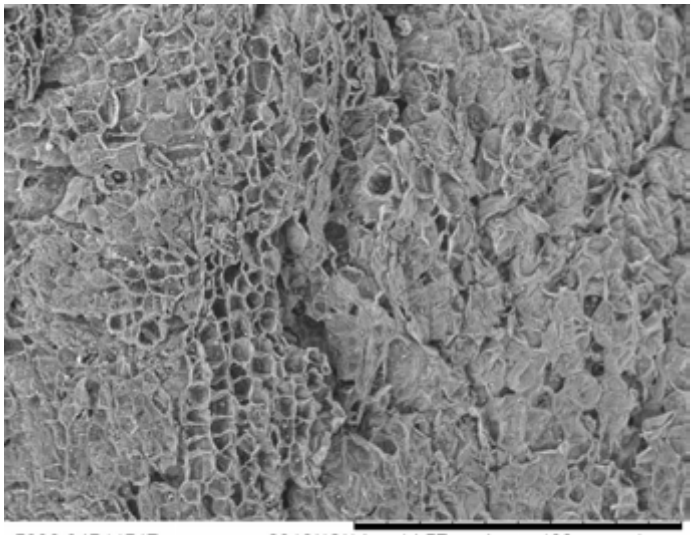
5006-04P11518 2016/12/14 14:59 L x50 2 mm



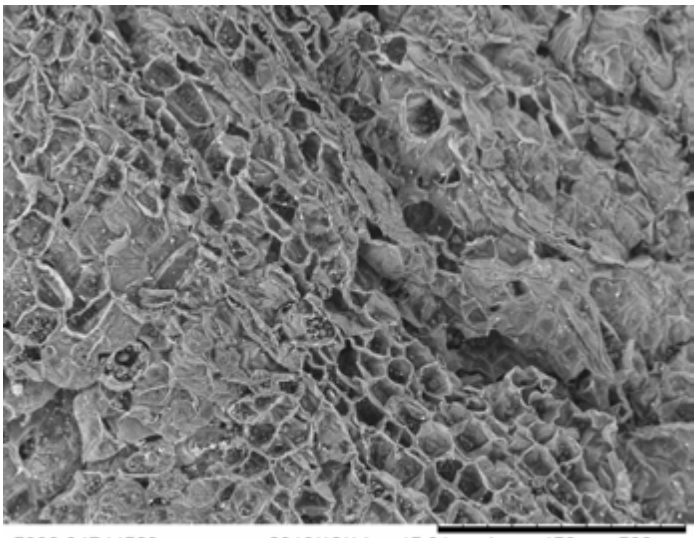
5006-04P11519 2016/12/14 15:00 L x100 1 mm



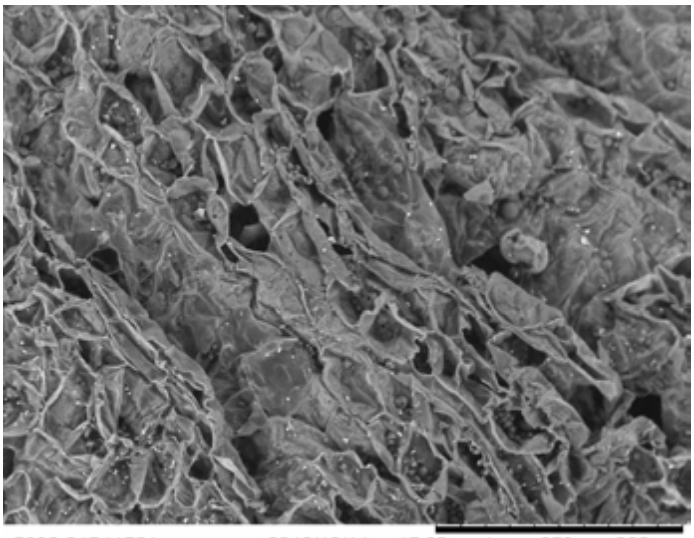
5006-04P11522 2016/12/14 15:05 L x100 1 mm



5006-04P11517 2016/12/14 14:57 L x100 1 mm



5006-04P11520 2016/12/14 15:01 L x150 500 um

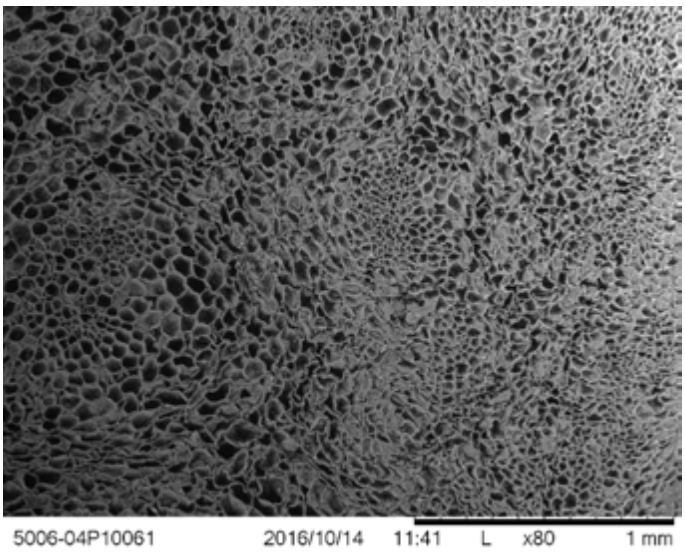


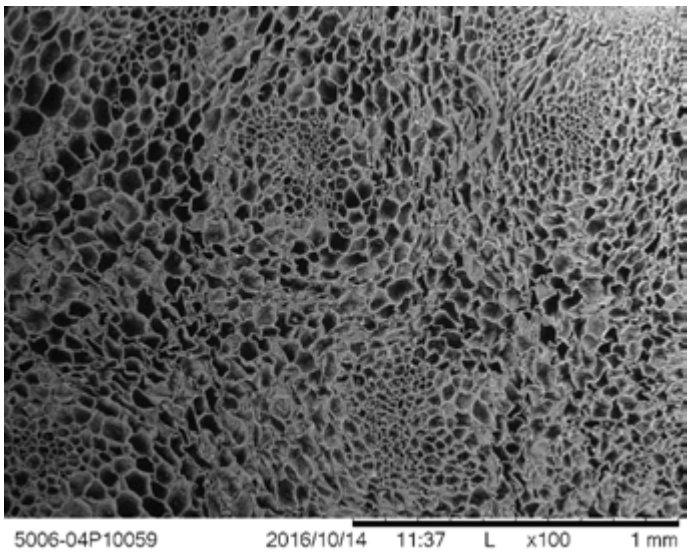
5006-04P11521 2016/12/14 15:03 L x250 300 um

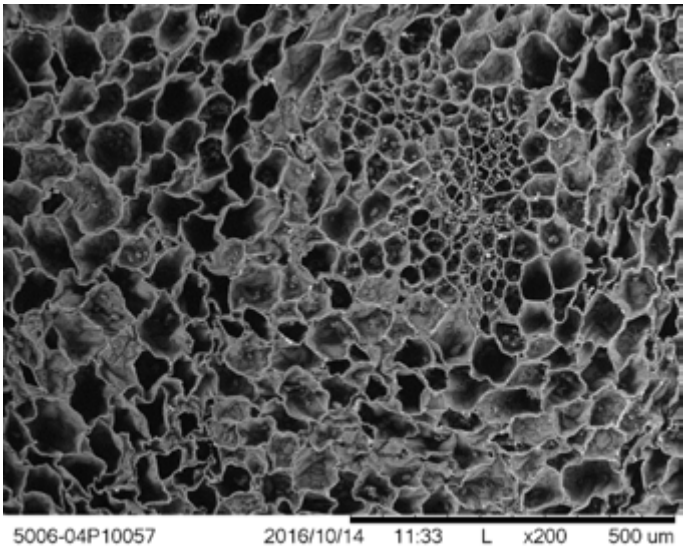
Lepidium meyenii
BRASSICACEAE

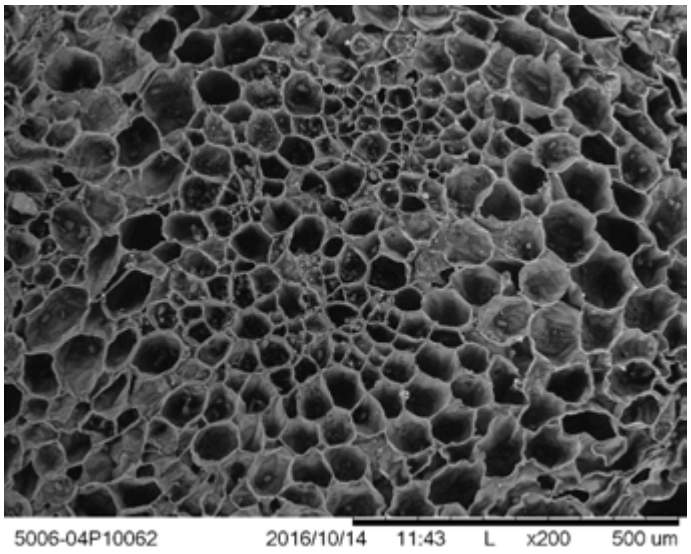
Common Name: Maca
Sample Type: Wet/Fresh

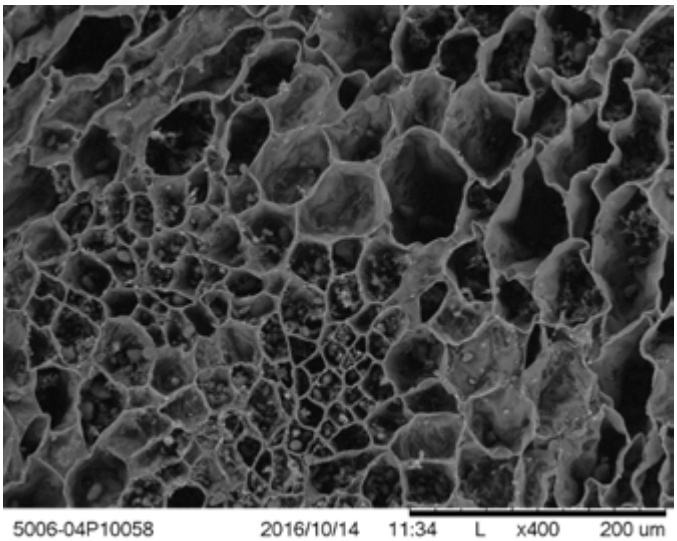
Transverse Center

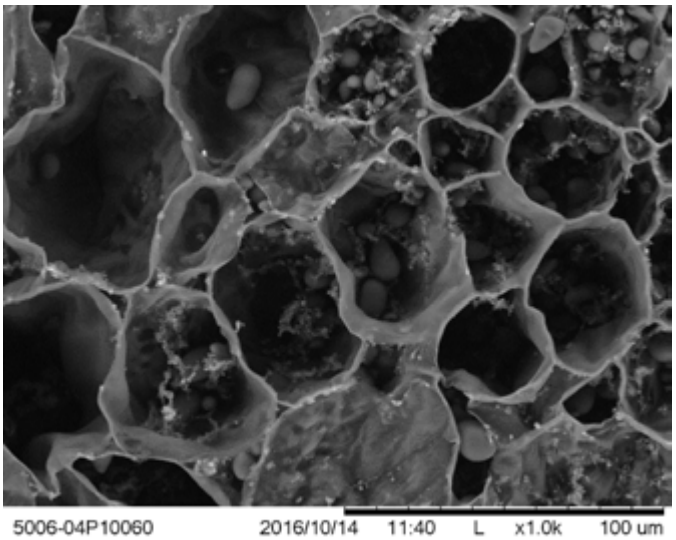








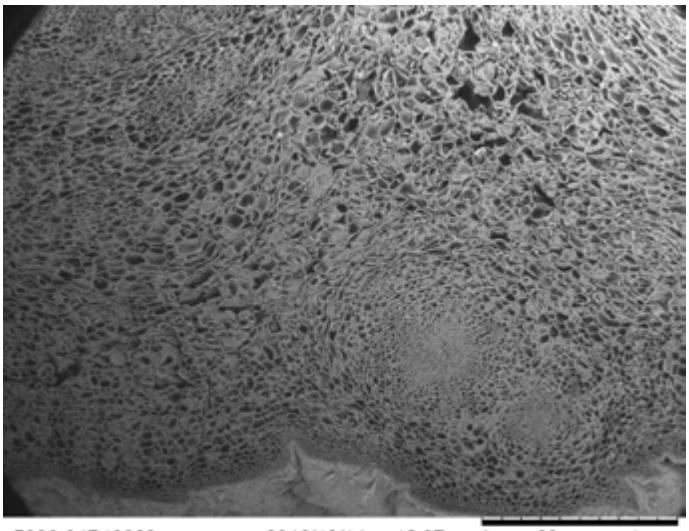


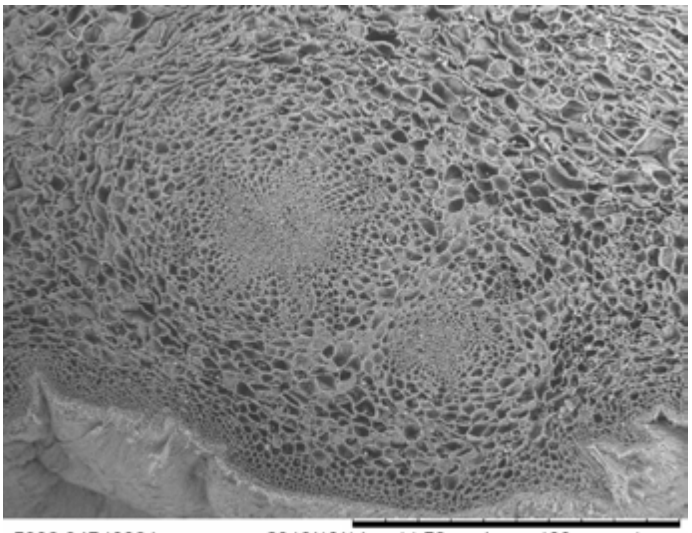


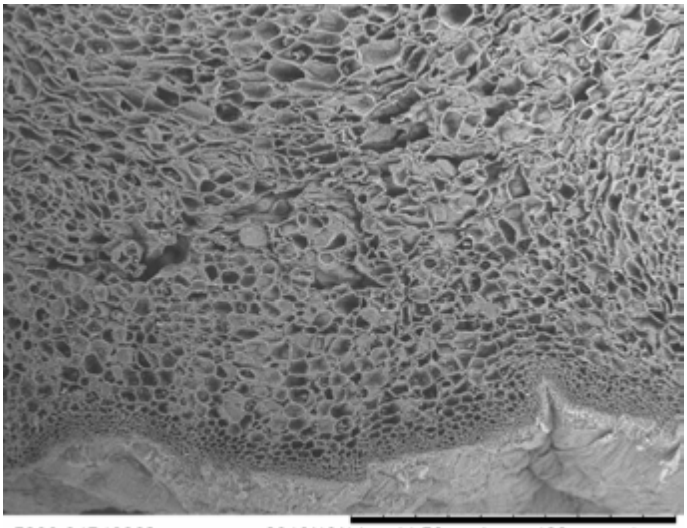
Lepidium meyenii
BRASSICACEAE

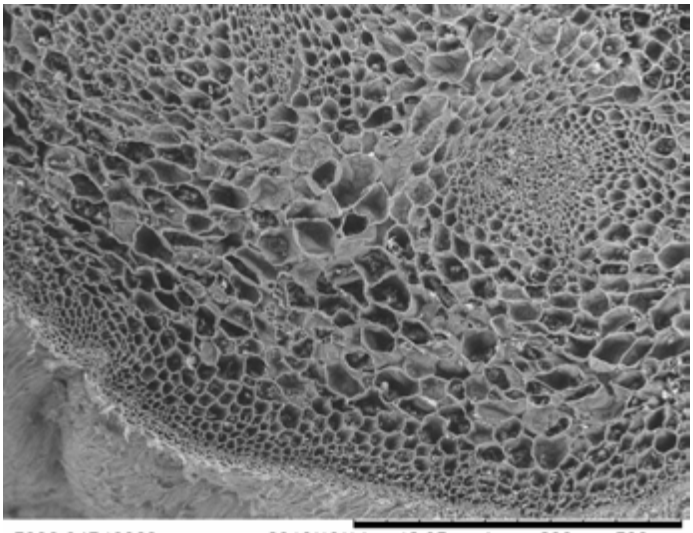
Common Name: Maca
Sample Type: Wet/Fresh

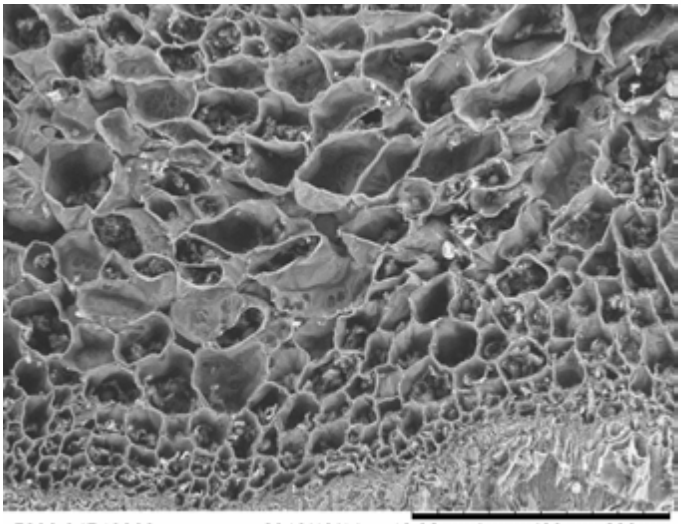
Transverse Edge

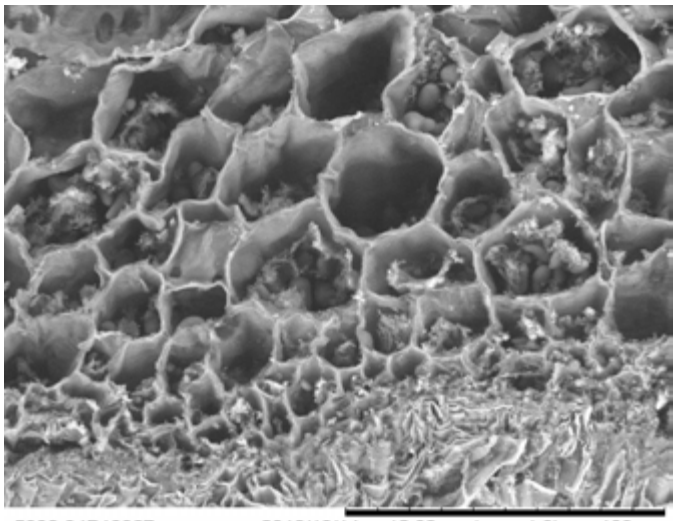








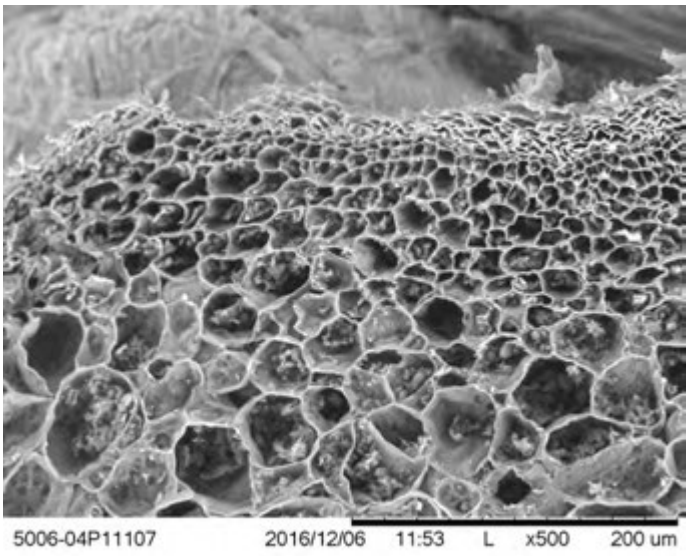


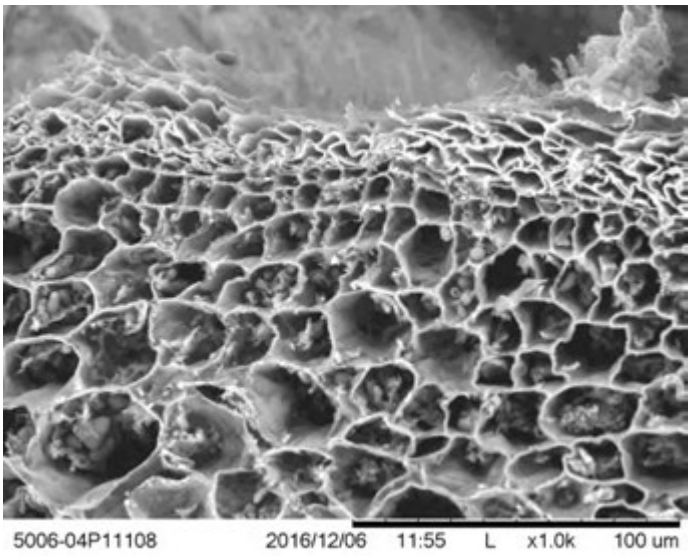


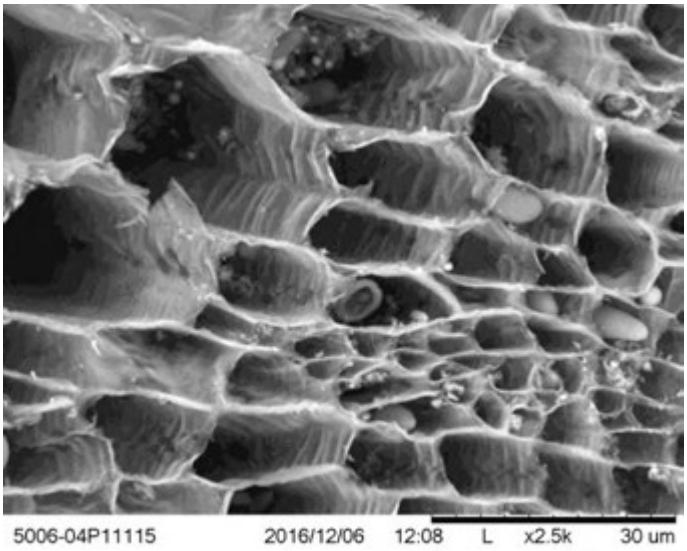
Lepidium meyenii
BRASSICACEAE

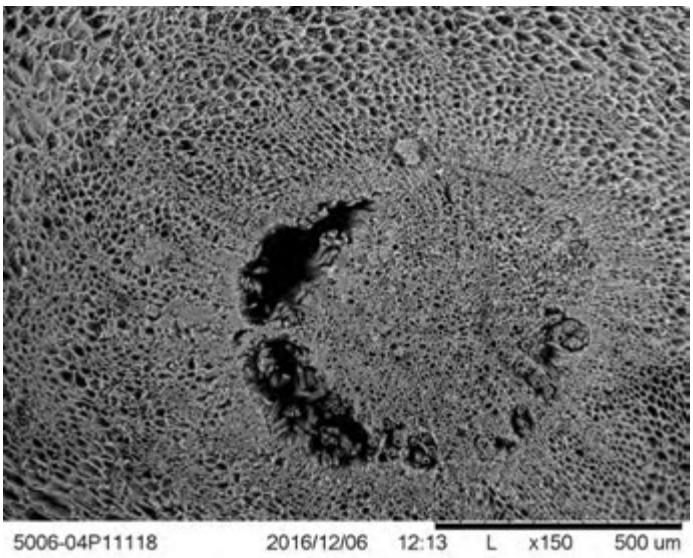
Common Name: Maca
Sample Type: Wet/Fresh

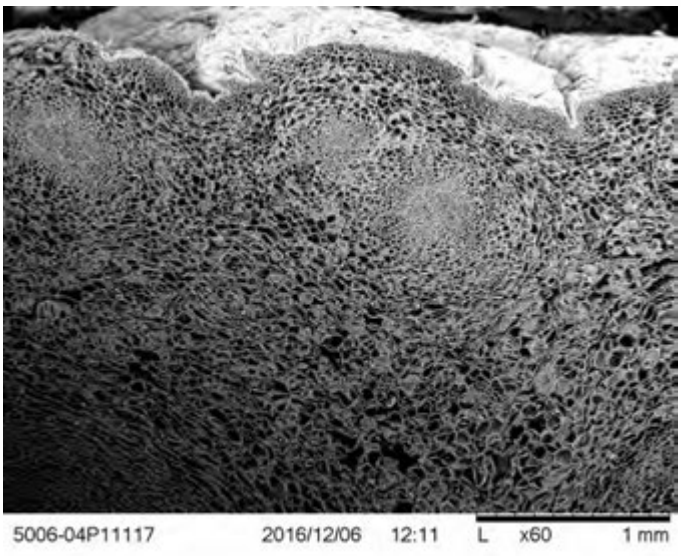
Transverse Edge (Continued)

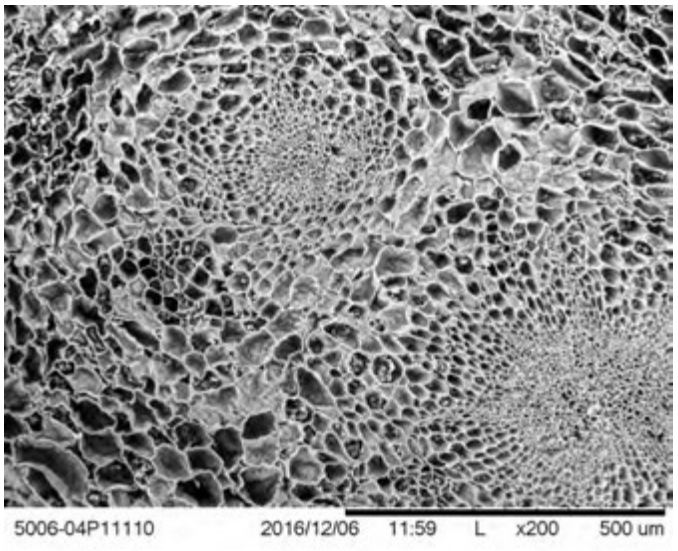




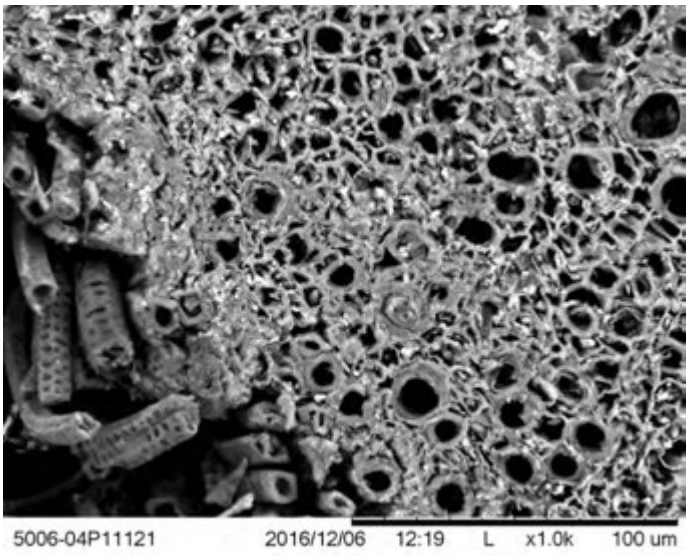


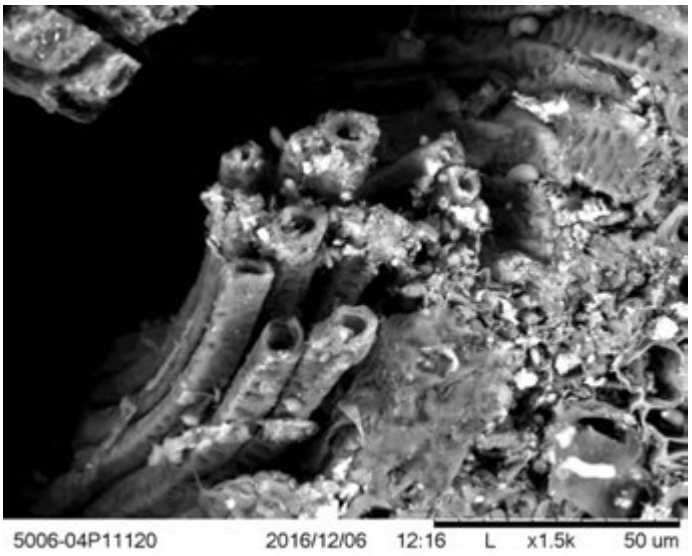


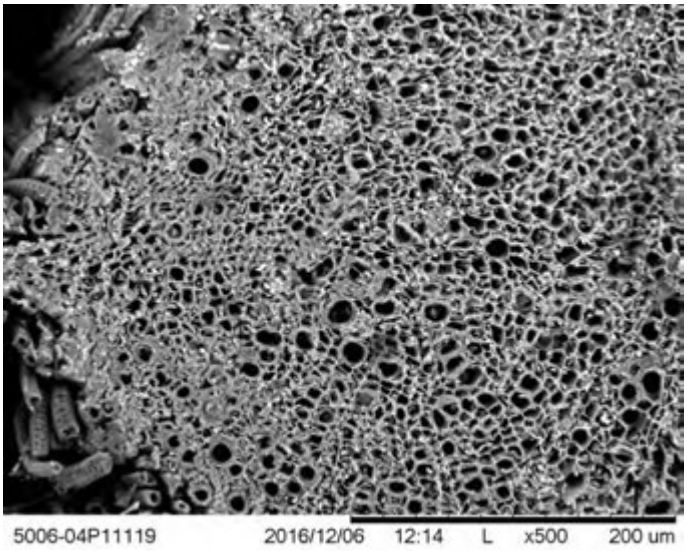


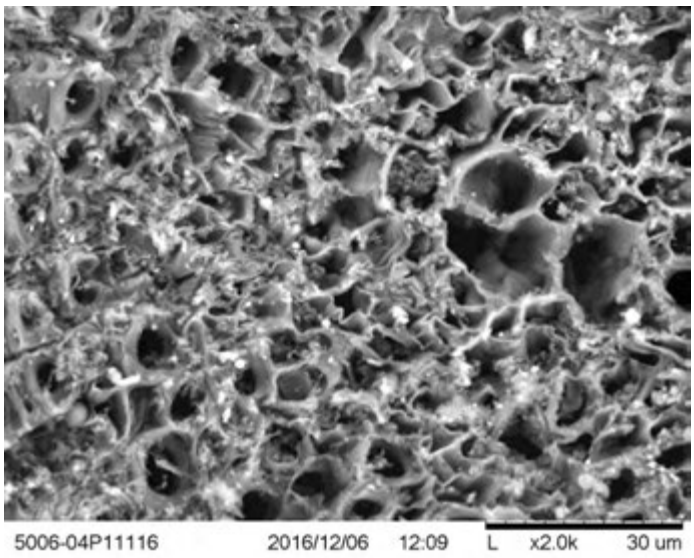


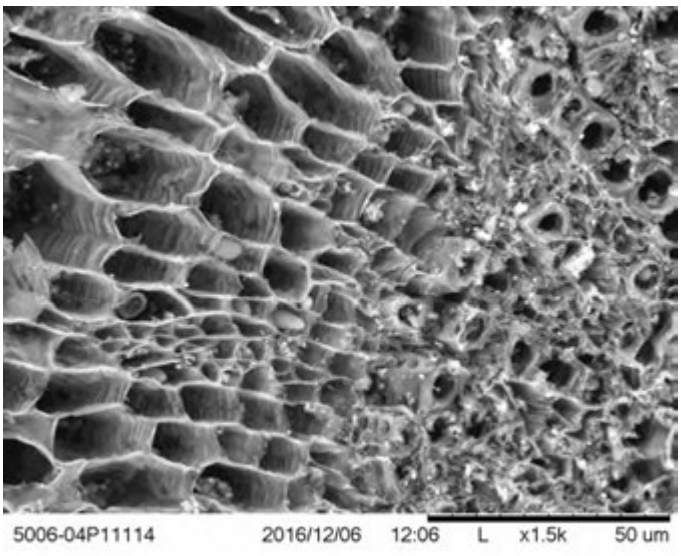
Lepidium meyenii Common Name: Maca Transverse Edge (Continued 2)
BRASSICACEAE Sample Type: Wet/Fresh

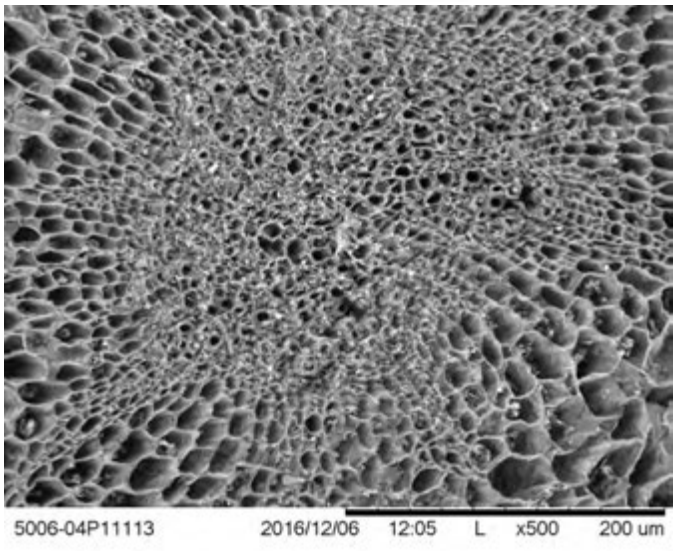




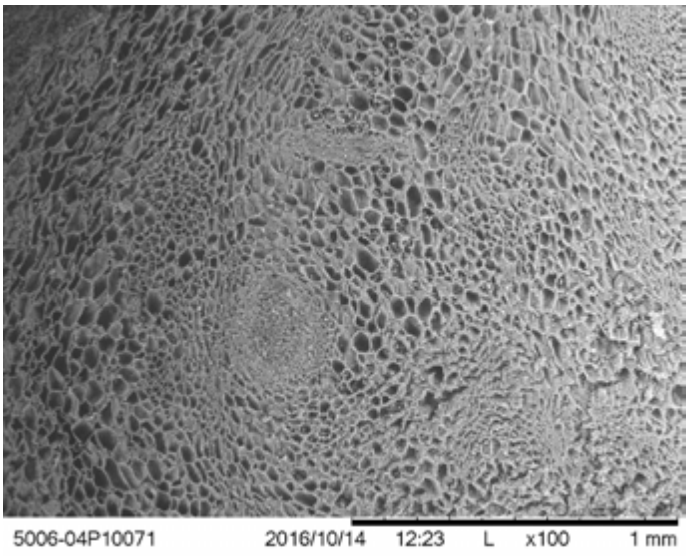


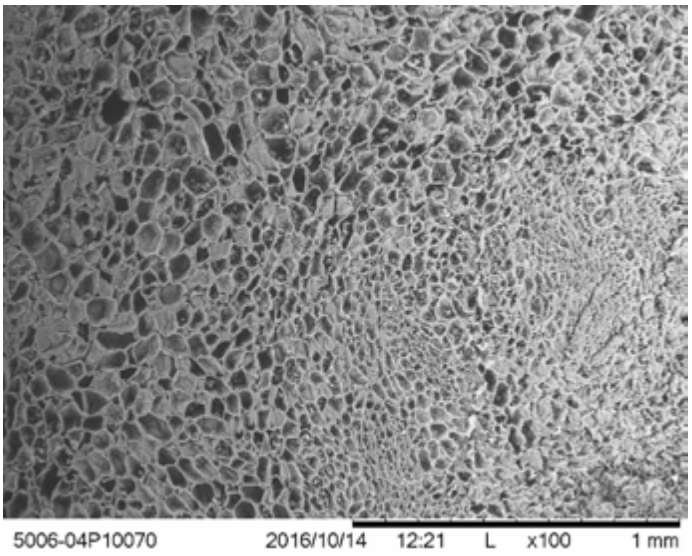


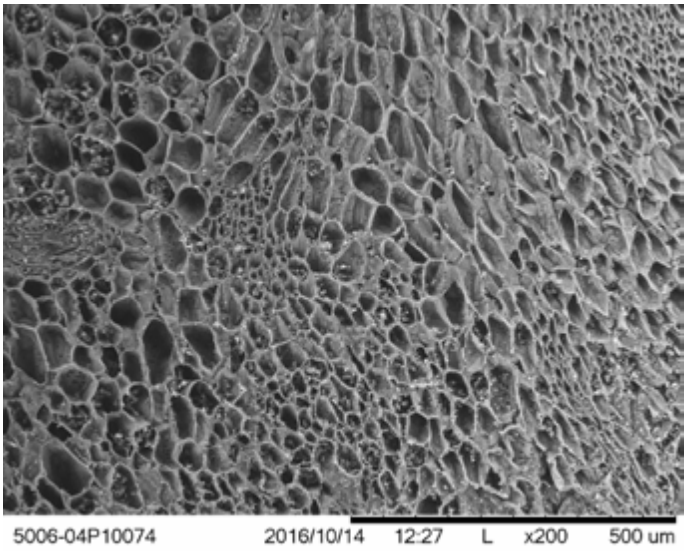


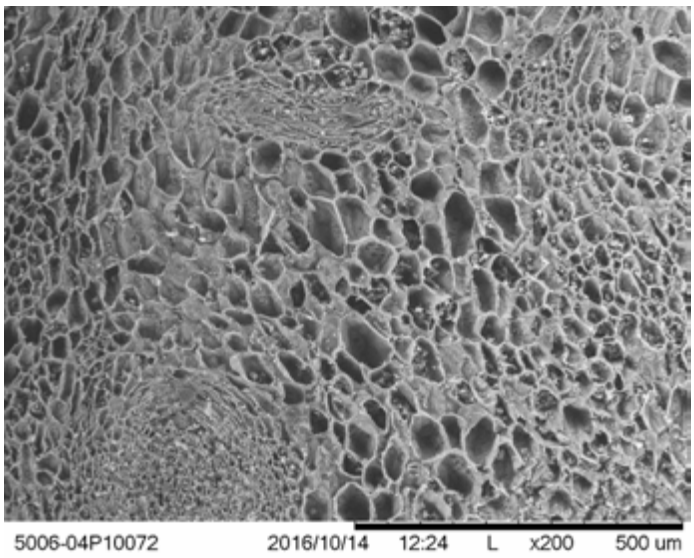


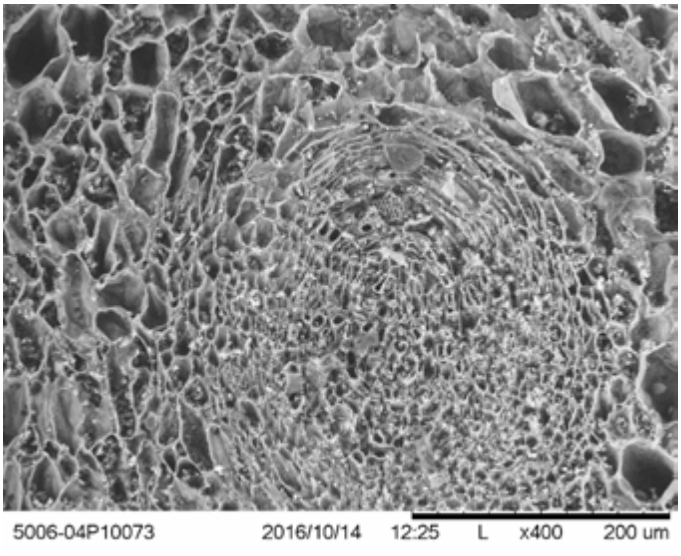
Lepidium meyenii Common Name: Maca Tangential Center
BRASSICACEAE Sample Type: Wet/Fresh

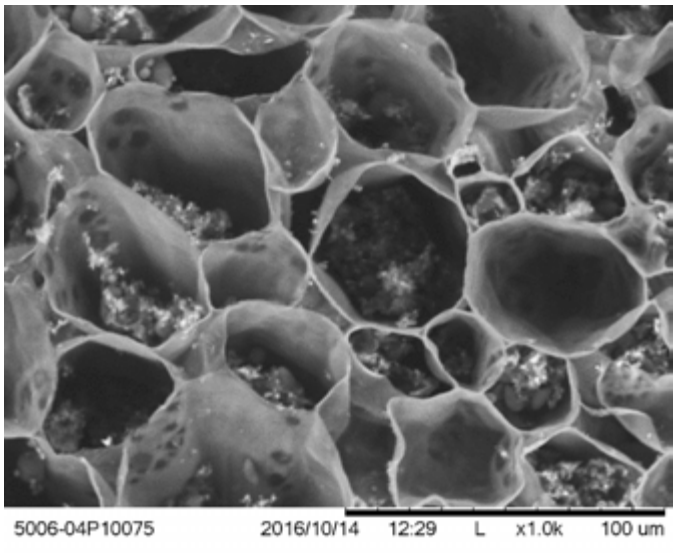








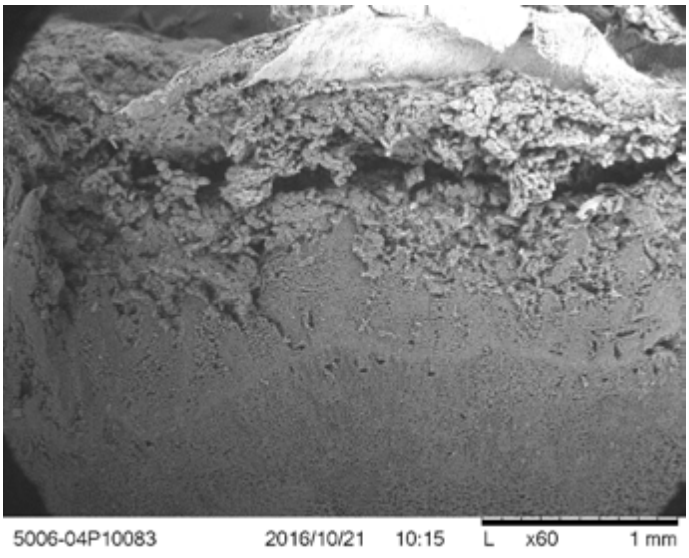


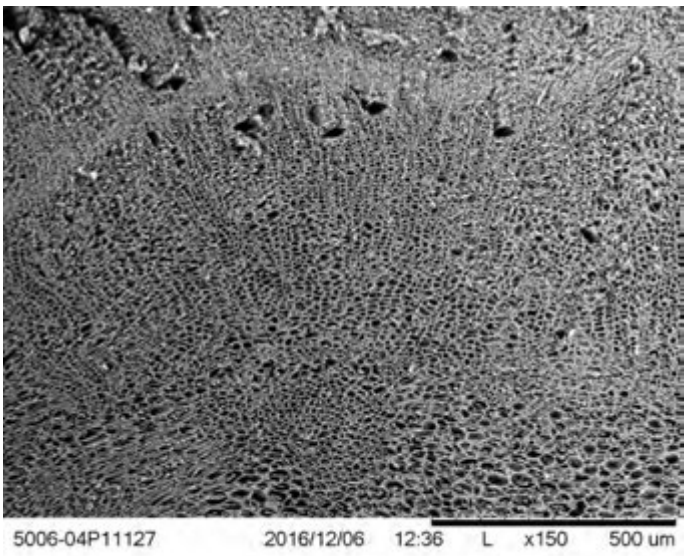


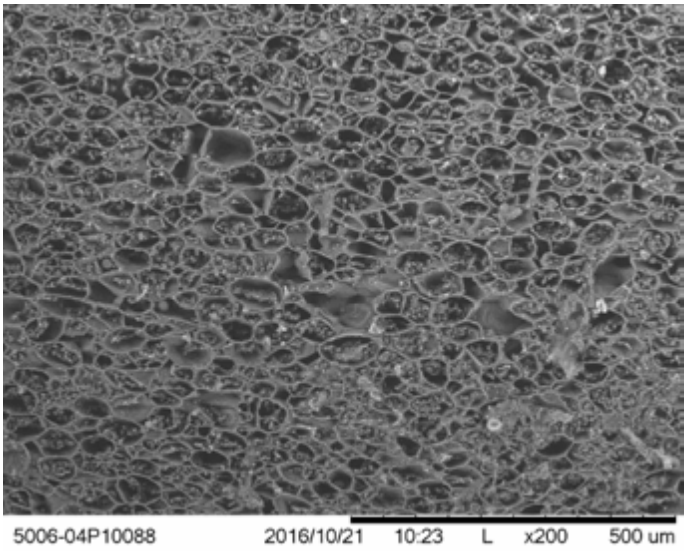
Lepidium meyenii
BRASSICACEAE

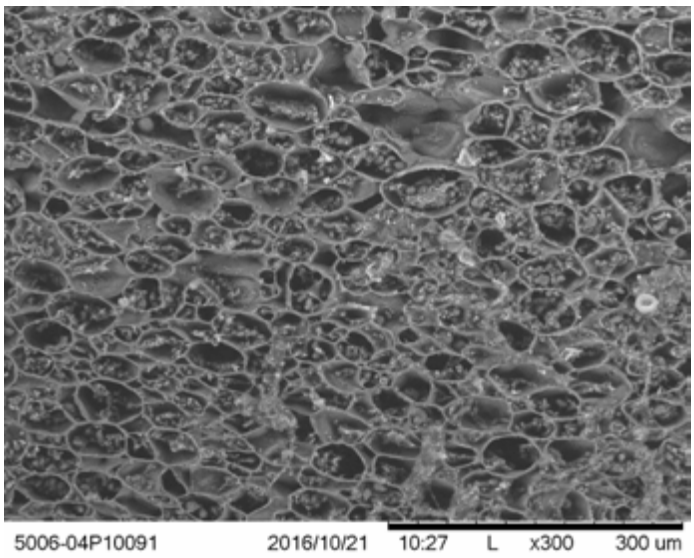
Common Name: Maca
Sample Type: Wet/Fresh

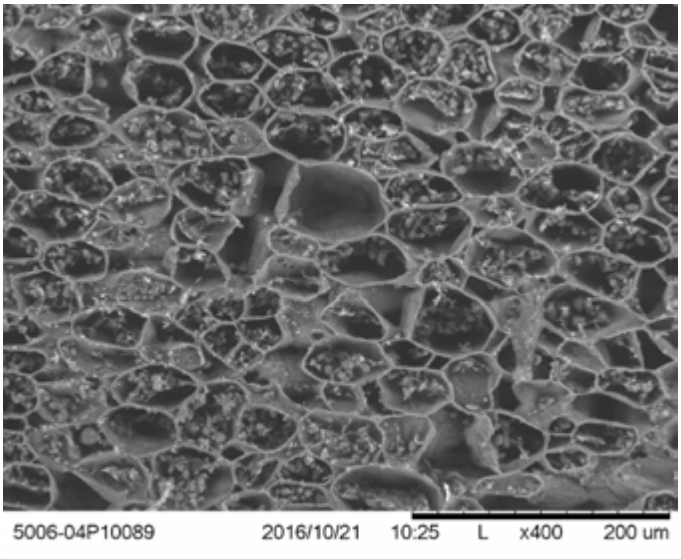
Tangential Edge

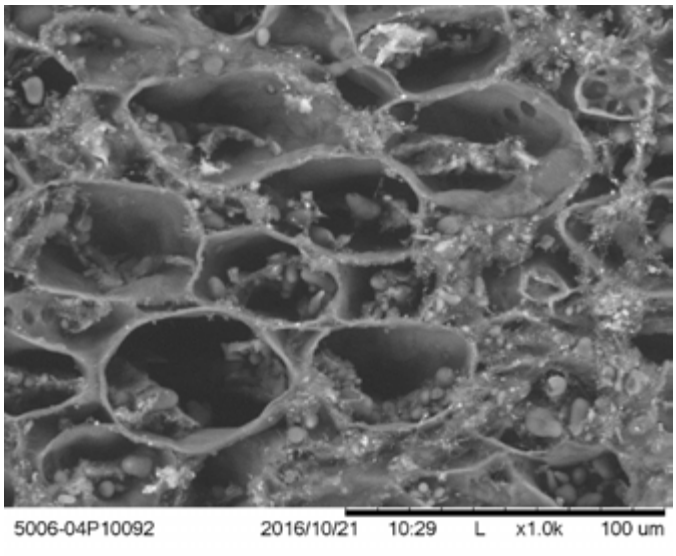






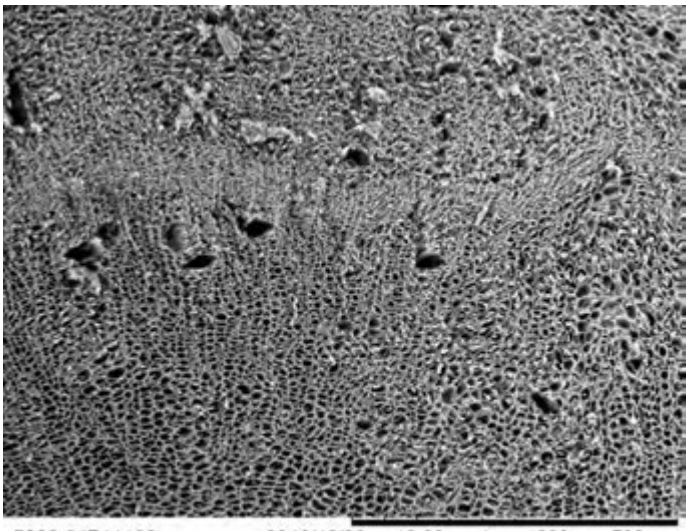


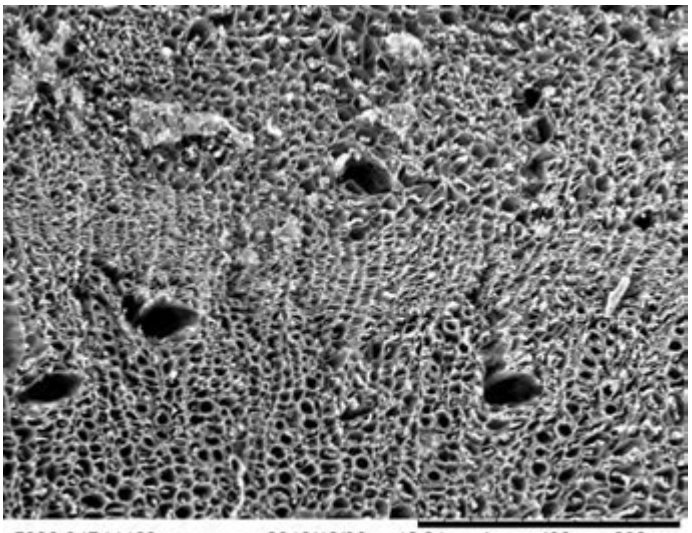


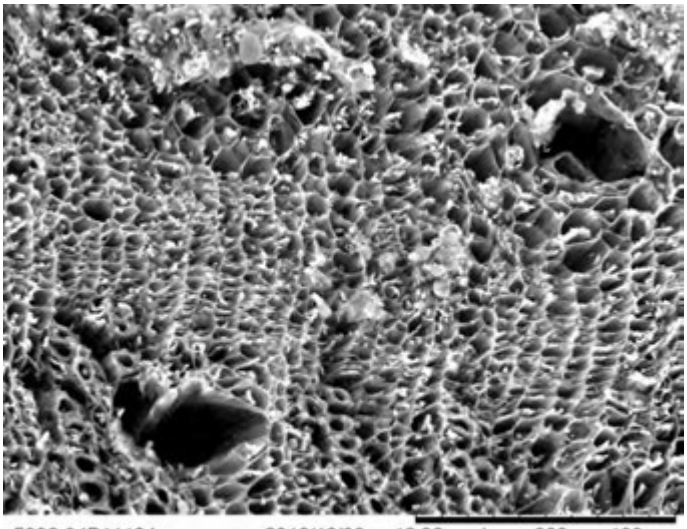


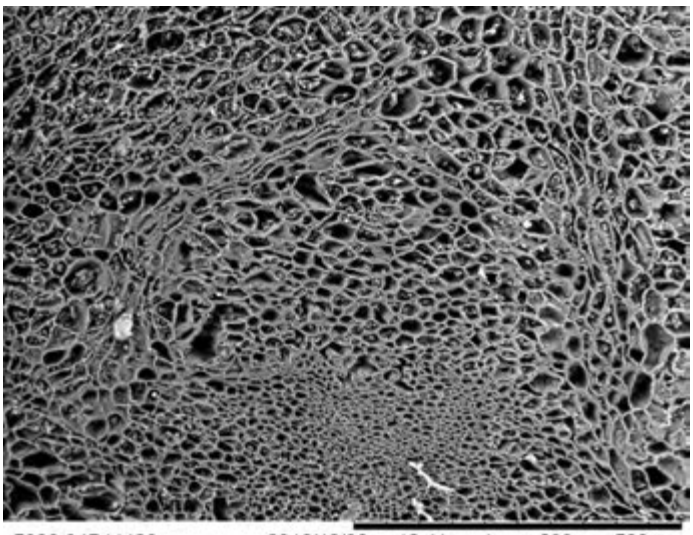
Lepidium meyenii
BRASSICACEAE

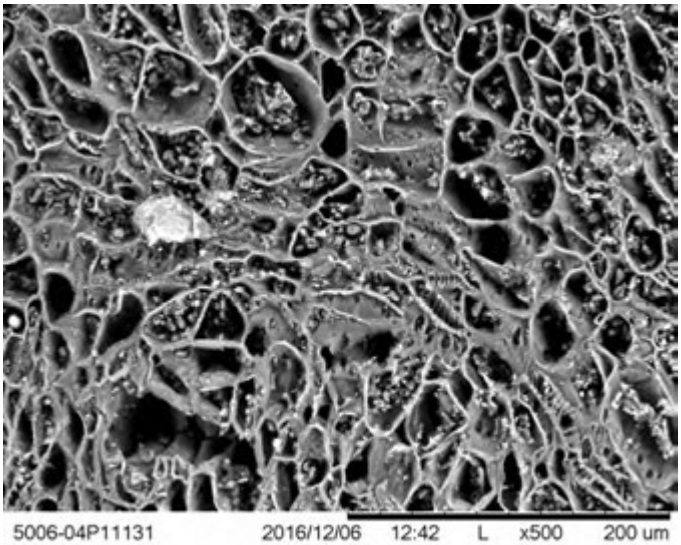
Common Name: Maca
Sample Type: Wet/Fresh

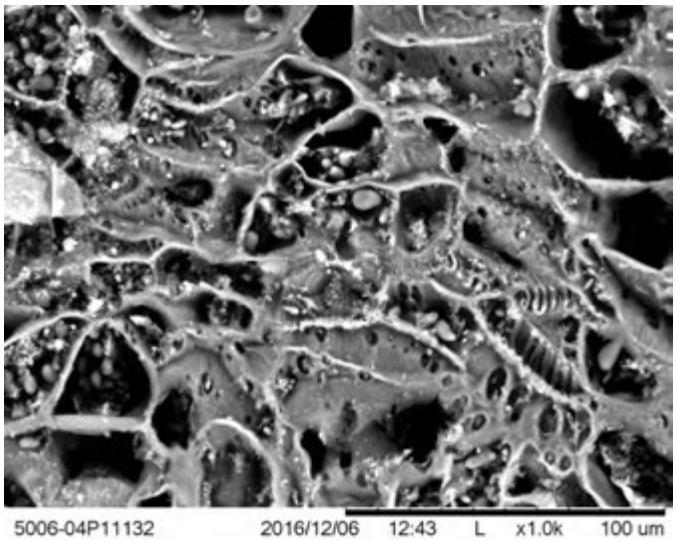




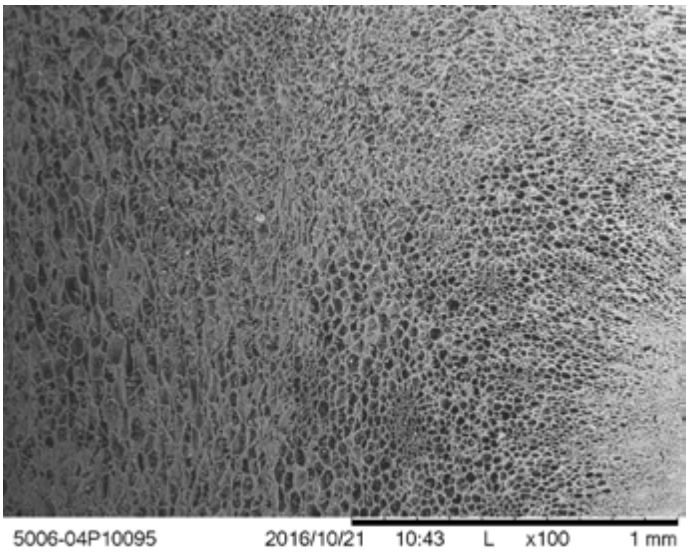


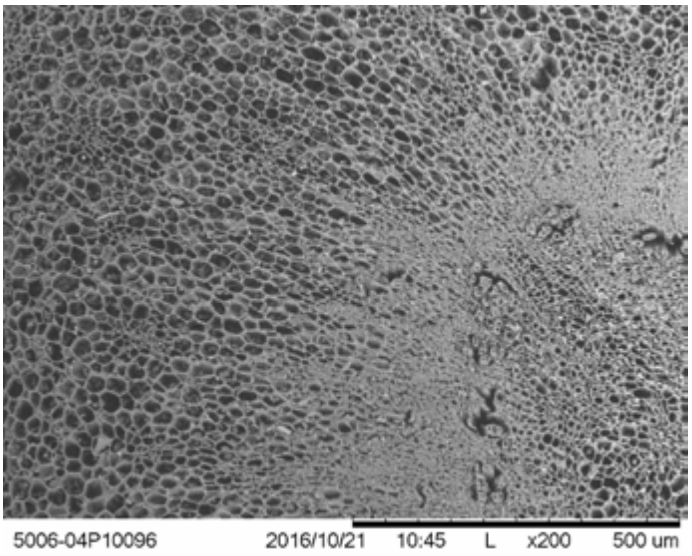


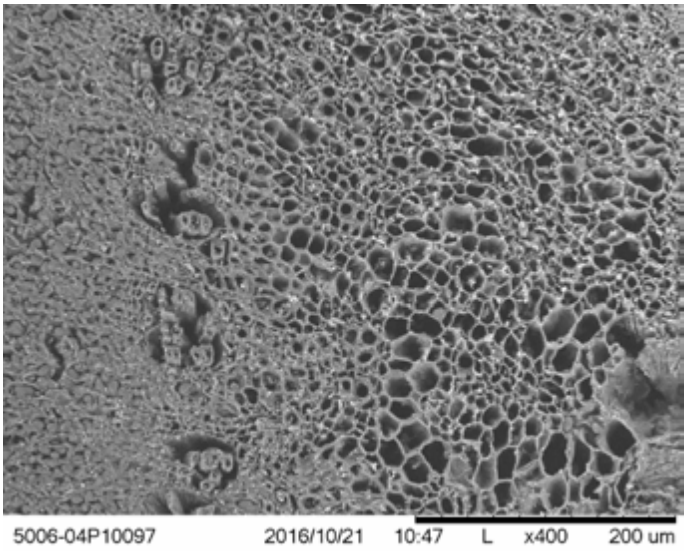


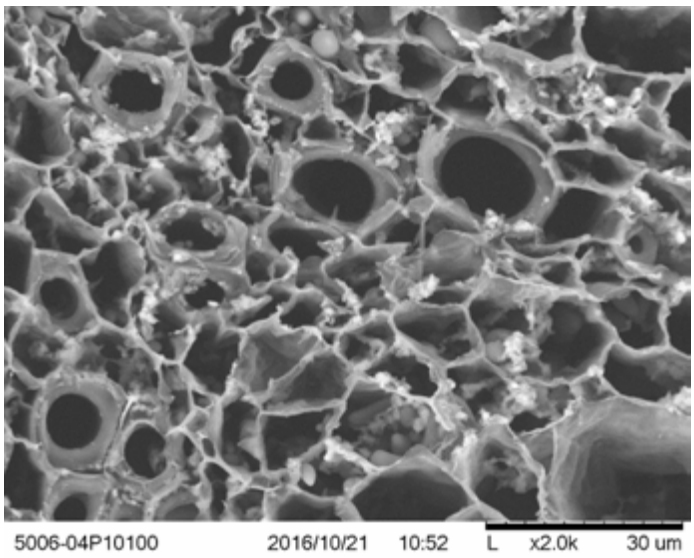


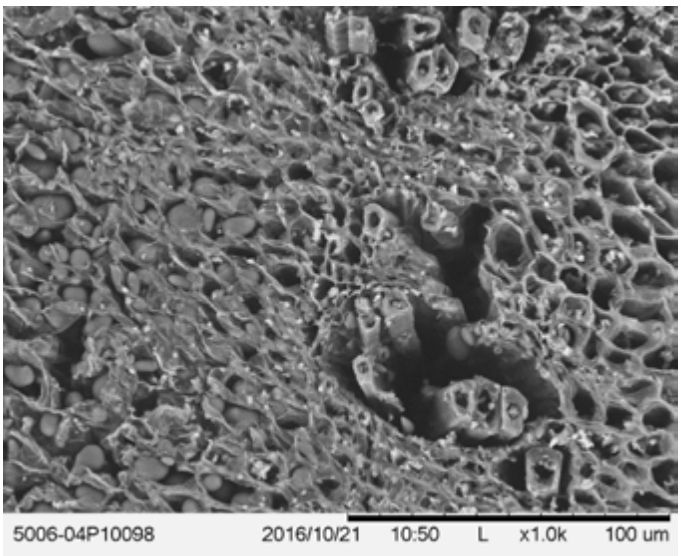
Lepidium meyenii Common Name: Maca Radial Center
BRASSICACEAE Sample Type: Wet/Fresh

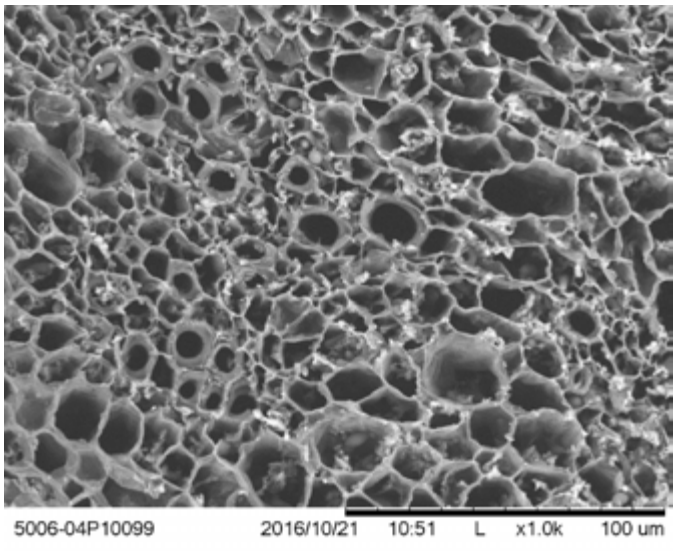




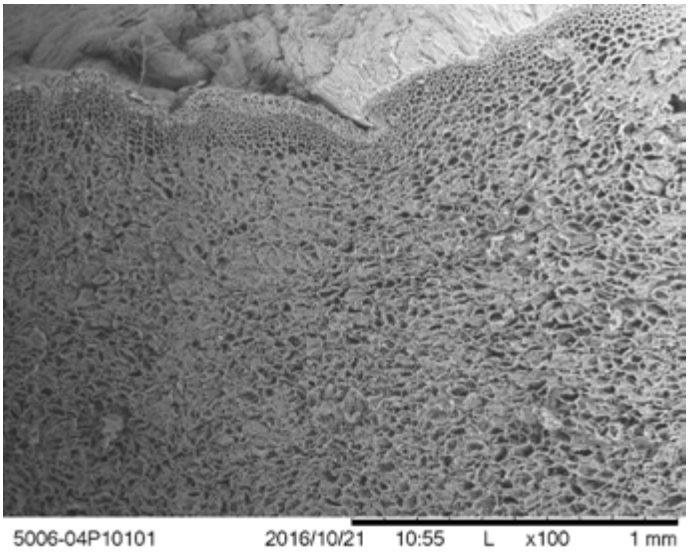


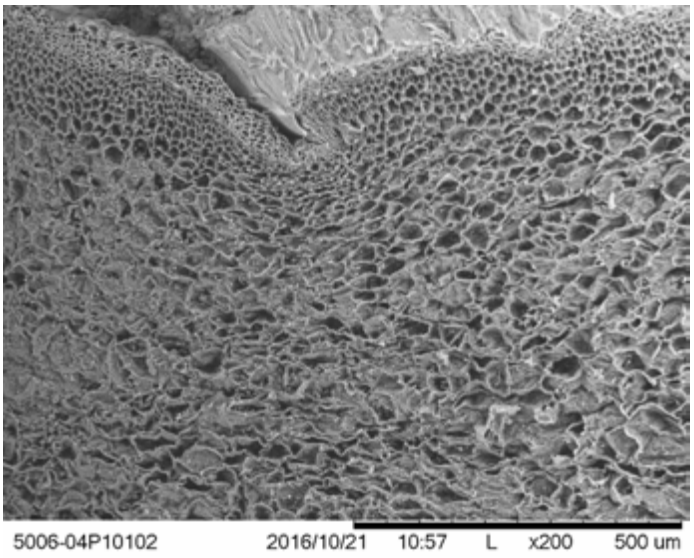


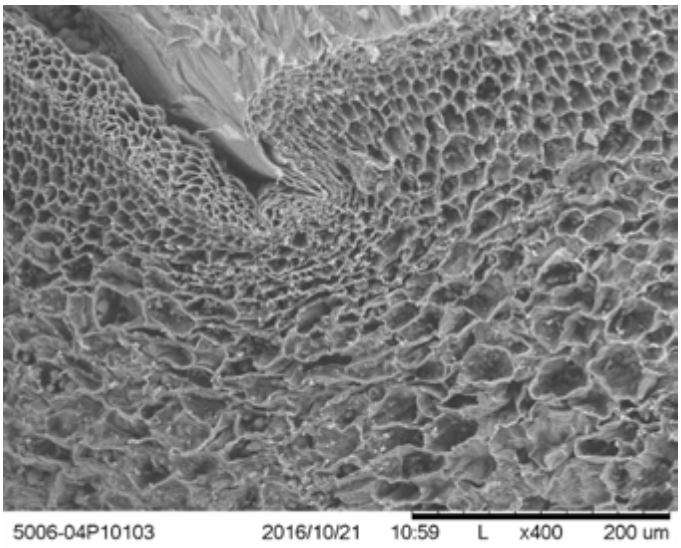


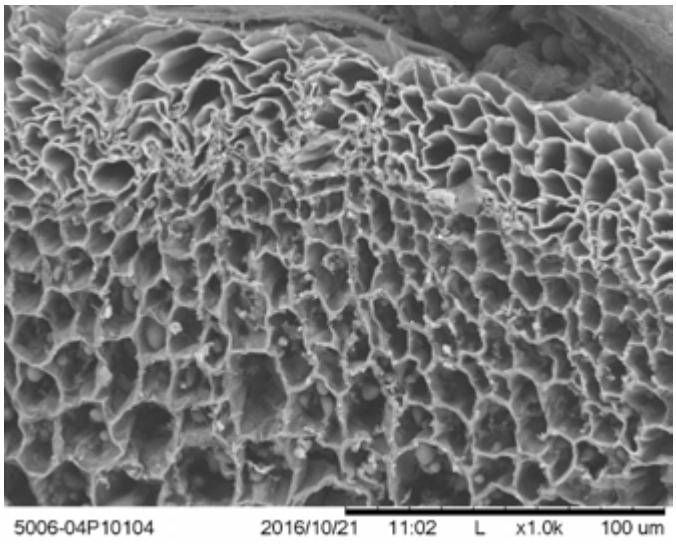


Lepidium meyenii Common Name: Maca Radial Edge
BRASSICACEAE Sample Type: Wet/Fresh





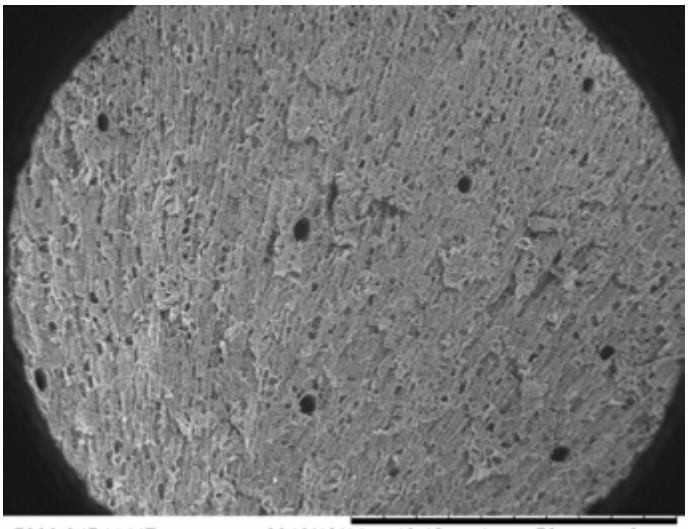


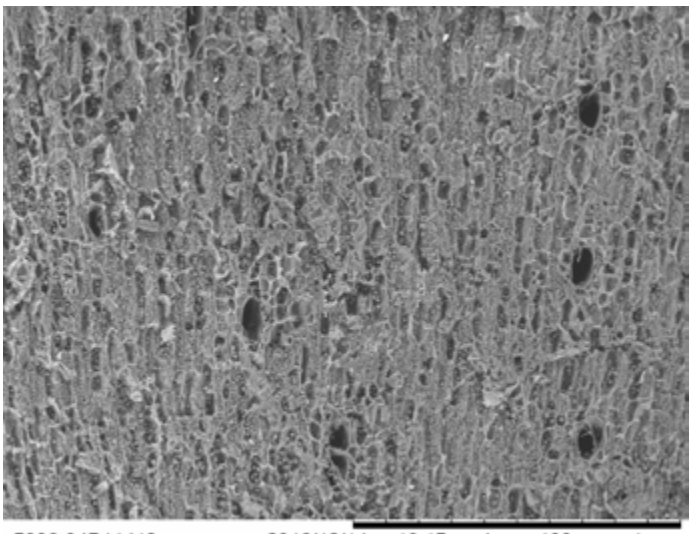


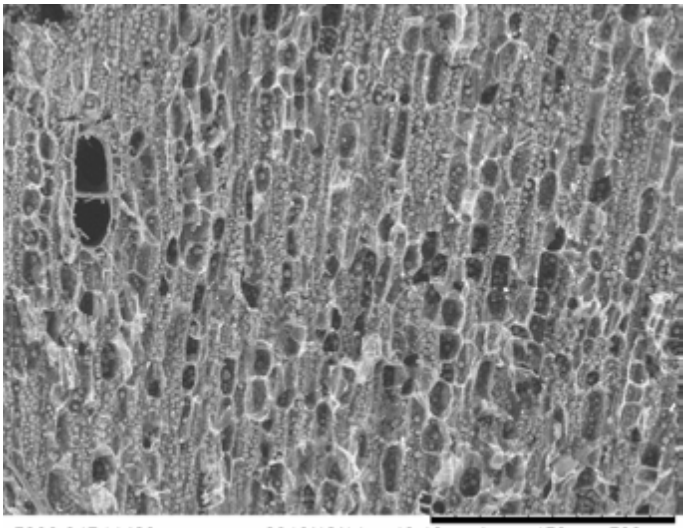
Manihot esculenta
EUPHORBIACEAE

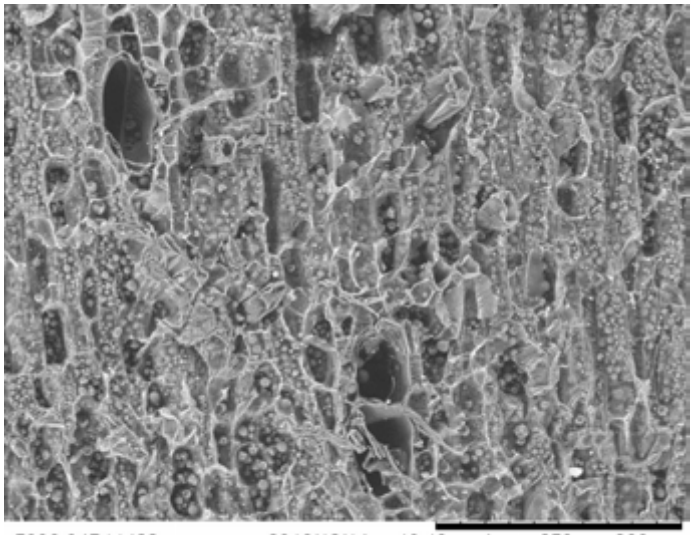
Common Name: Manioc
Sample Type: Wet/Fresh

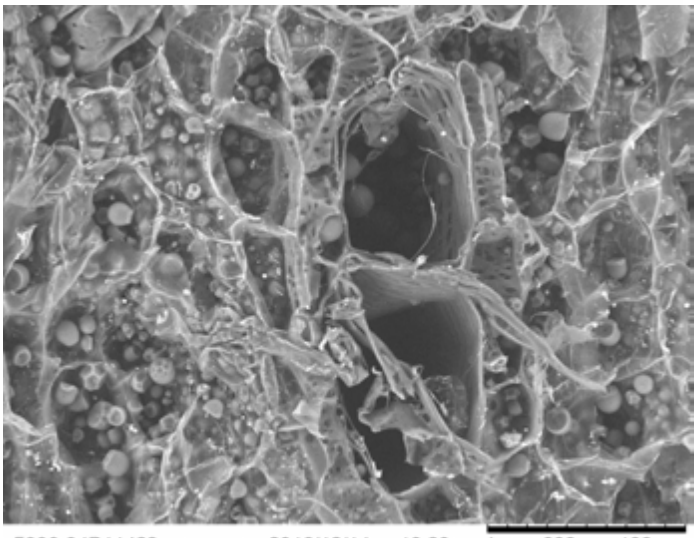
Transverse Center

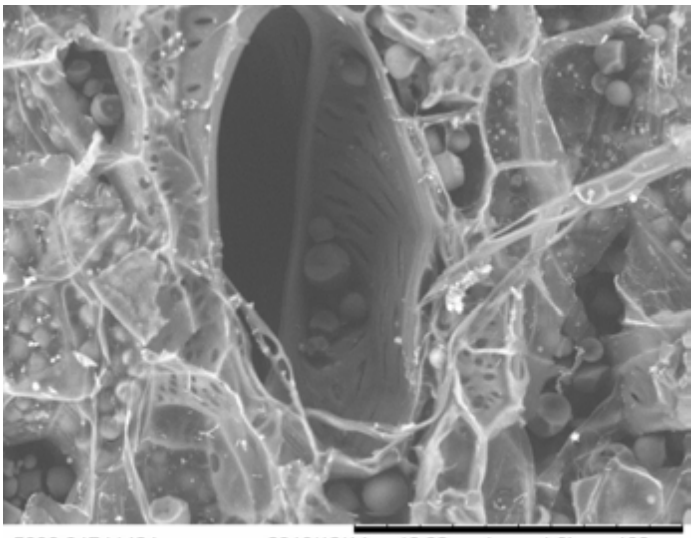








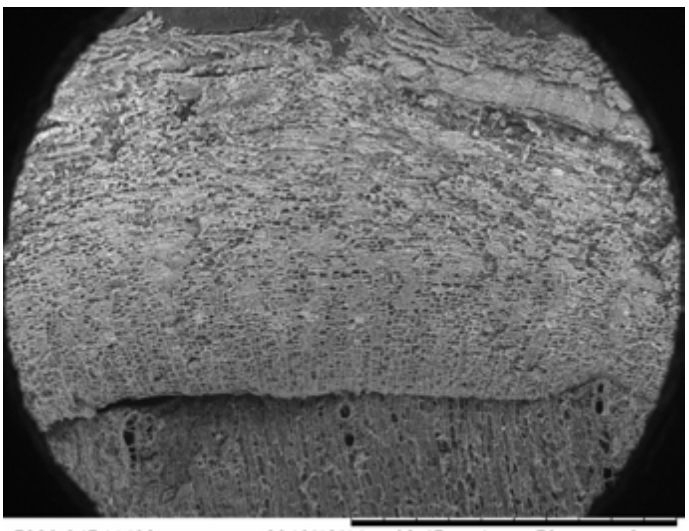


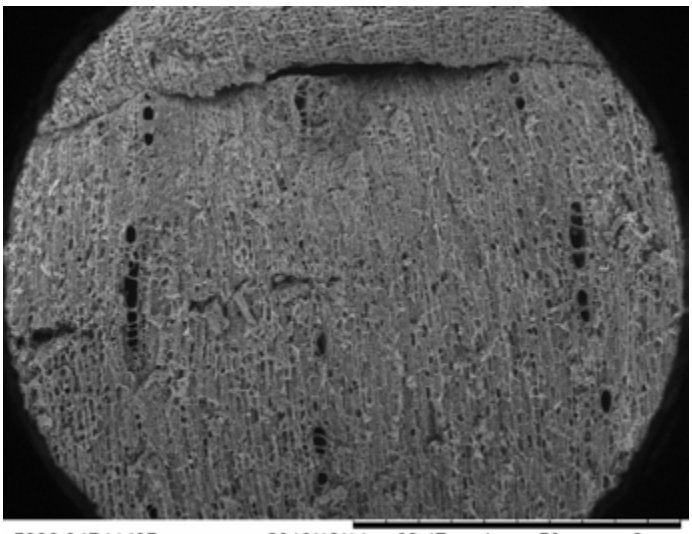


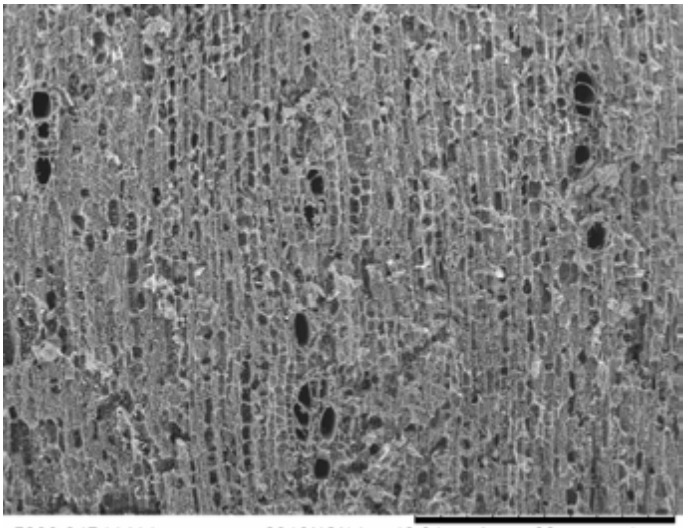
Manihot esculenta
EUPHORBIACEAE

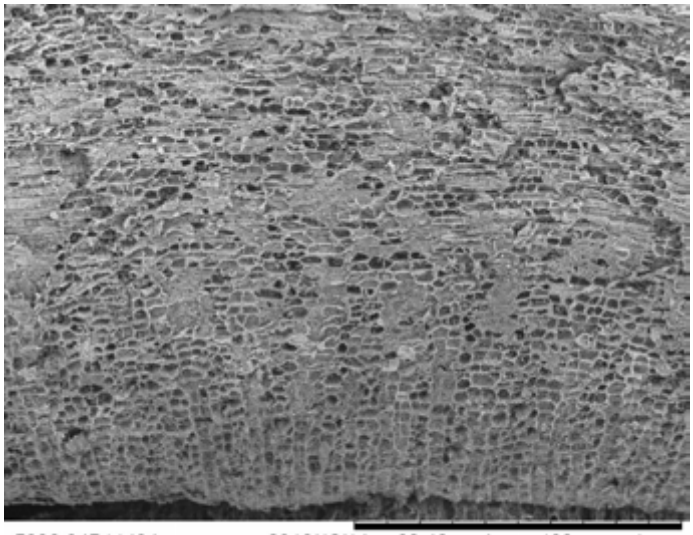
Common Name: Manioc
Sample Type: Wet/Fresh

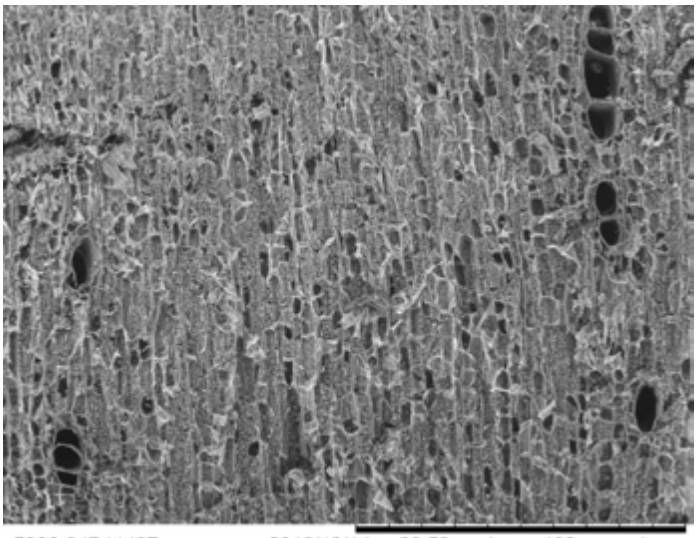
Transverse Edge

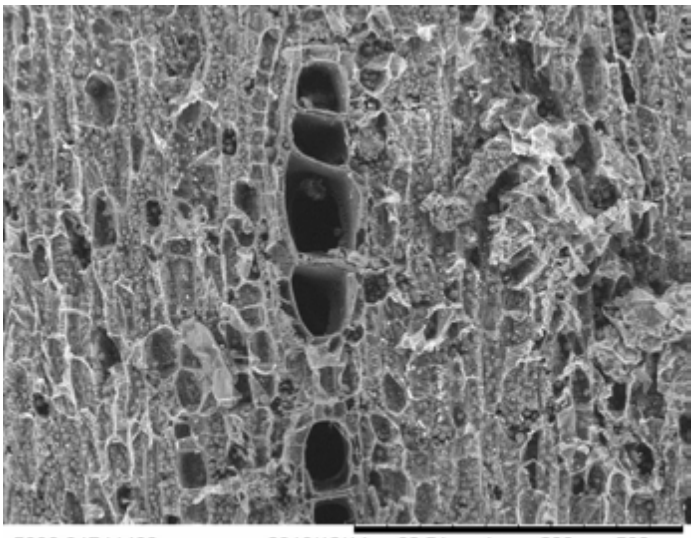






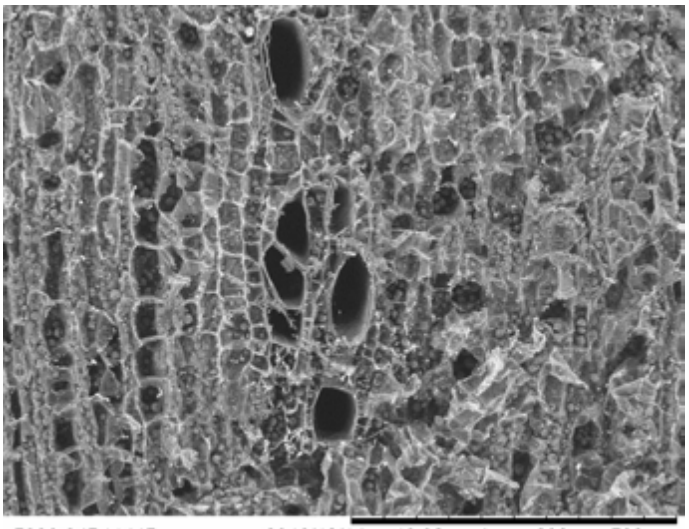


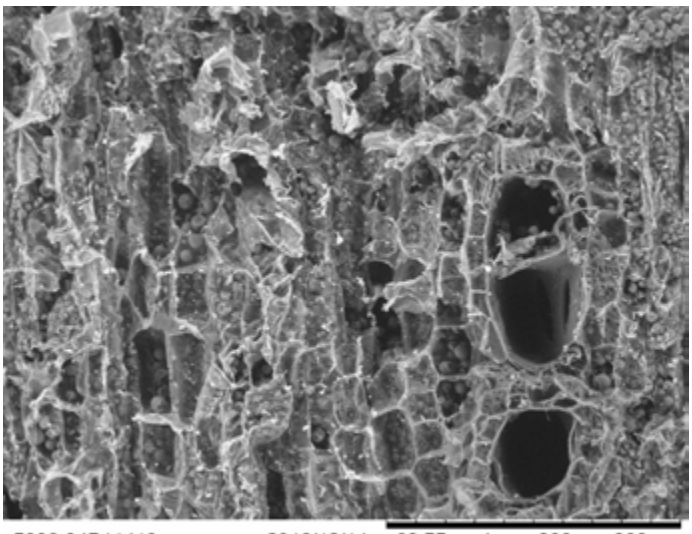


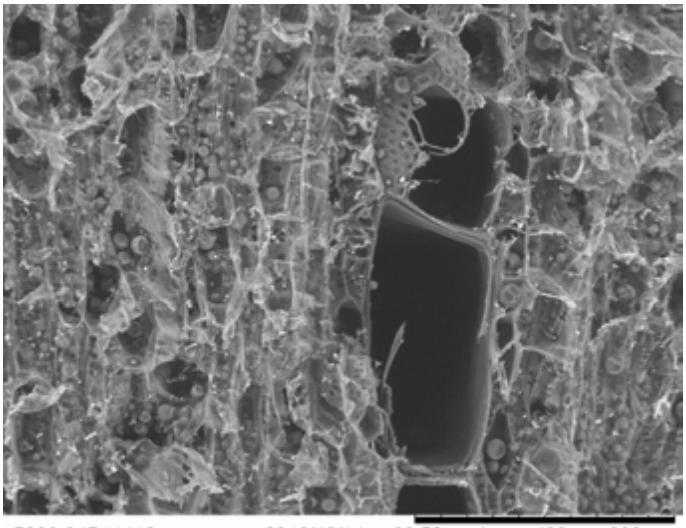


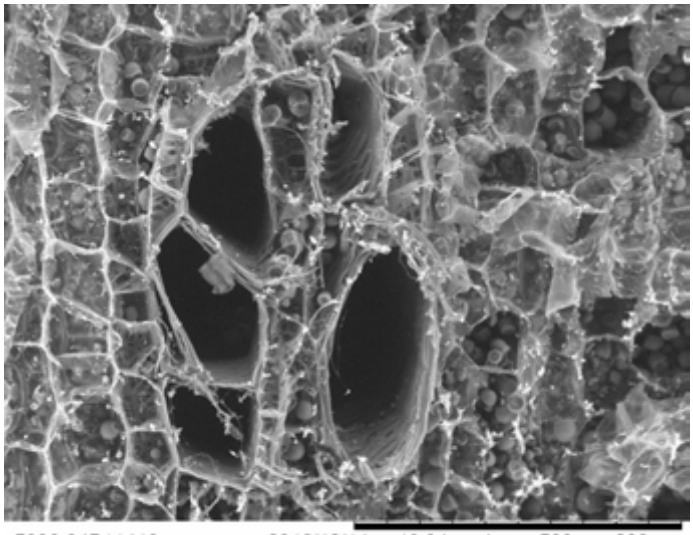
Manihot esculenta
EUPHORBIACEAE

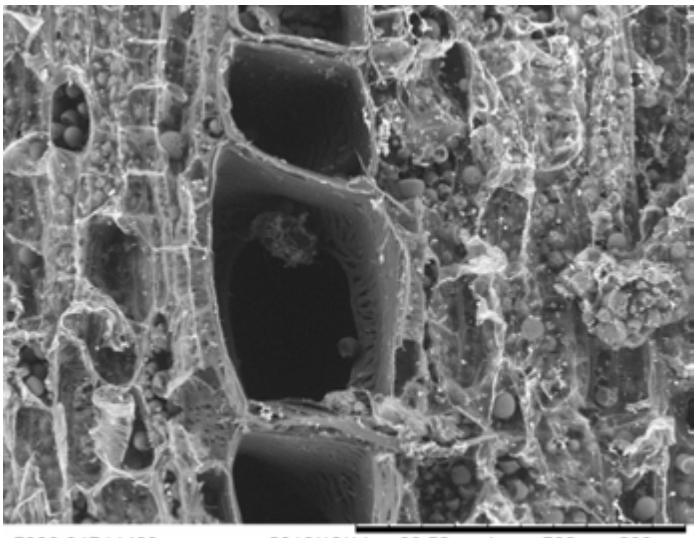
Common Name: Manioc
Sample Type: Wet/Fresh

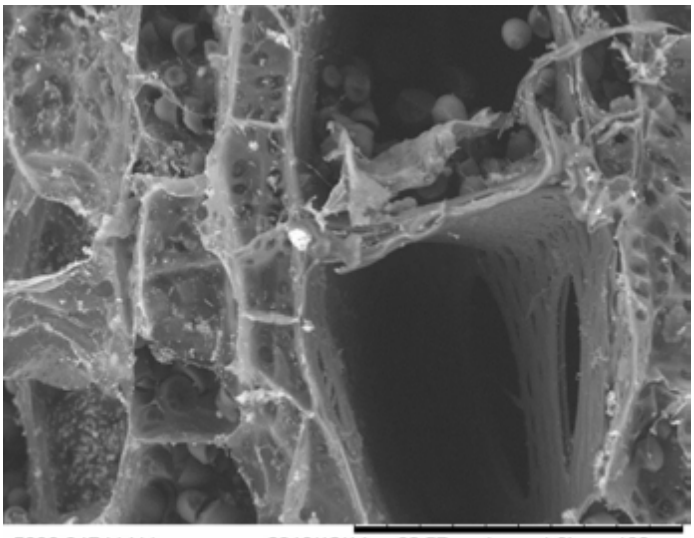








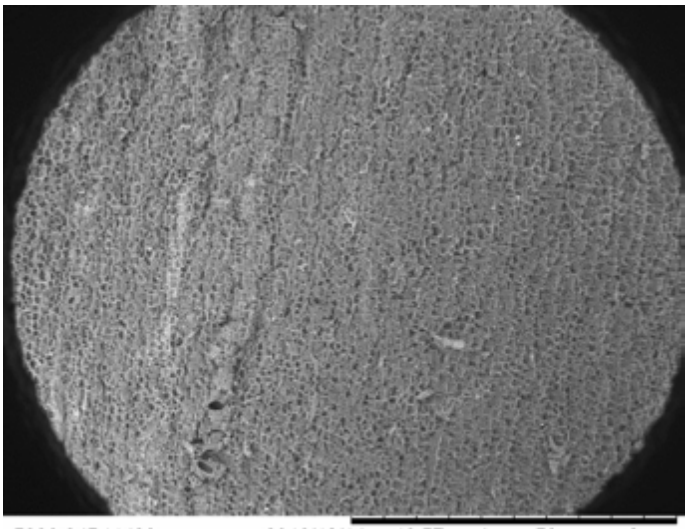


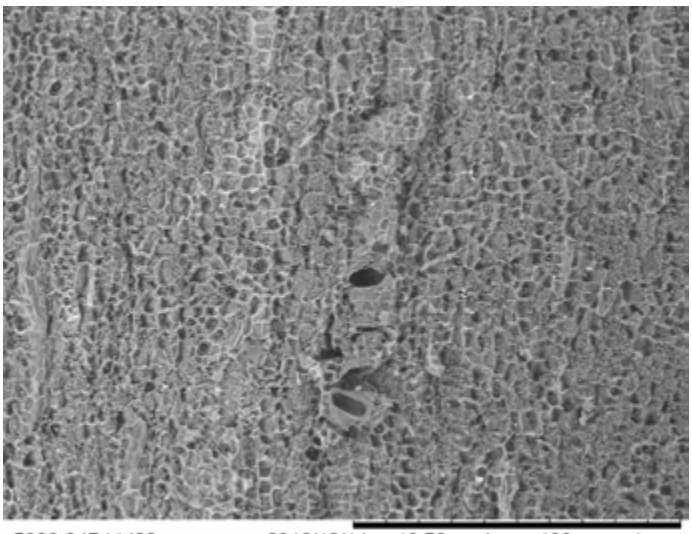


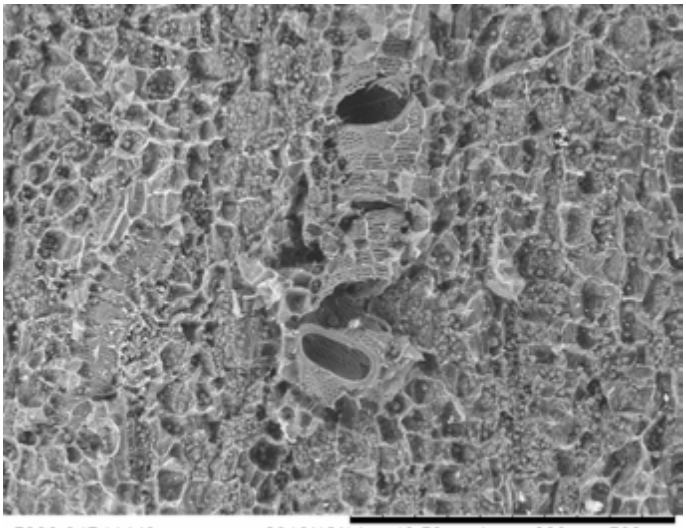
Manihot esculenta
EUPHORBIACEAE

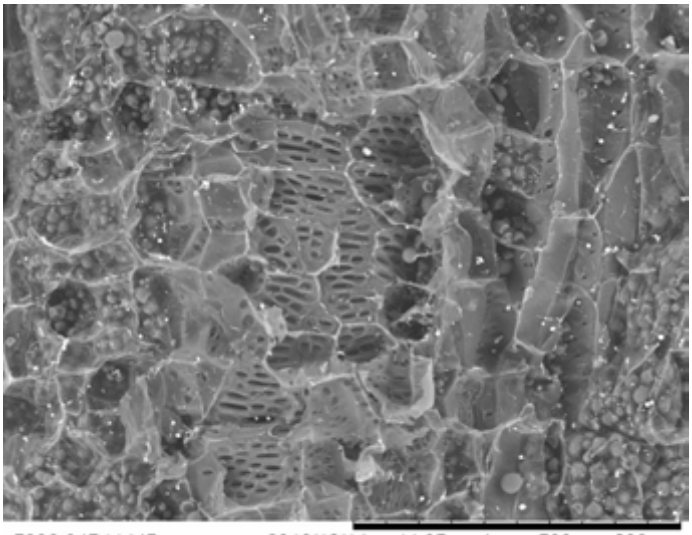
Common Name: Manioc
Sample Type: Wet/Fresh

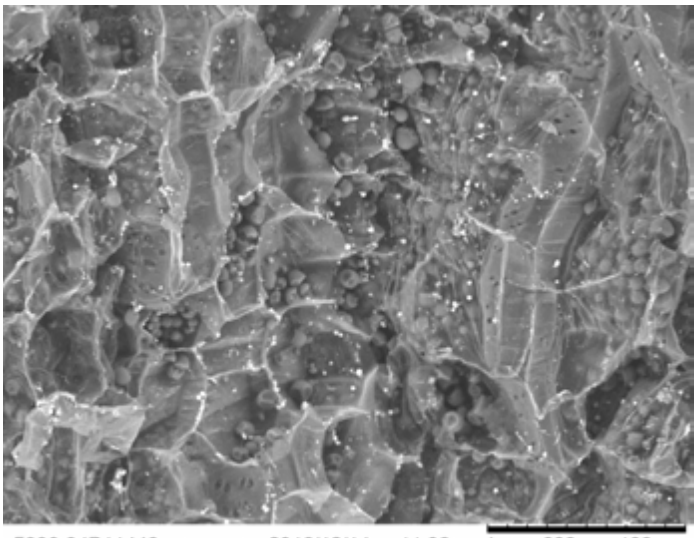
Tangential Center

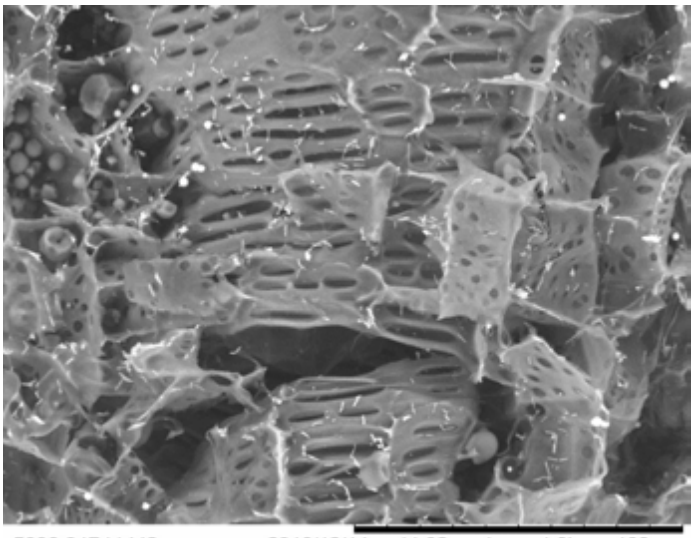








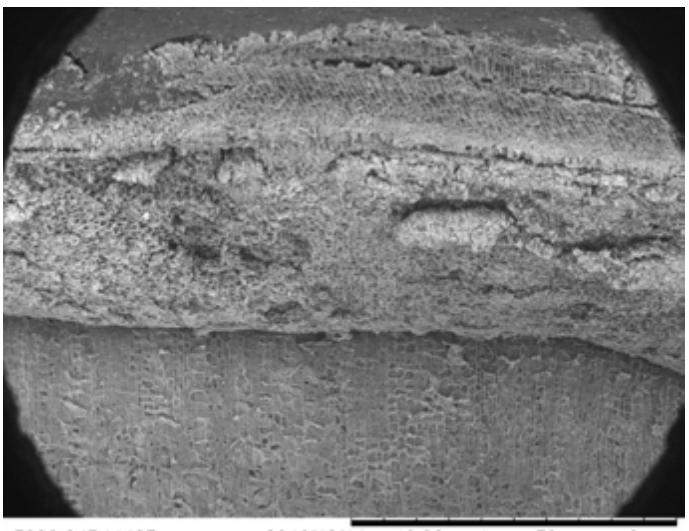


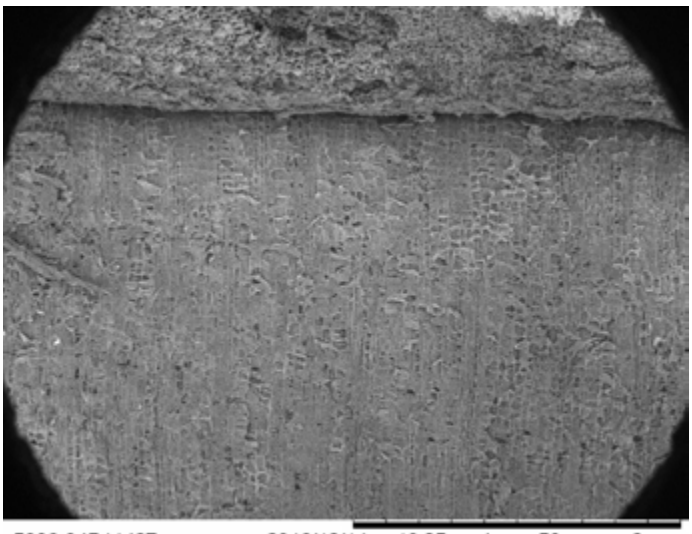


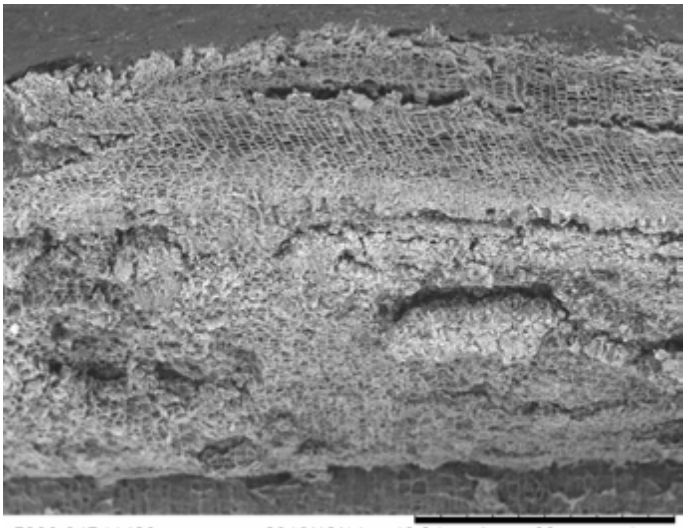
Manihot esculenta
EUPHORBIACEAE

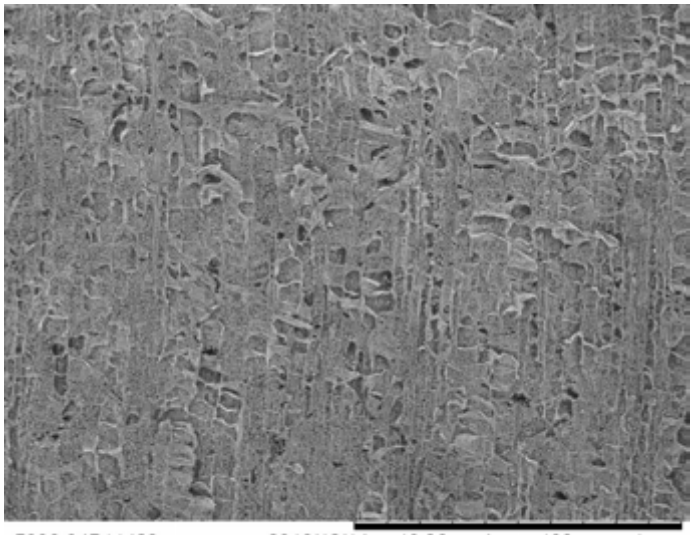
Common Name: Manioc
Sample Type: Wet/Fresh

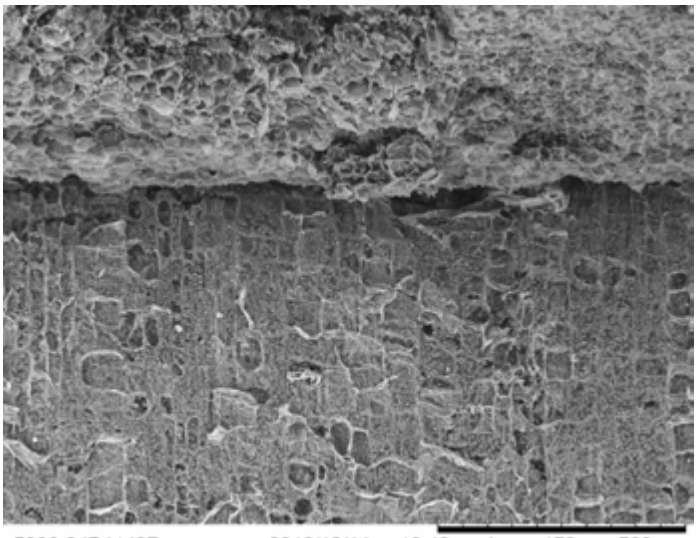
Tangential Edge

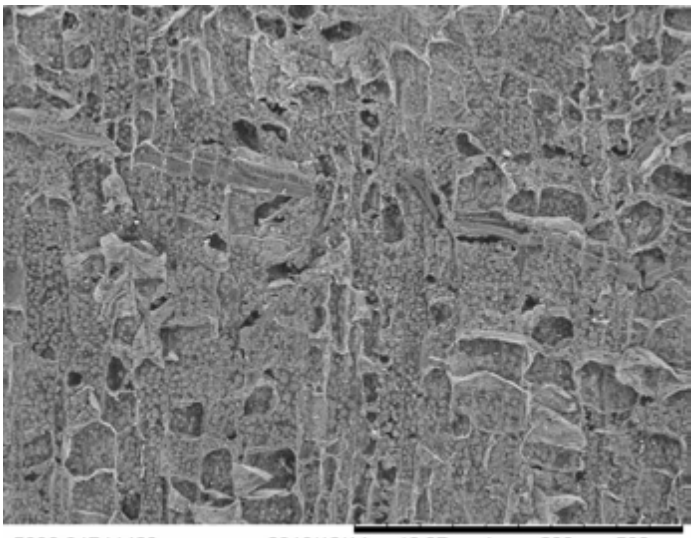








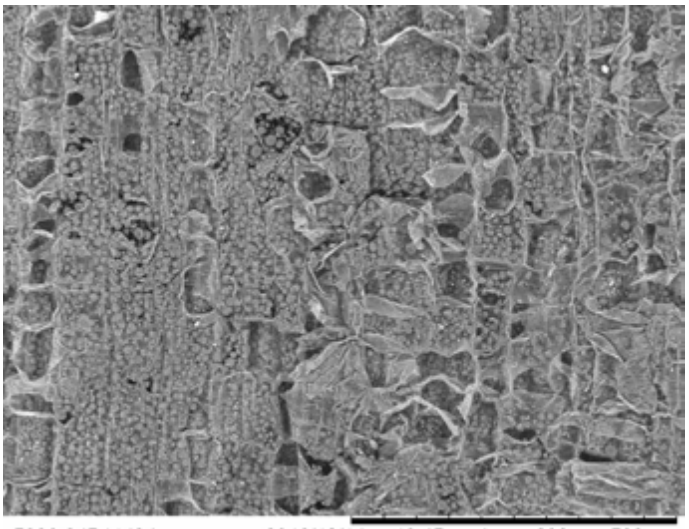


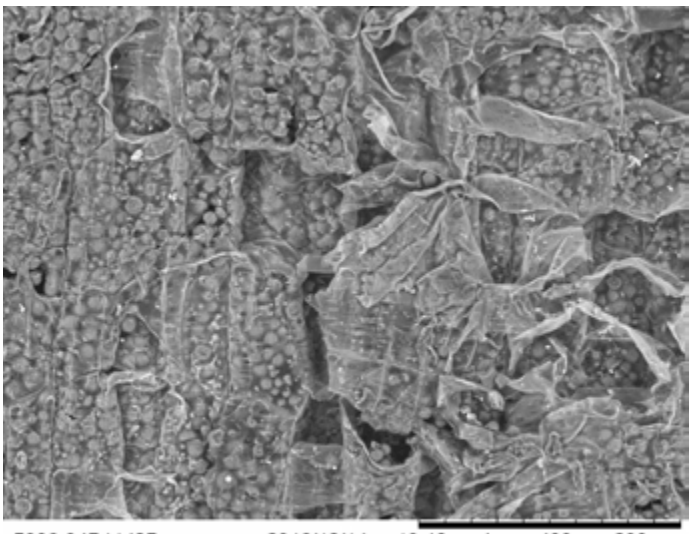


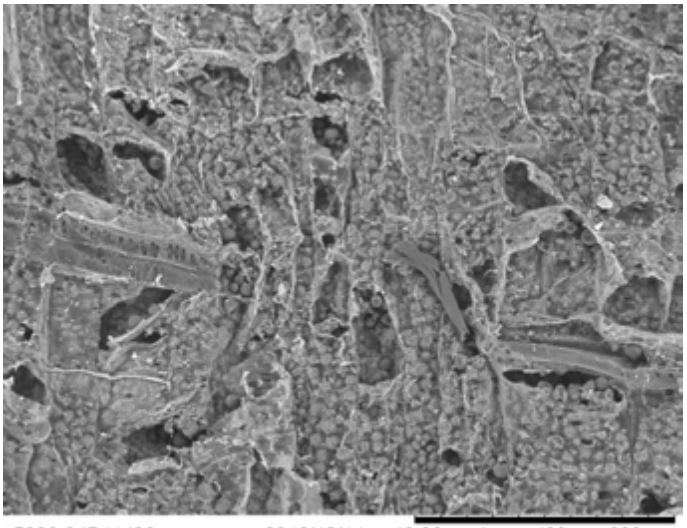
Manihot esculenta
EUPHORBIACEAE

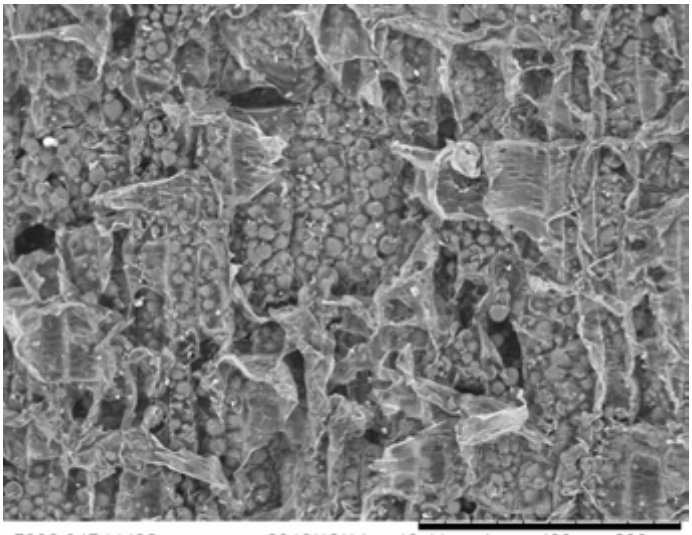
Common Name: Manioc
Sample Type: Wet/Fresh

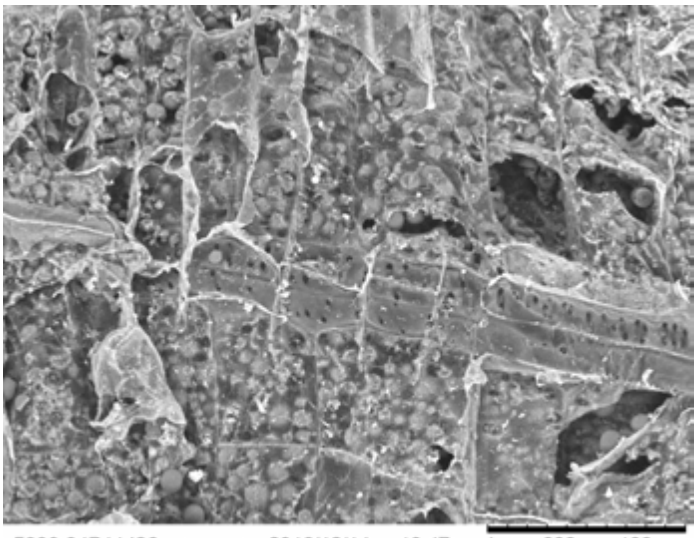
Tangential Edge (Continued)

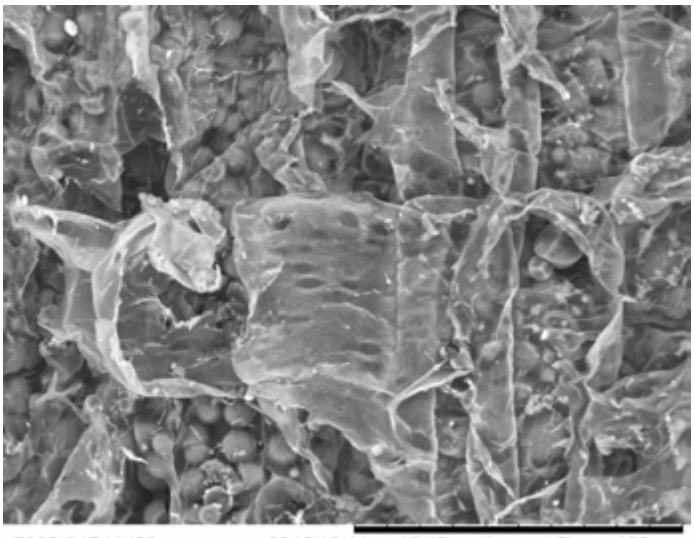




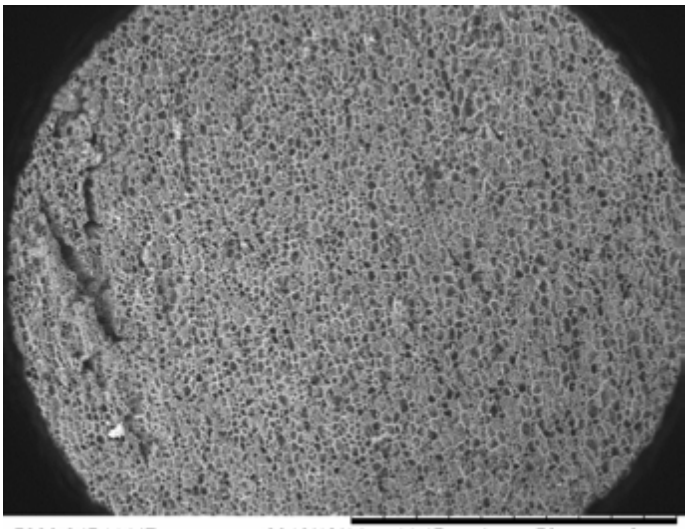


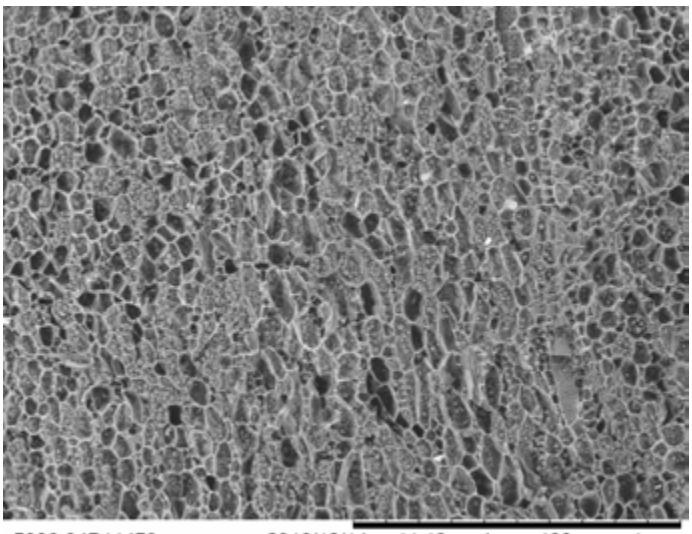


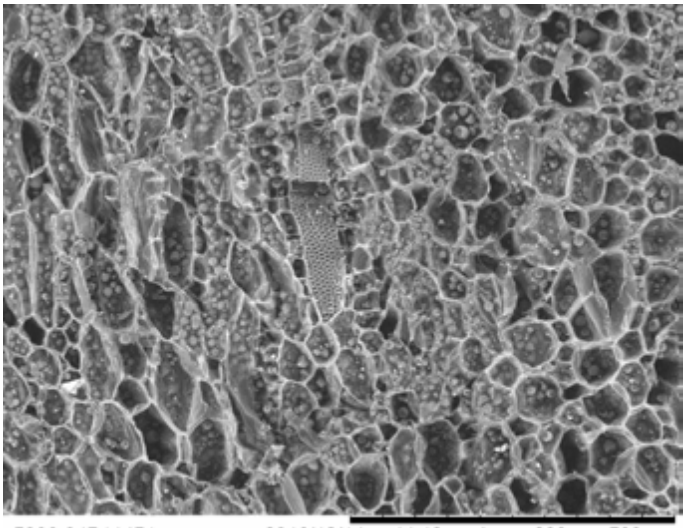


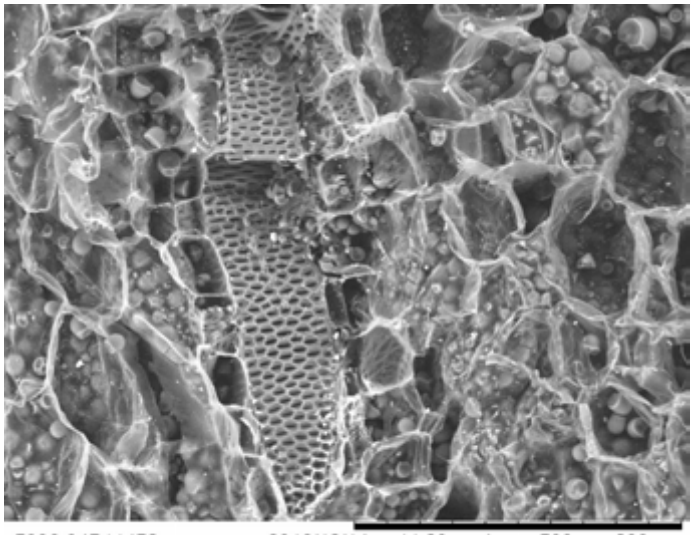


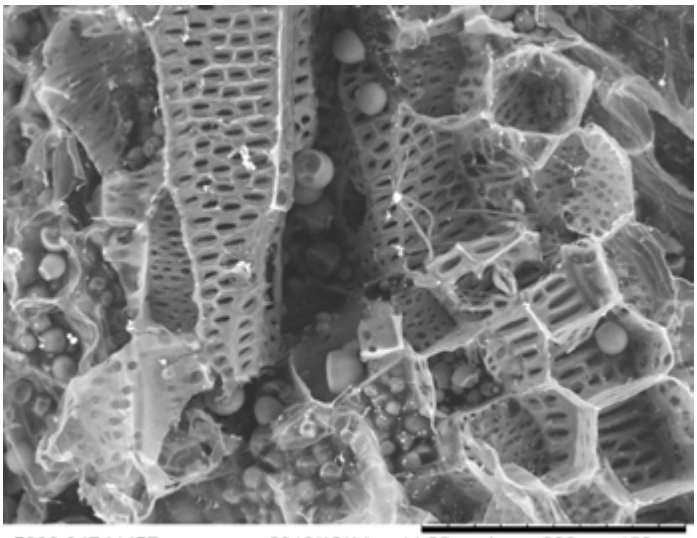
Manihot esculenta Common Name: Manioc Radial
EUPHORBIACEAE Sample Type: Wet/Fresh

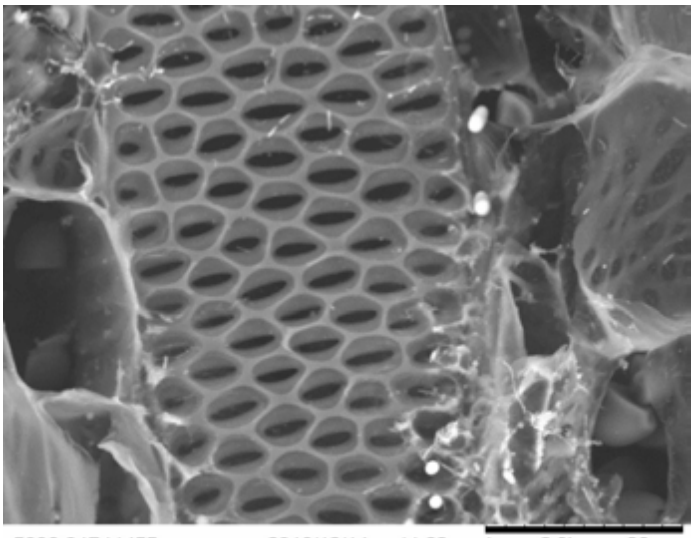








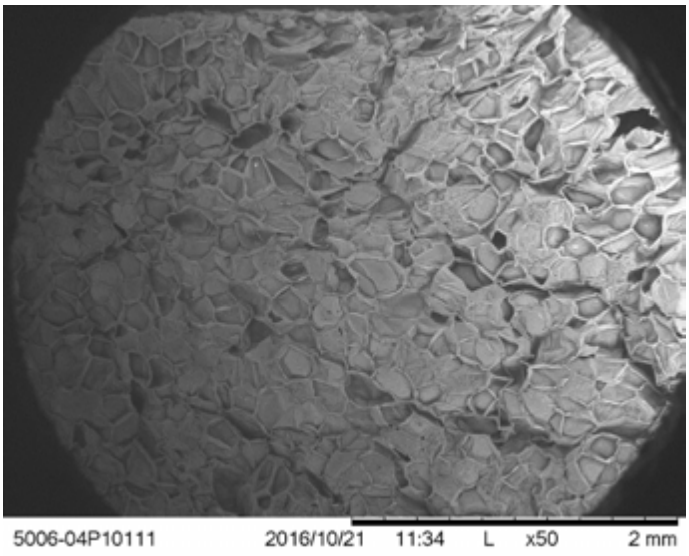


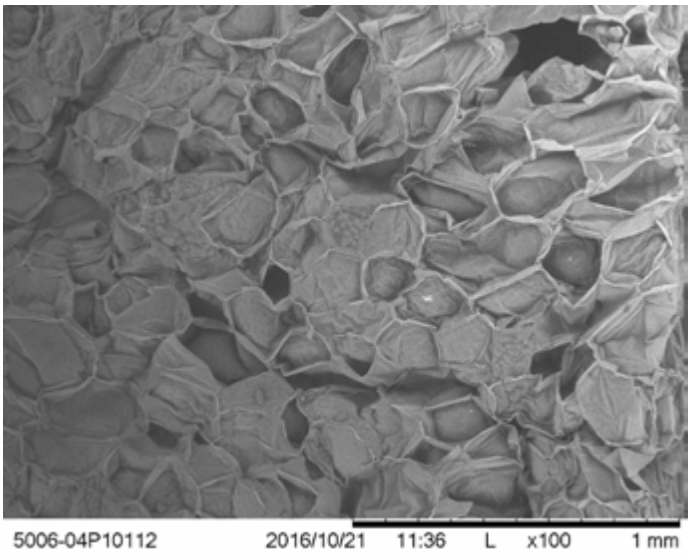


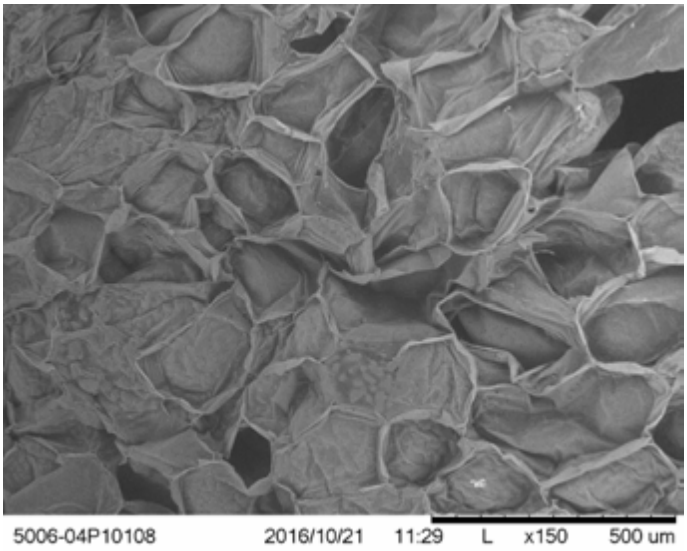
Oxalis tuberosa
OXALIDACEAE

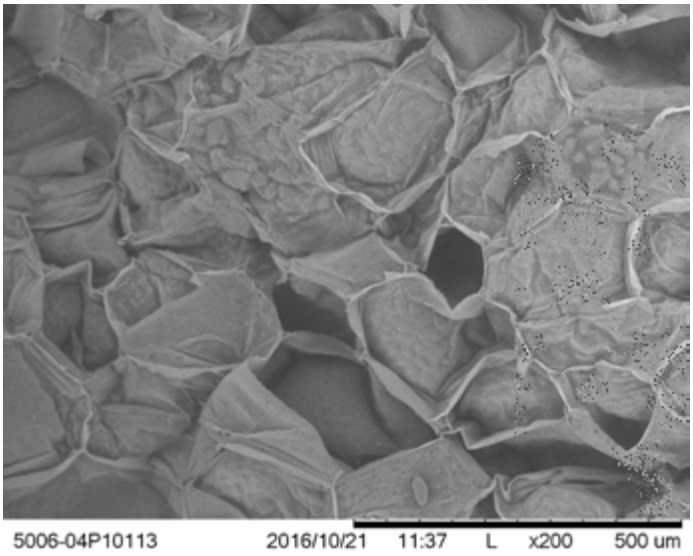
Common Name: Oca
Sample Type: Wet/Fresh

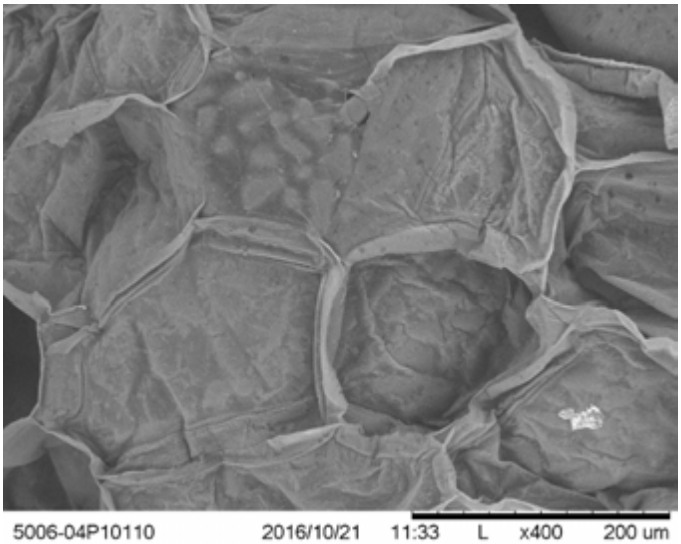
Transverse Center

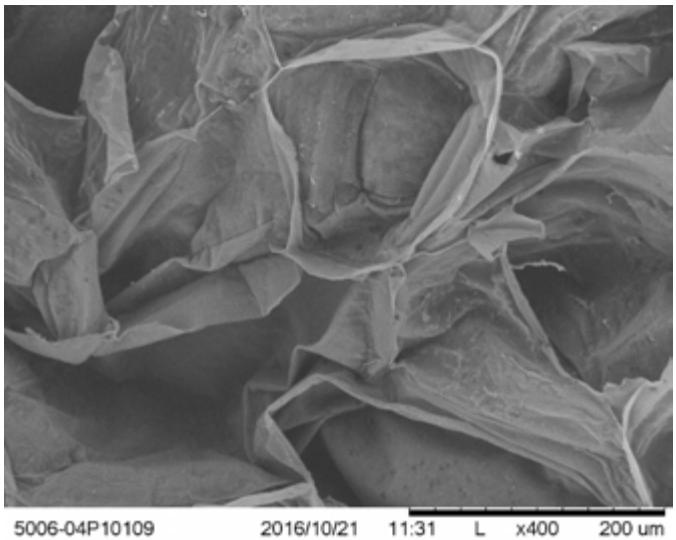








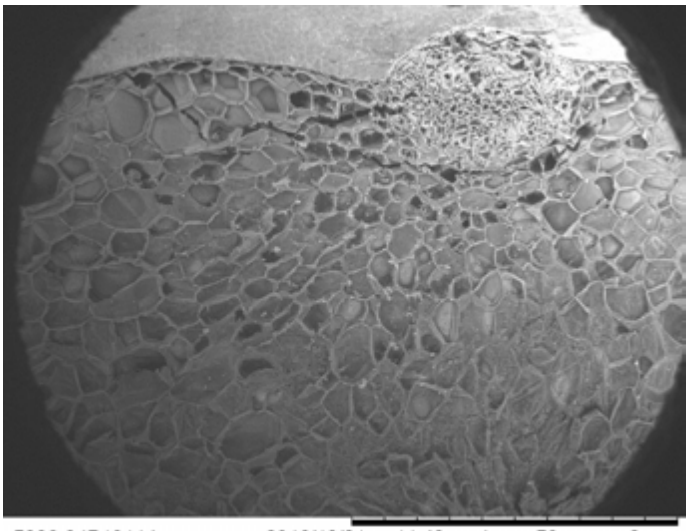


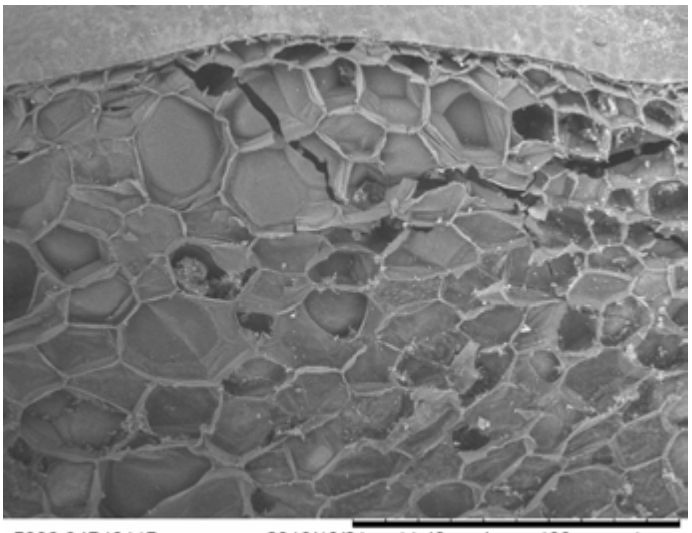


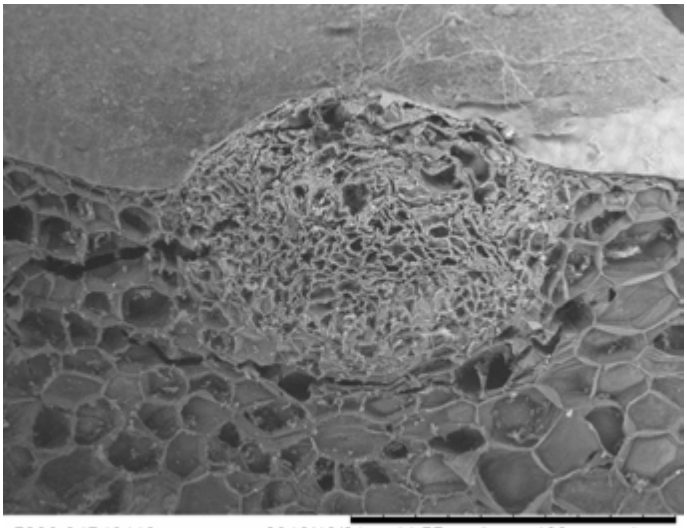
Oxalis tuberosa
OXALIDACEAE

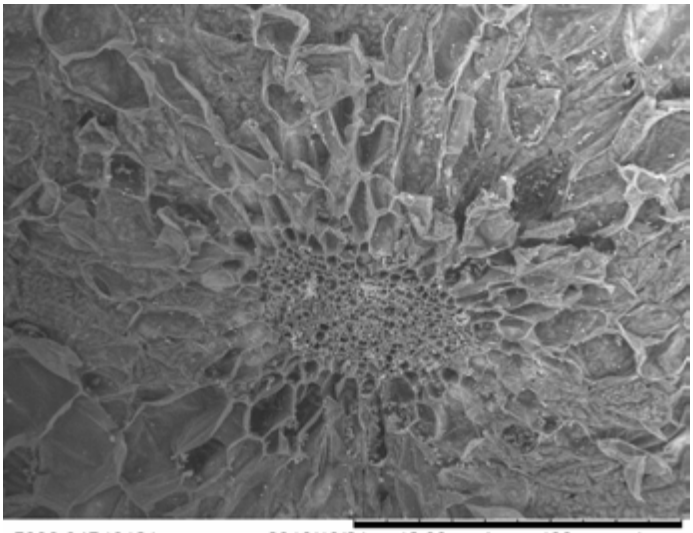
Common Name: Oca
Sample Type: Wet/Fresh

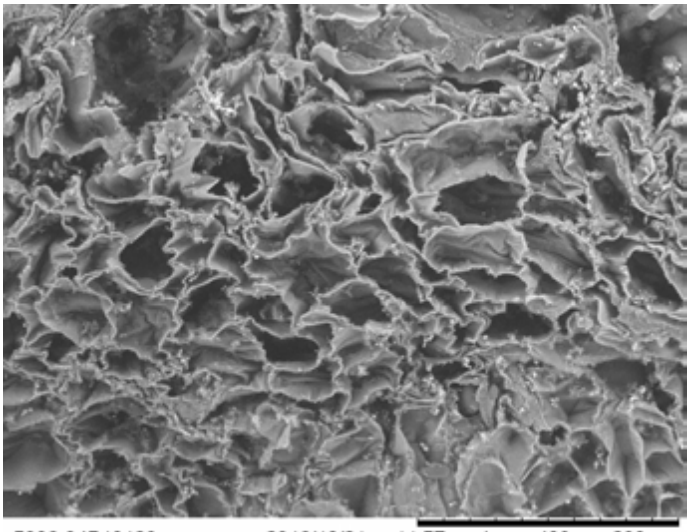
Transverse Edge

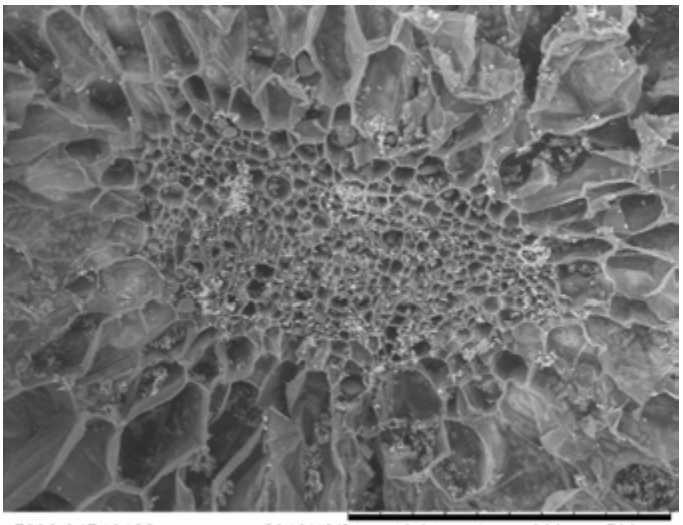








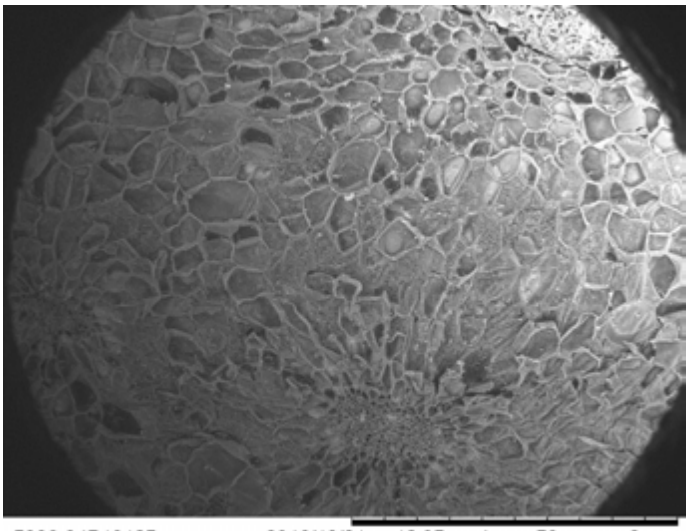


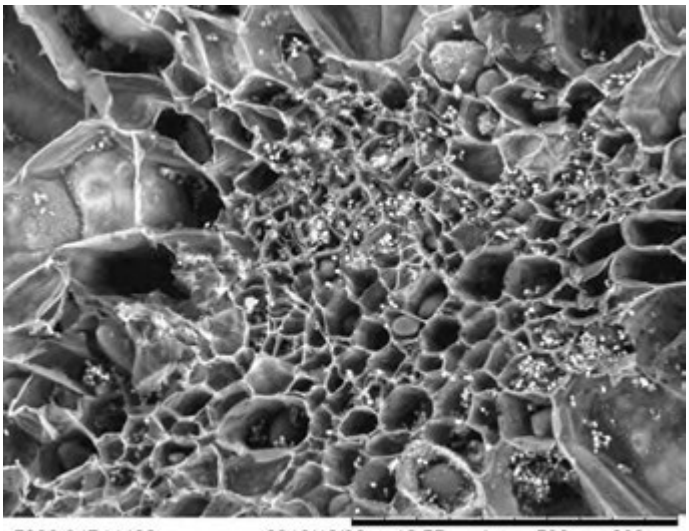


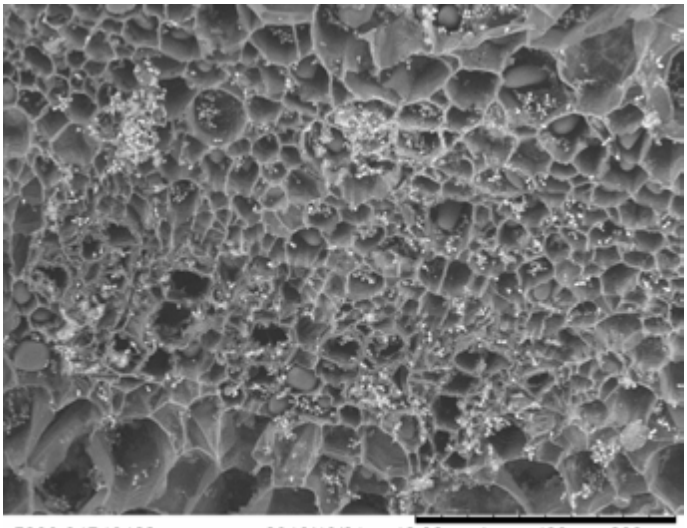
Oxalis tuberosa
OXALIDACEAE

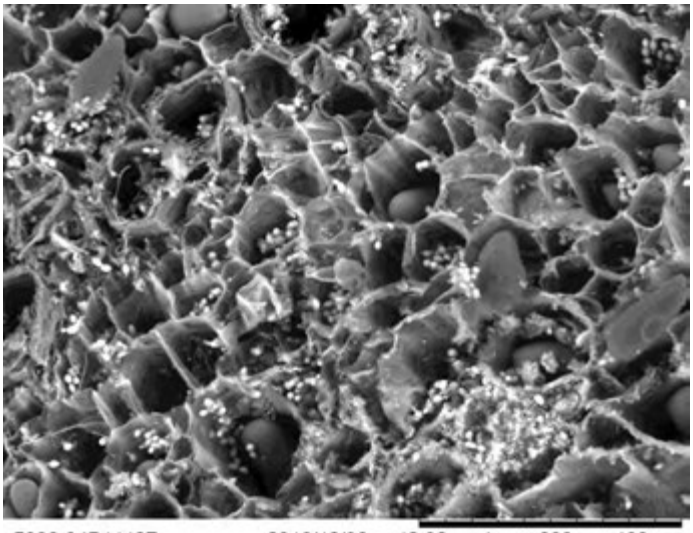
Common Name: Oca
Sample Type: Wet/Fresh

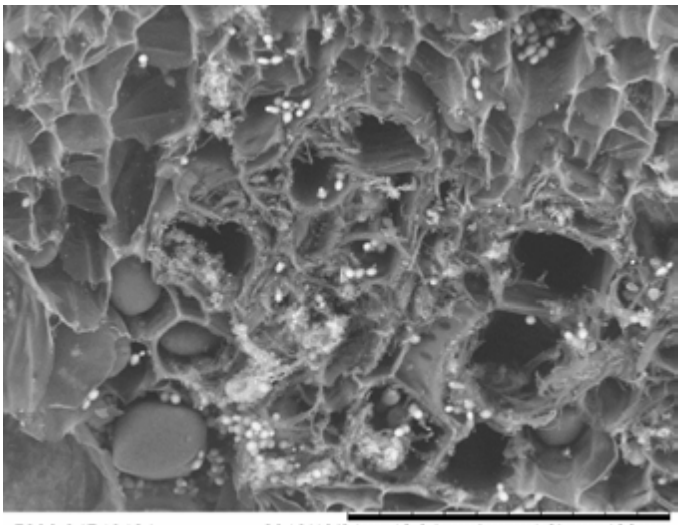
Transverse Edge
(Continued)

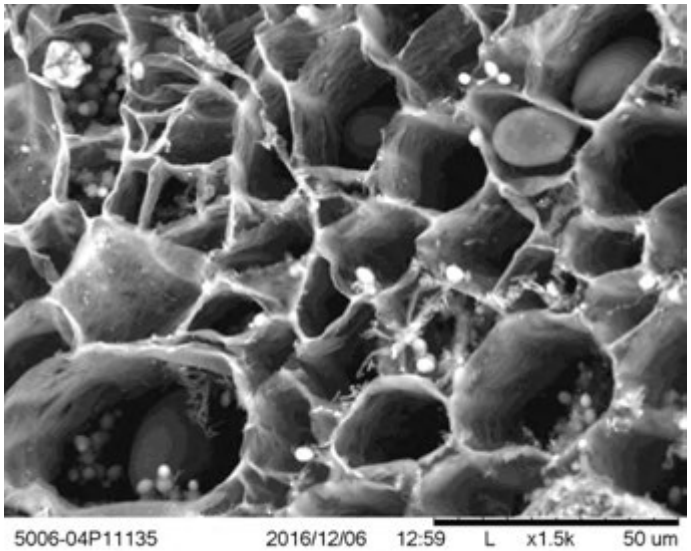








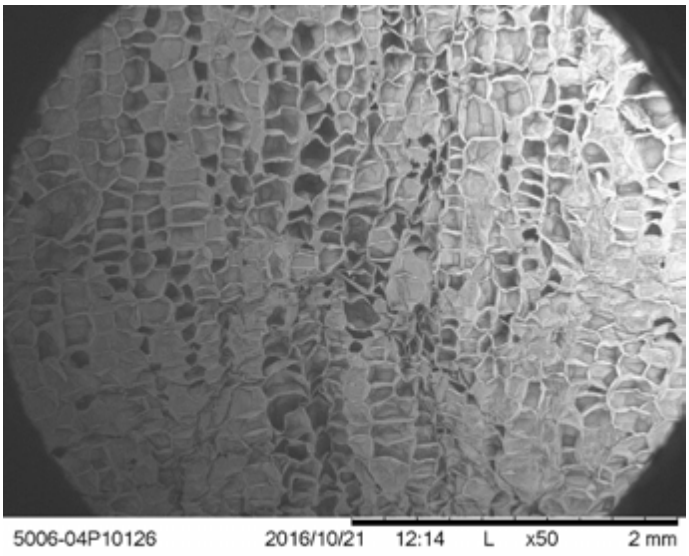


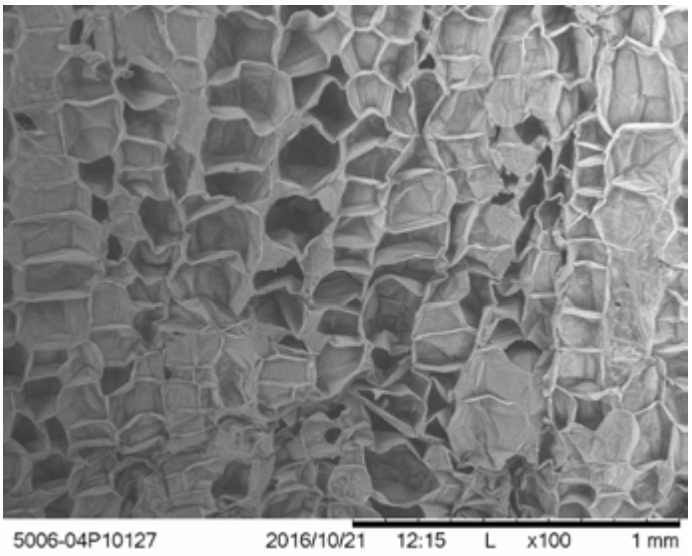


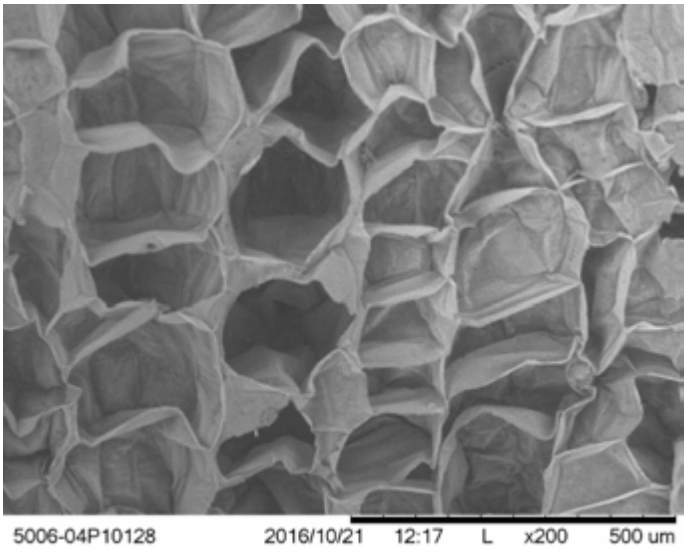
Oxalis tuberosa
OXALIDACEAE

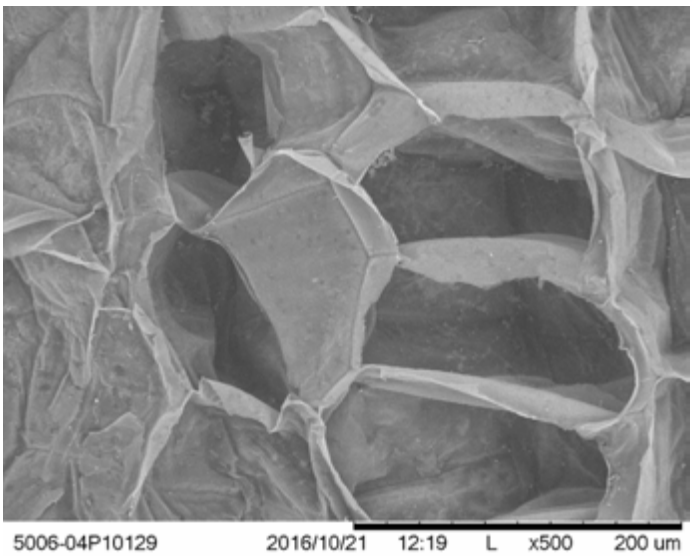
Common Name: Oca
Sample Type: Wet/Fresh

Tangential Center





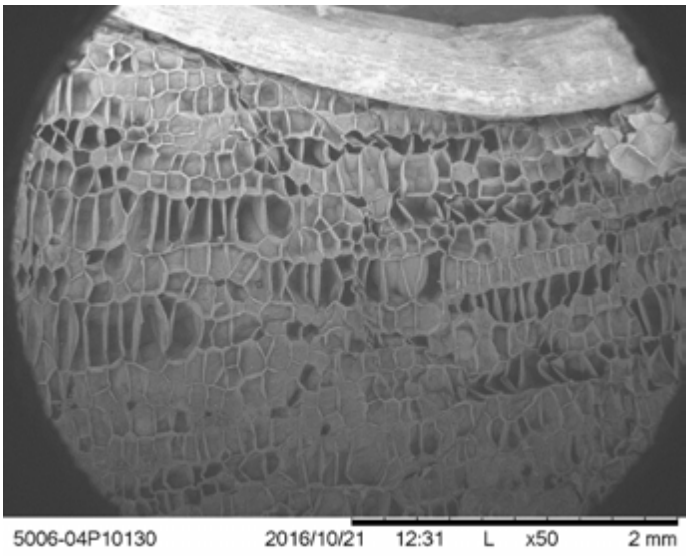


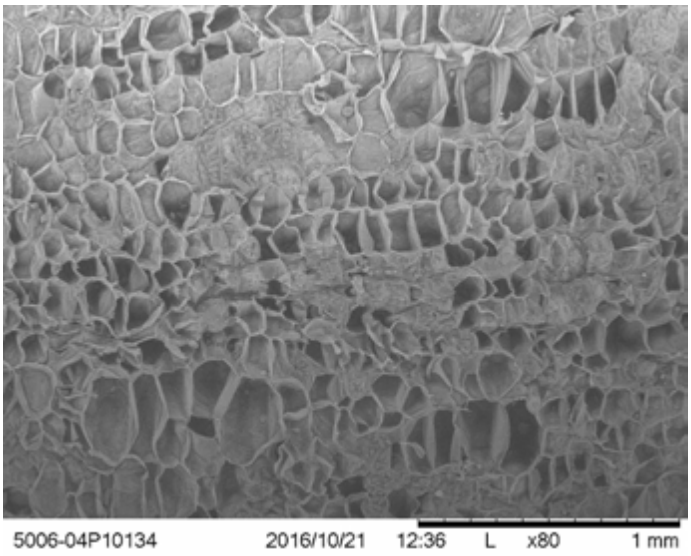


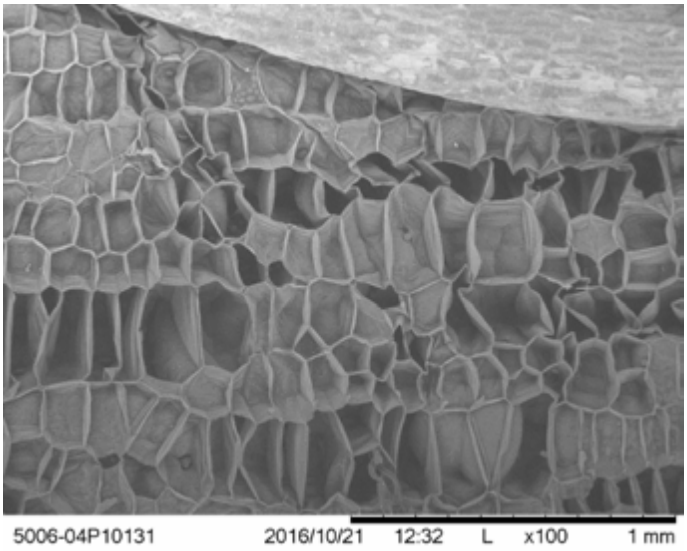
Oxalis tuberosa
OXALIDACEAE

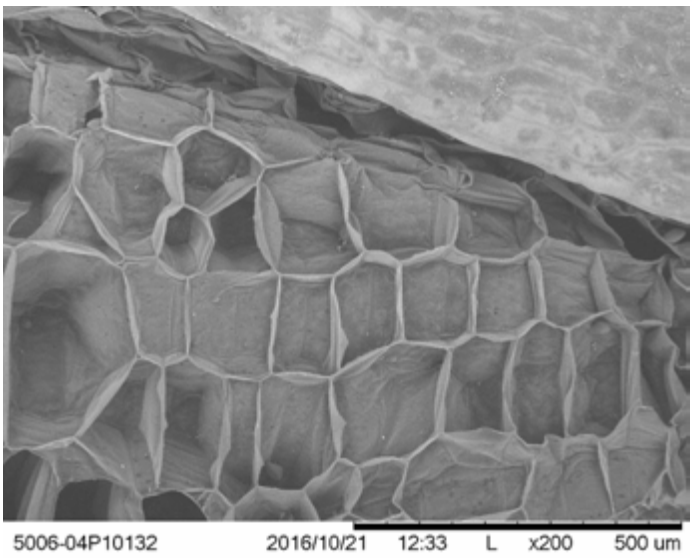
Common Name: Oca
Sample Type: Wet/Fresh

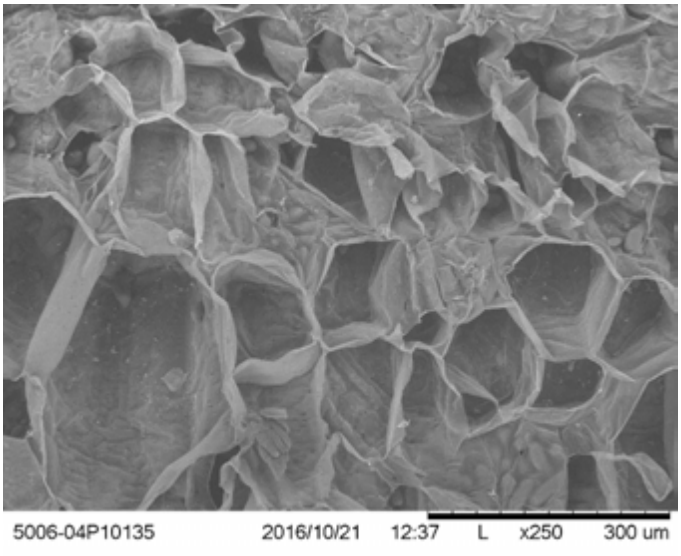
Tangential Edge

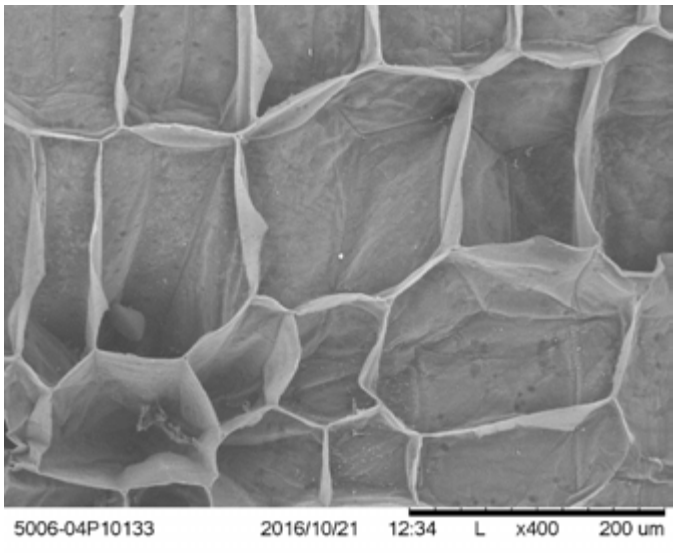








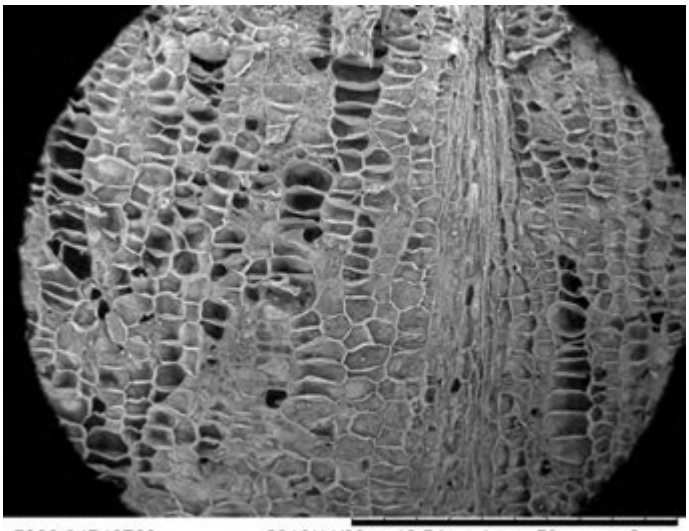


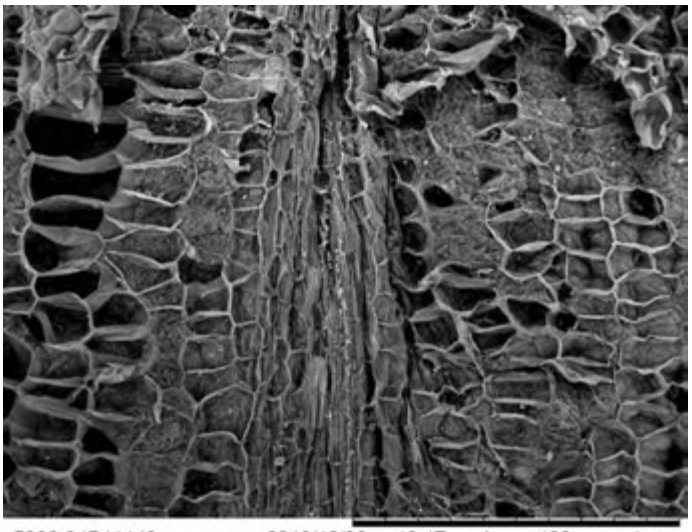


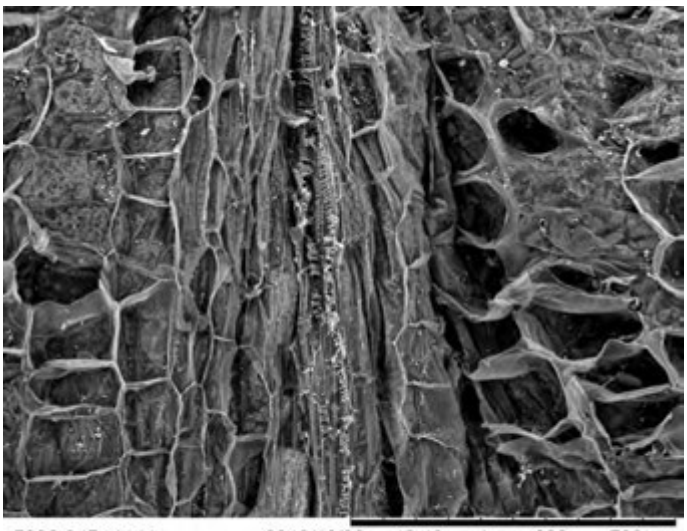
Oxalis tuberosa
OXALIDACEAE

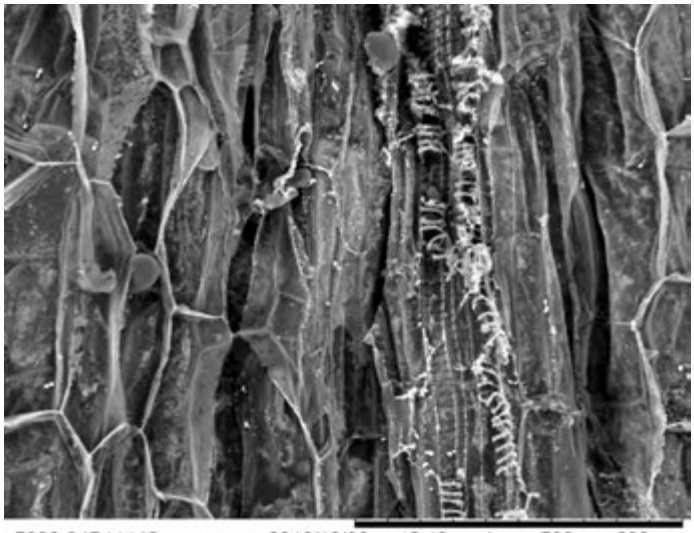
Common Name: Oca
Sample Type: Wet/Fresh

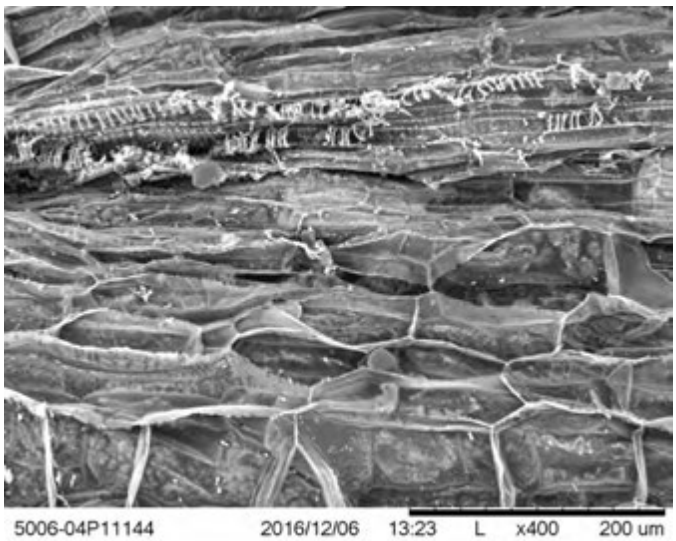
Radial







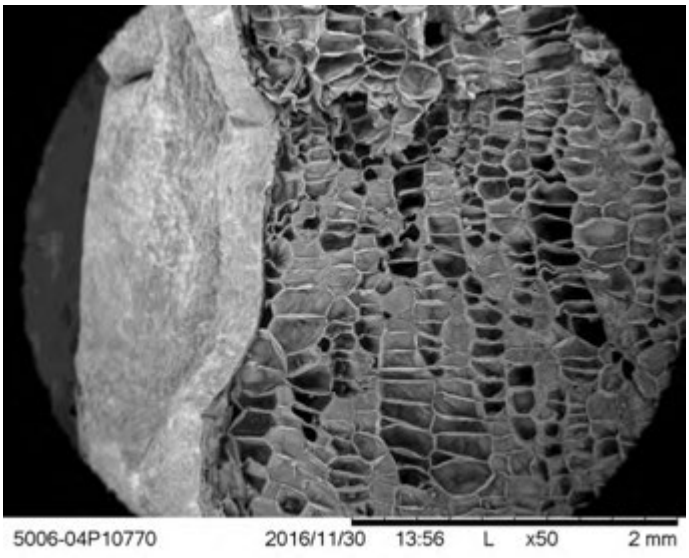


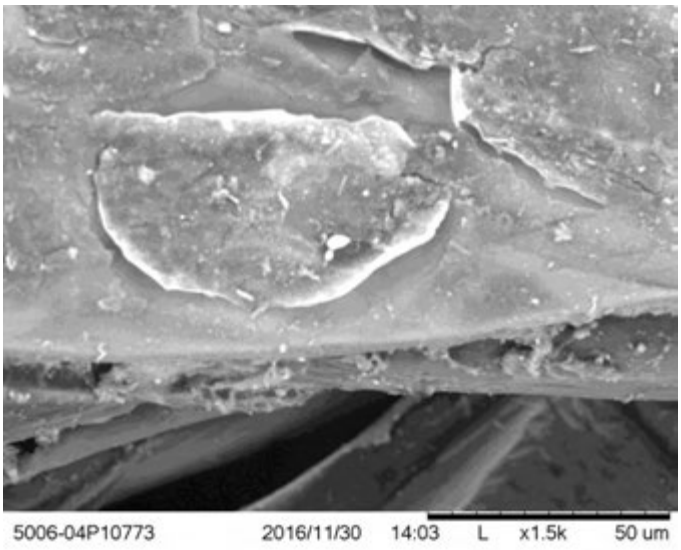


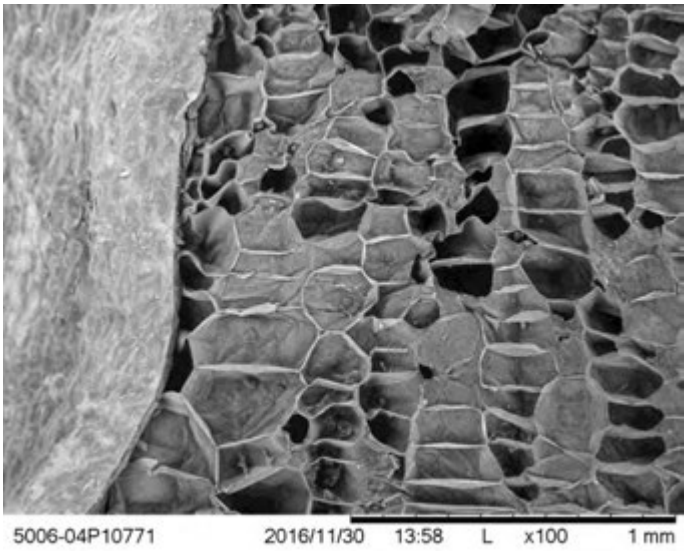
Oxalis tuberosa
OXALIDACEAE

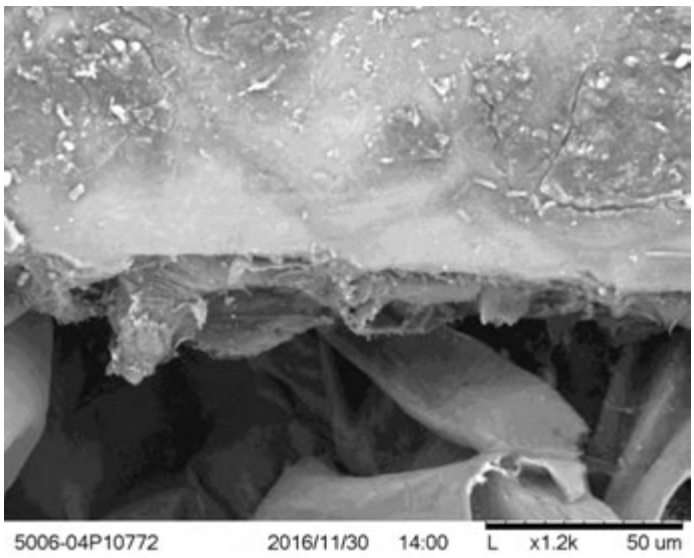
Common Name: Oca
Sample Type: Wet/Fresh

Radial Edge





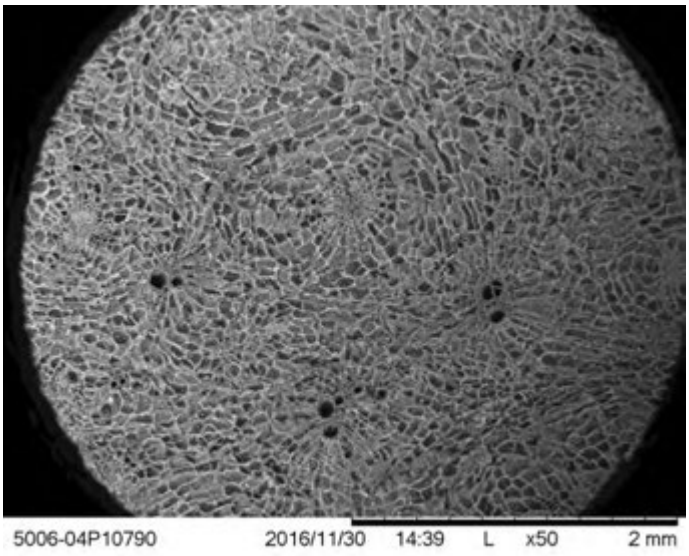


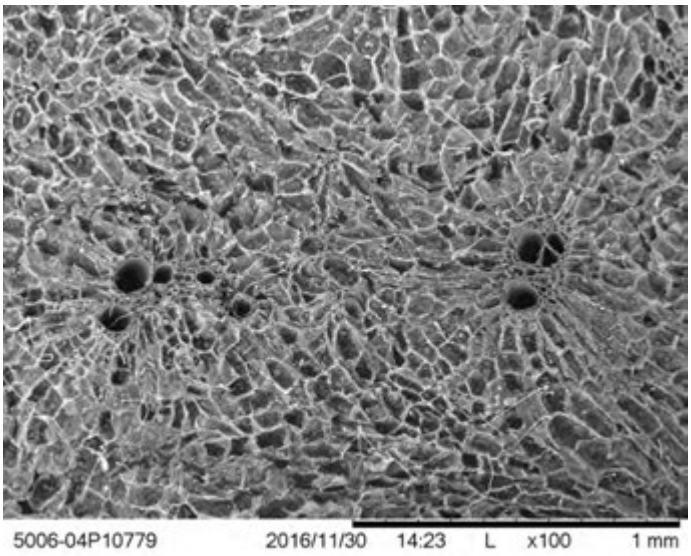


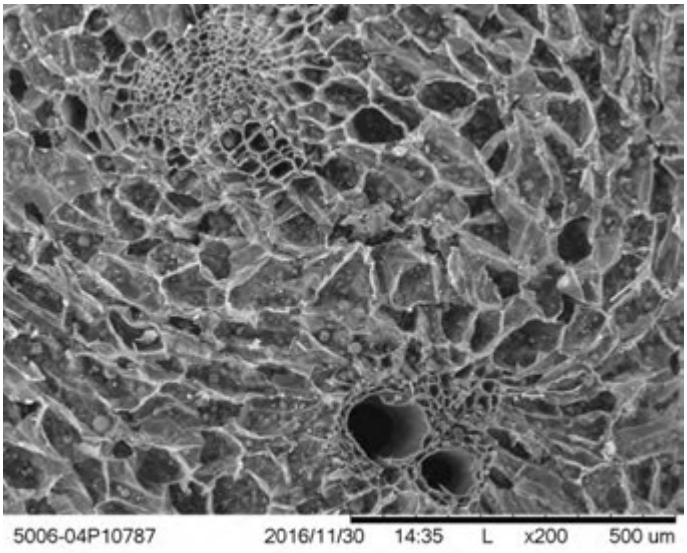
Pachyrhizus erosus
FABACEAE

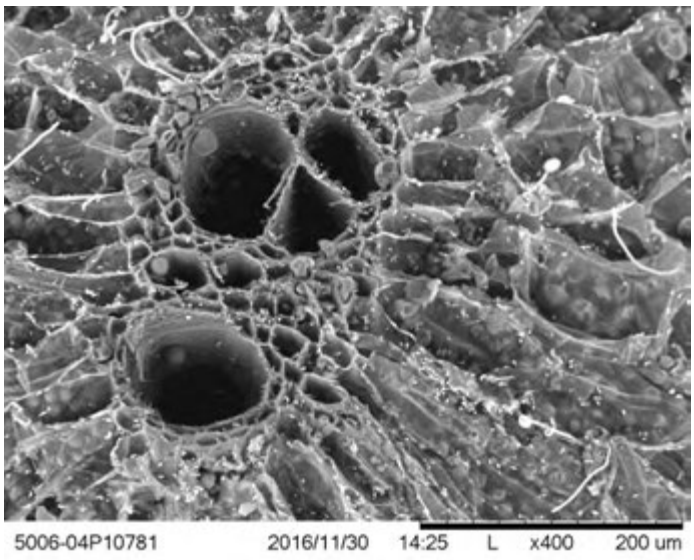
Common Name: Jicama
Sample Type: Wet/Fresh

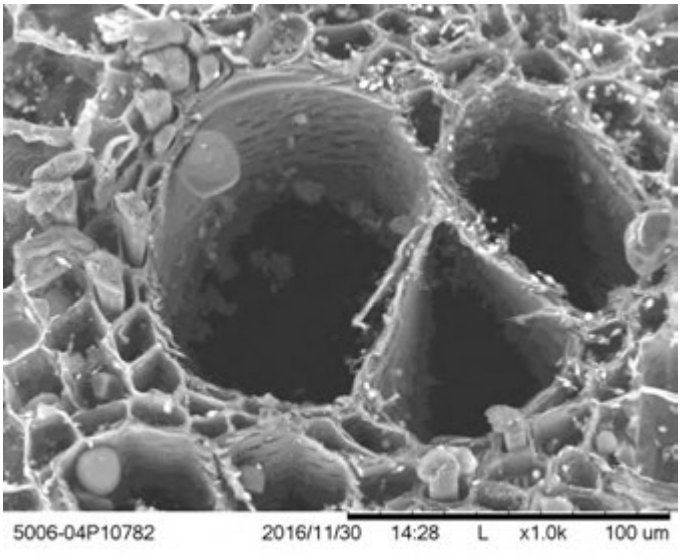
Transverse Center

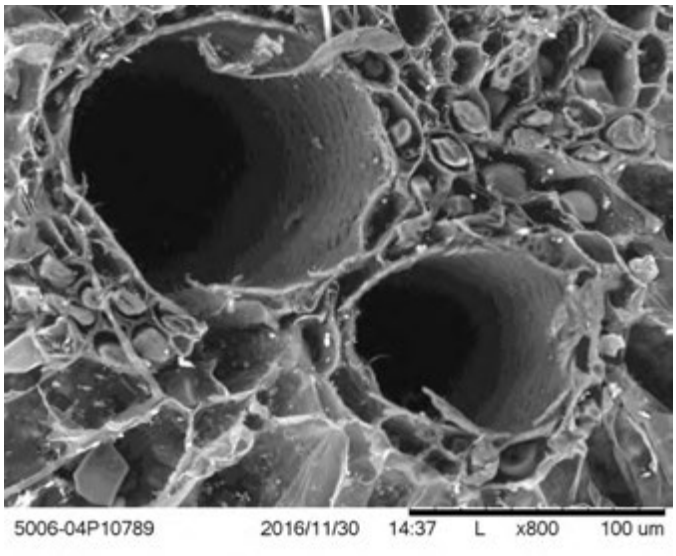








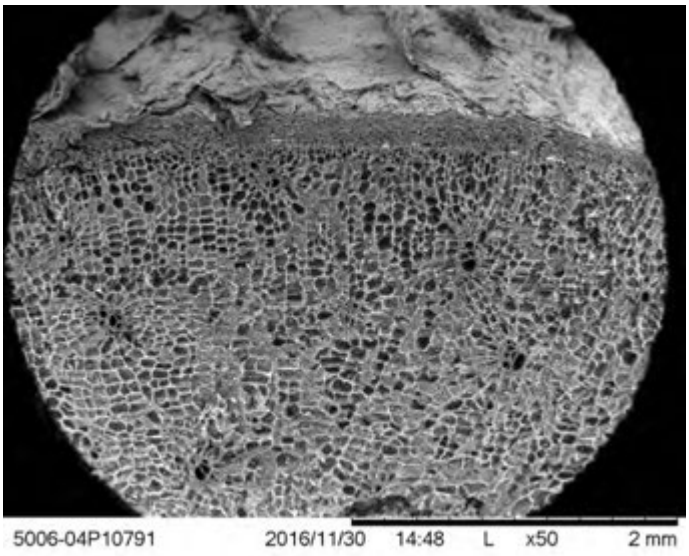


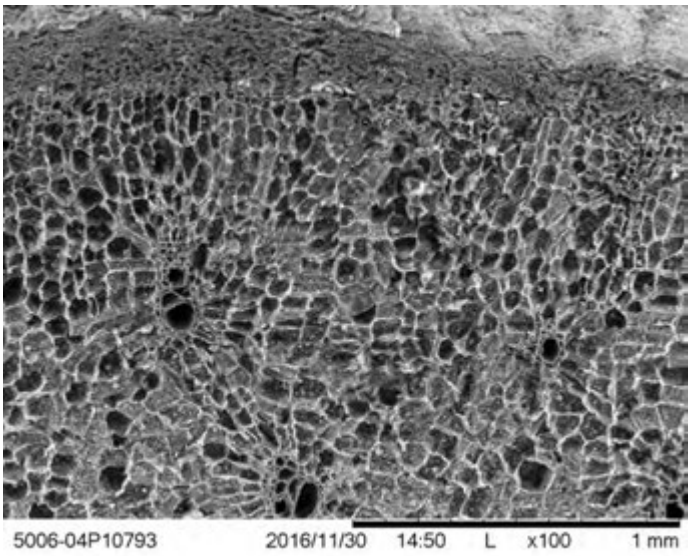


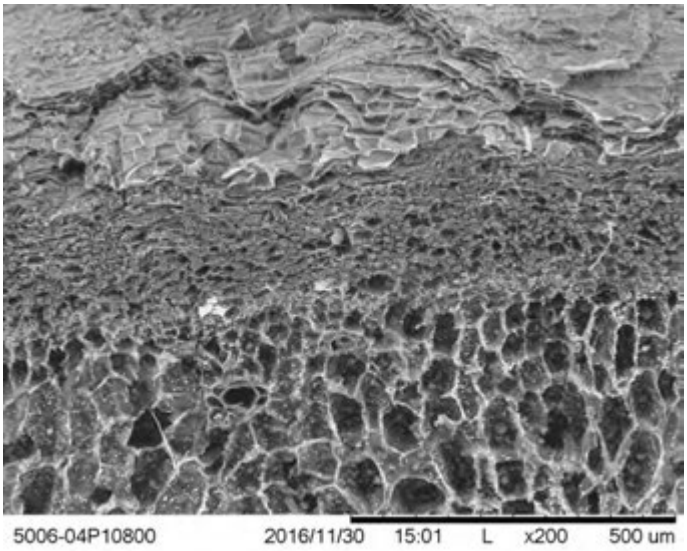
Pachyrhizus erosus
FABACEAE

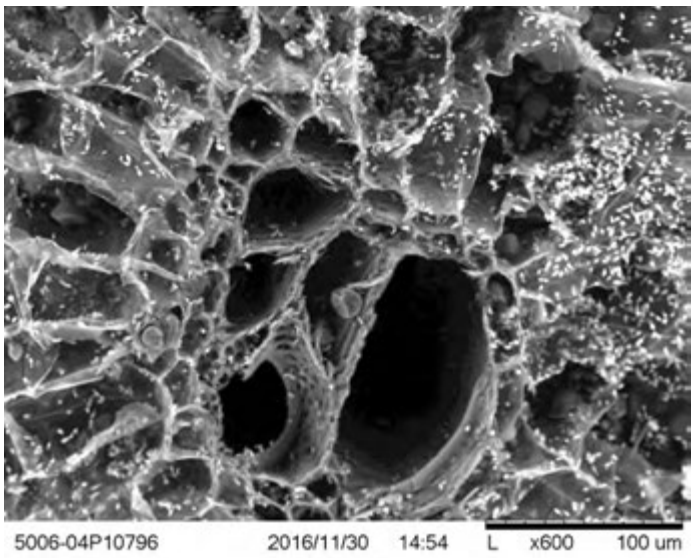
Common Name: Jicama
Sample Type: Wet/Fresh

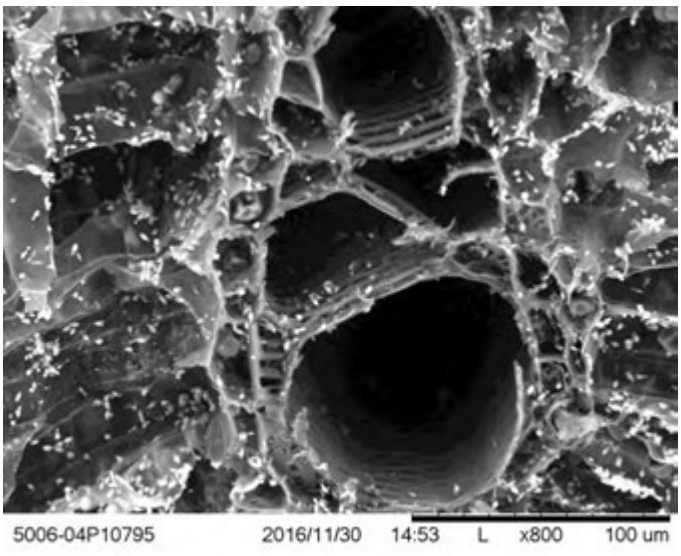
Transverse Edge

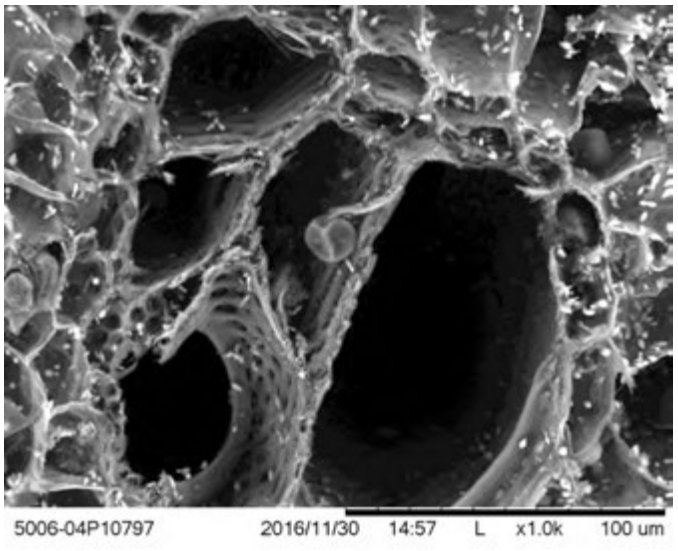








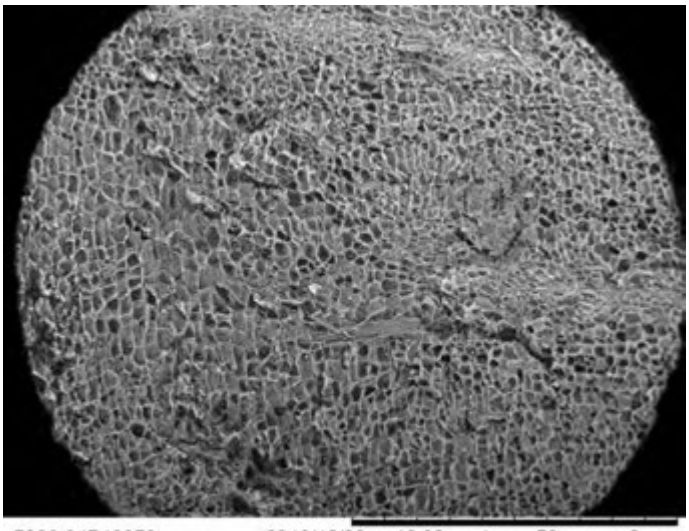


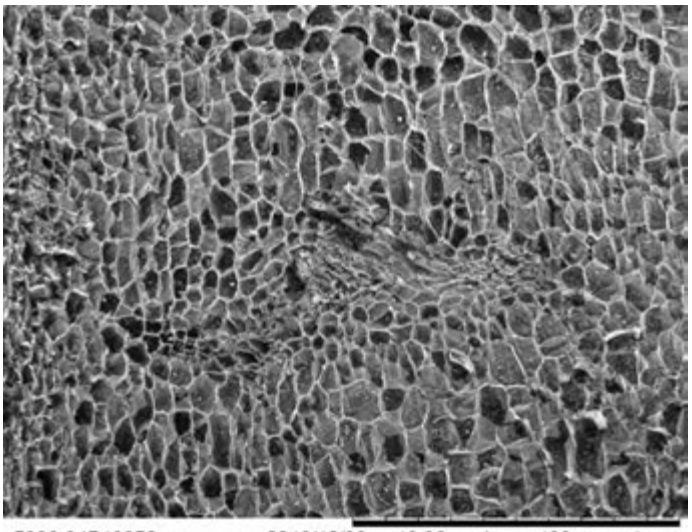


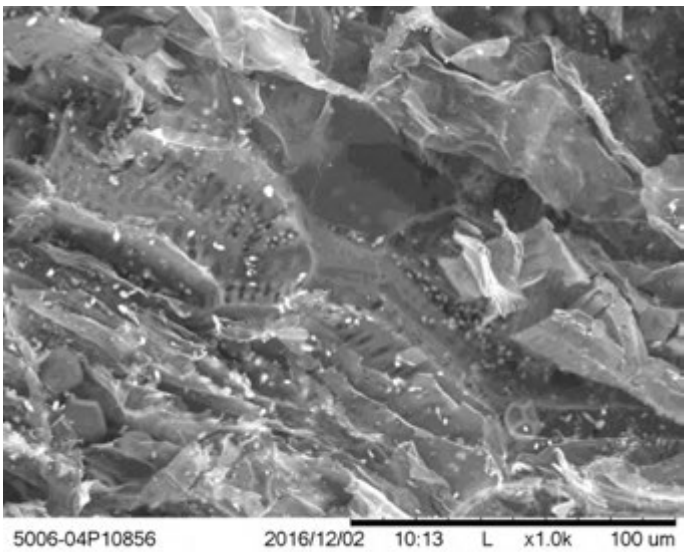
Pachyrhizus erosus
FABACEAE

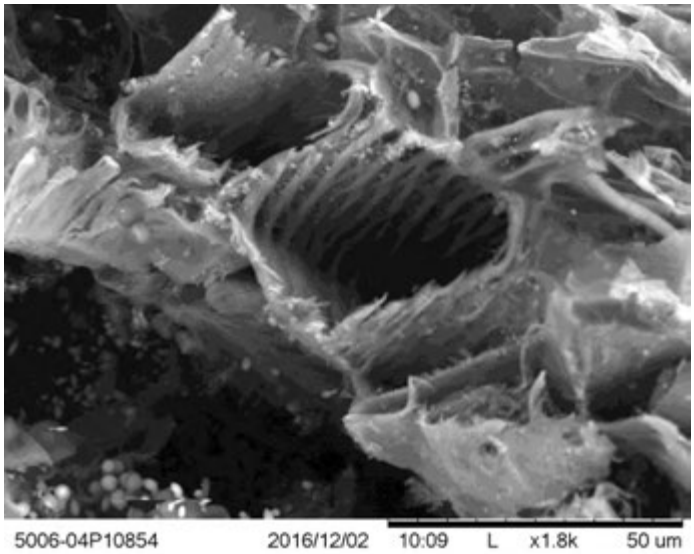
Common Name: Jicama
Sample Type: Wet/Fresh

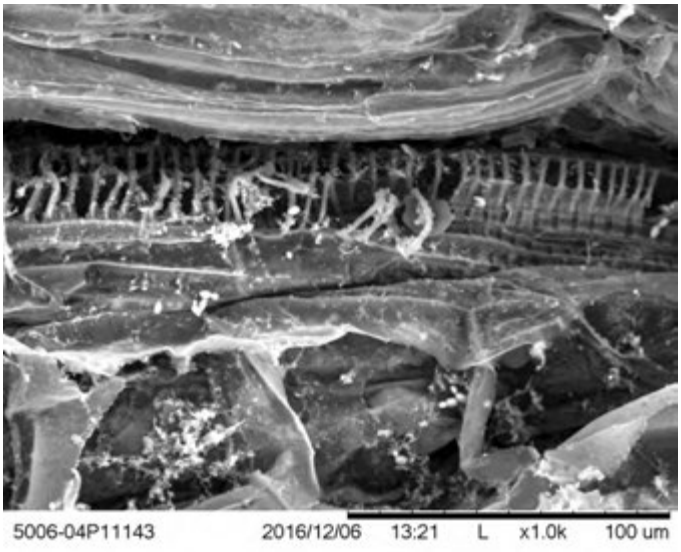
Tangential Center

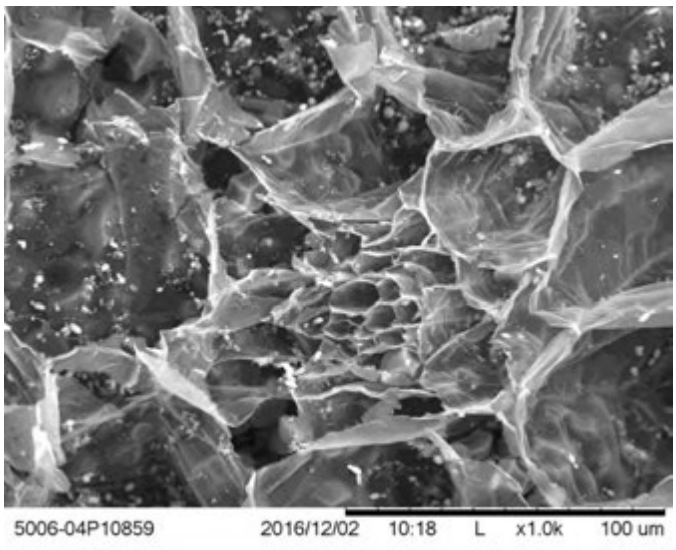








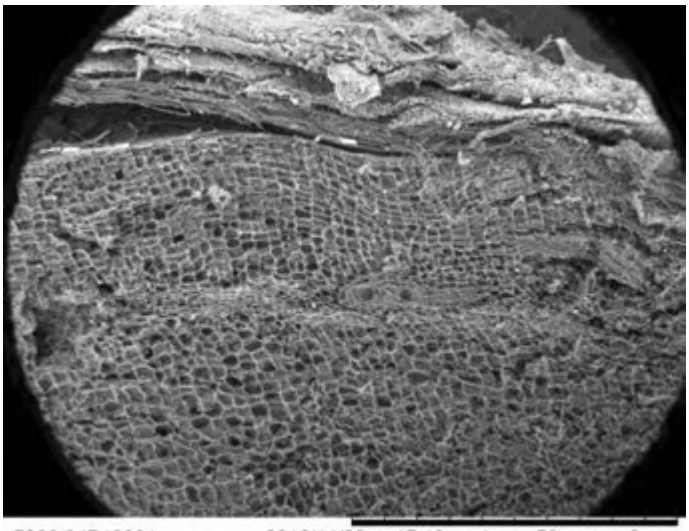


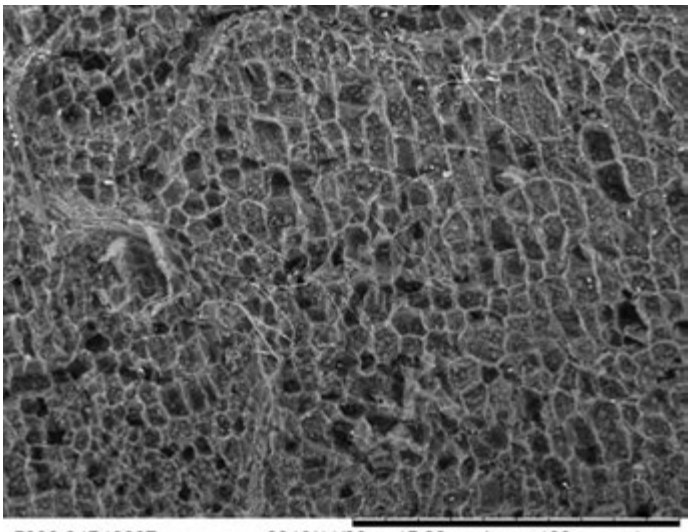


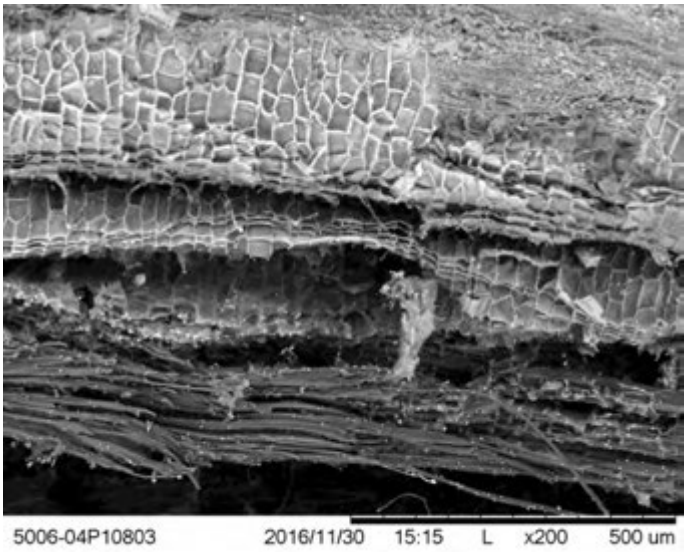
Pachyrhizus erosus
FABACEAE

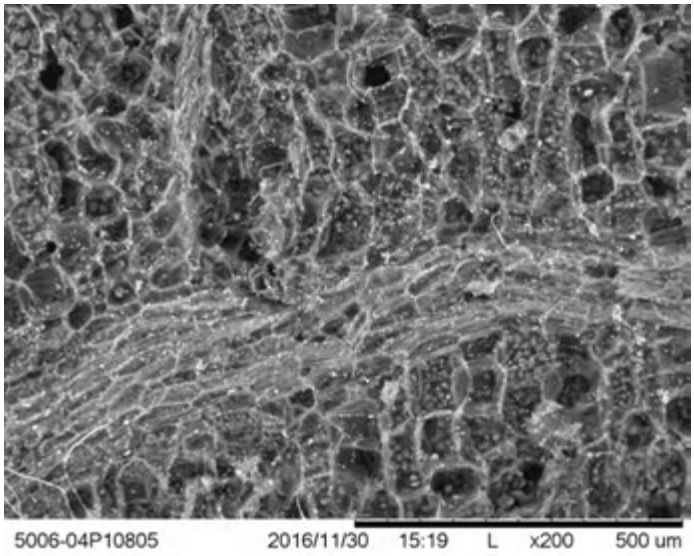
Common Name: Jicama
Sample Type: Wet/Fresh

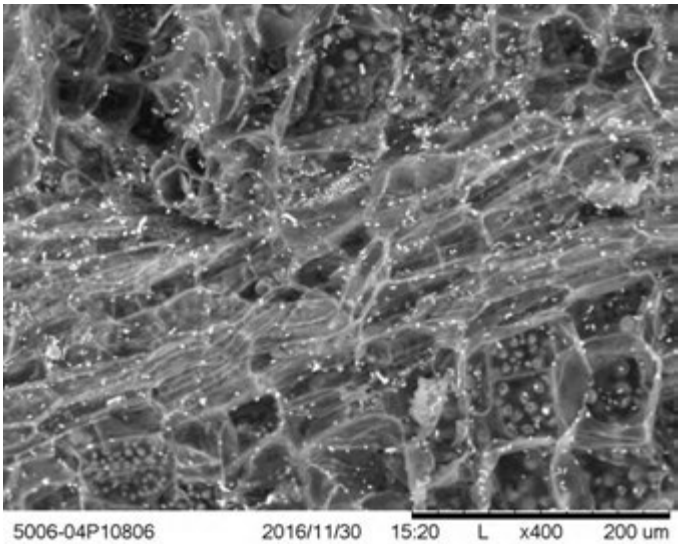
Tangential Edge

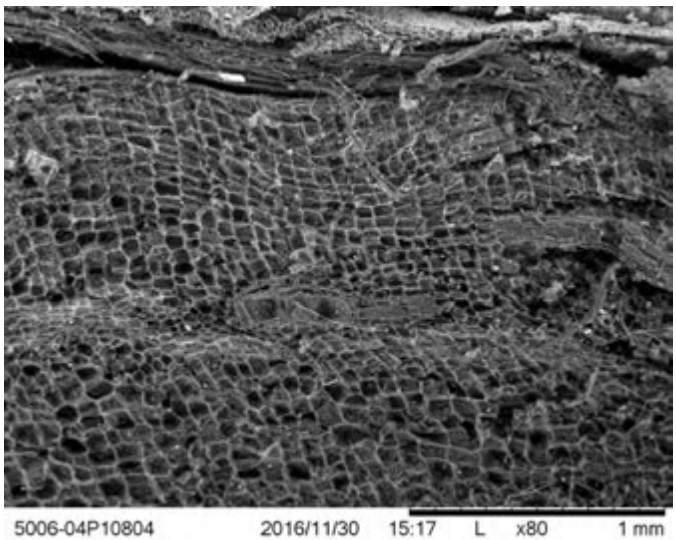




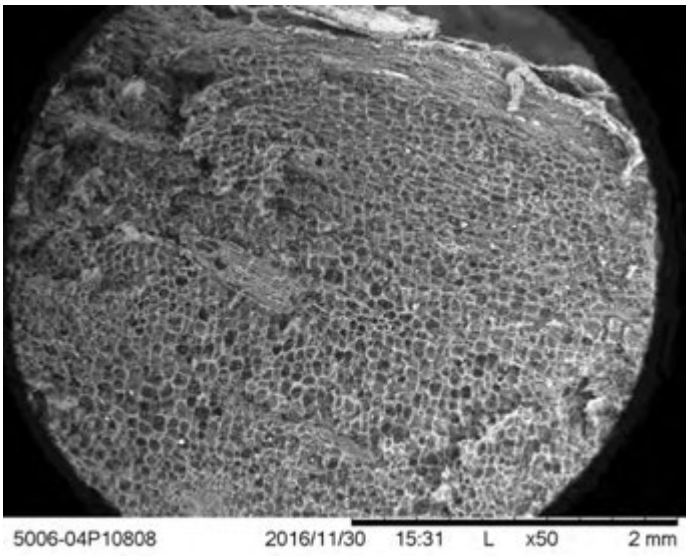


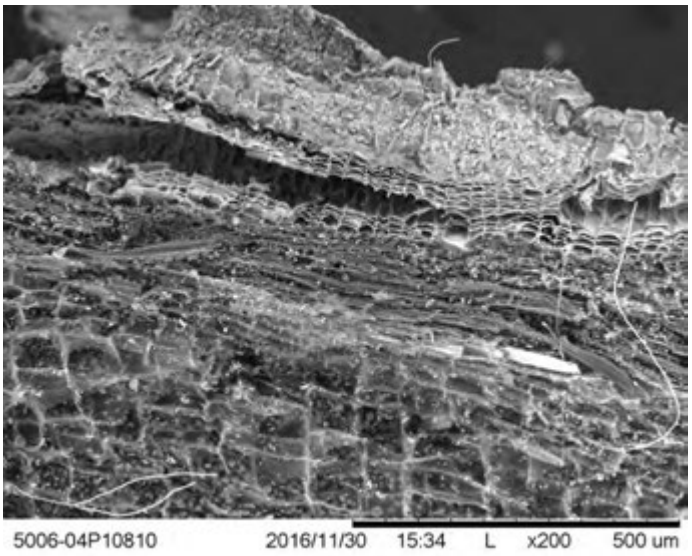


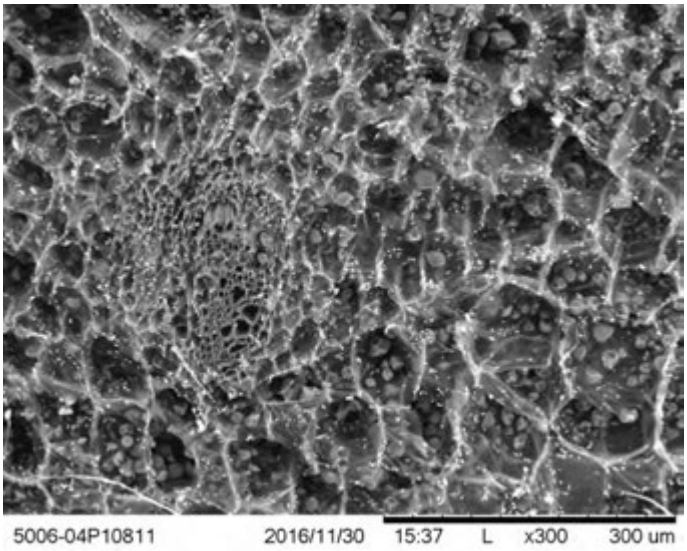


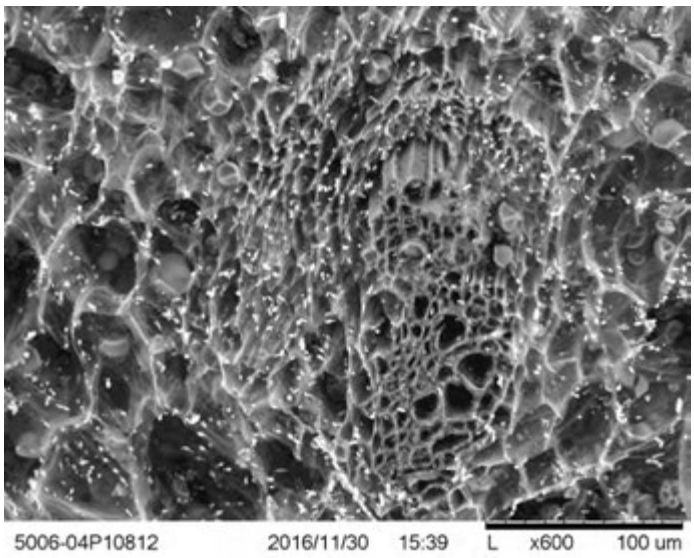


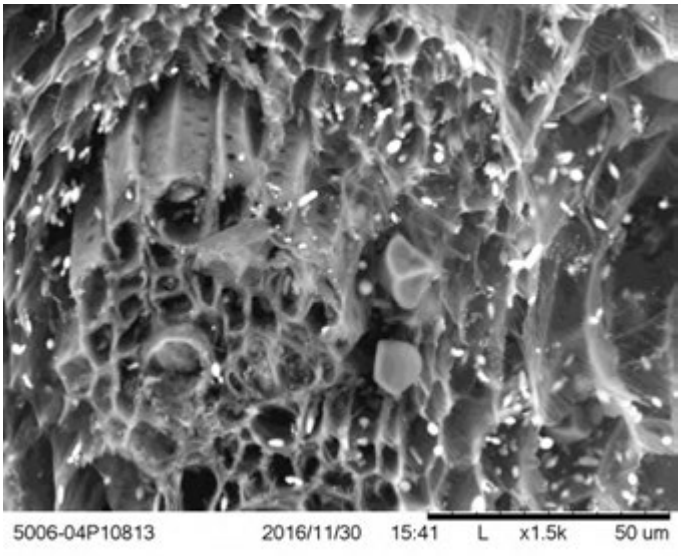
Pachyrhizus erosus Common Name: Jicama Radial
FABACEAE Sample Type: Wet/Fresh

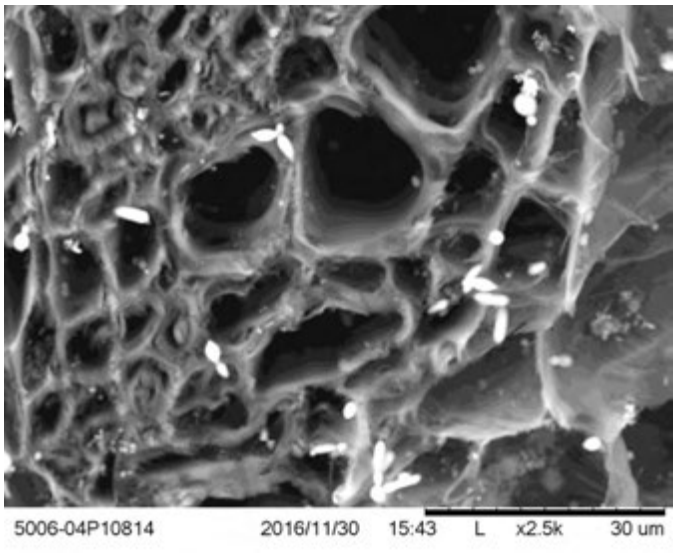




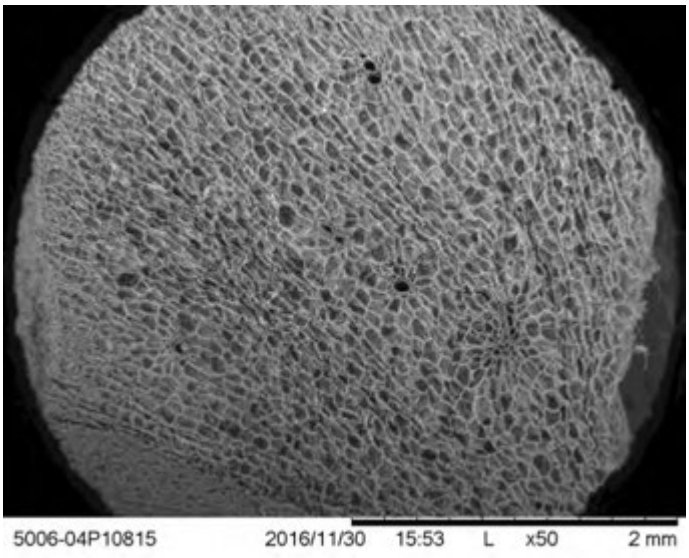


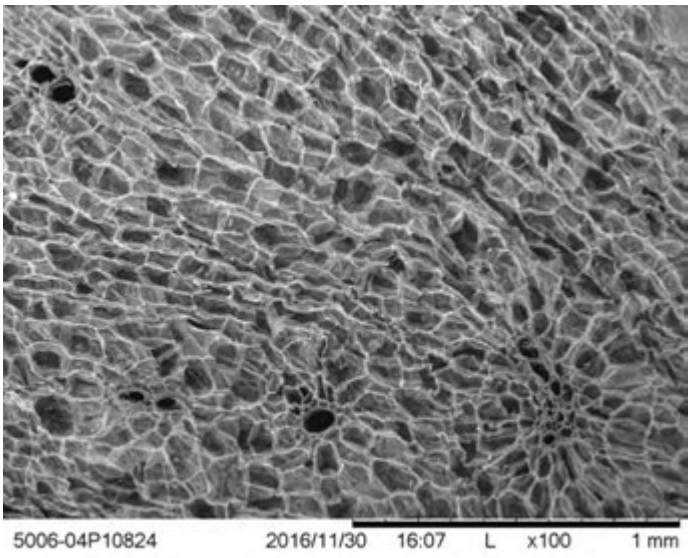


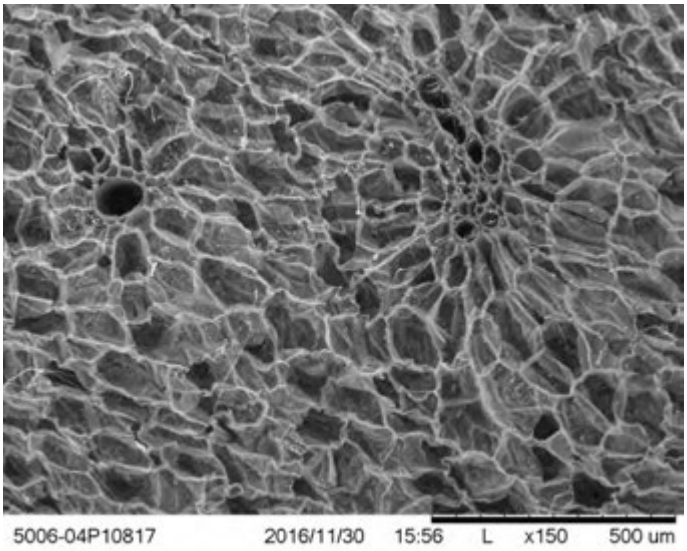


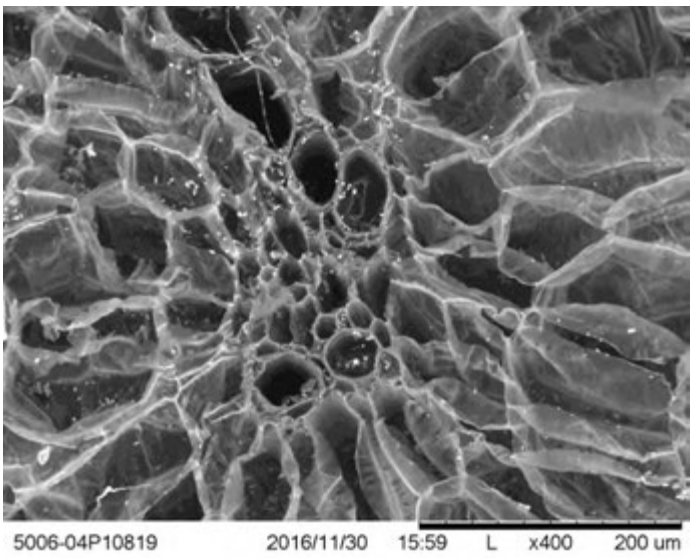


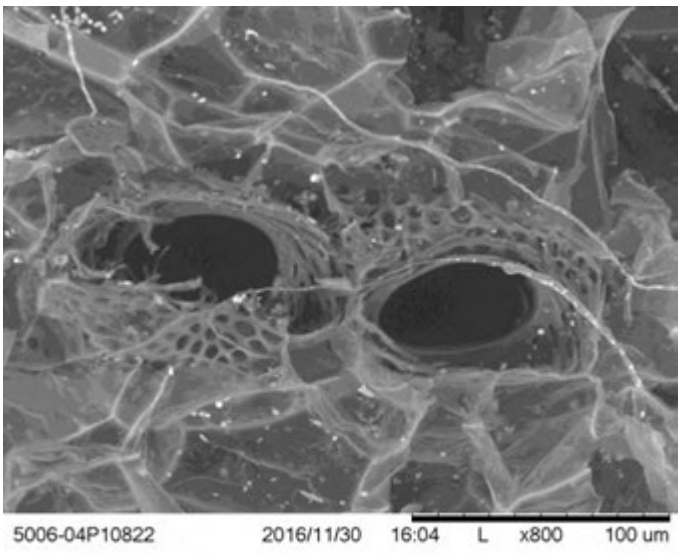
Smallanthus sonchifolius Common Name: Yacon Transverse Center
ASTERACEAE Sample Type: Wet/Fresh

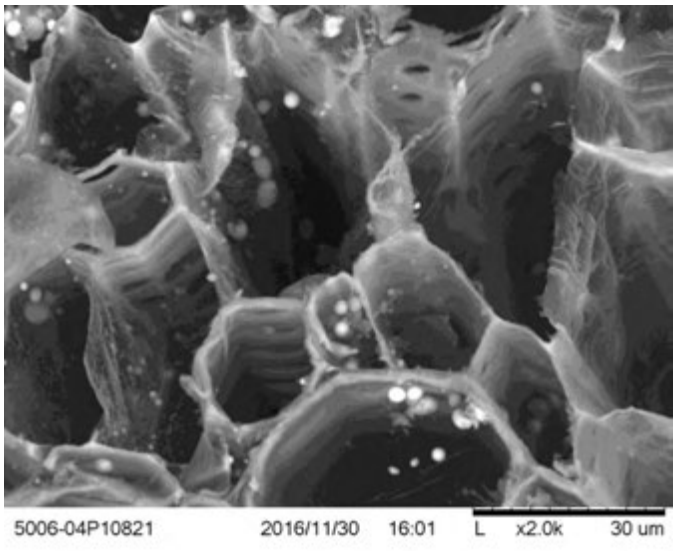




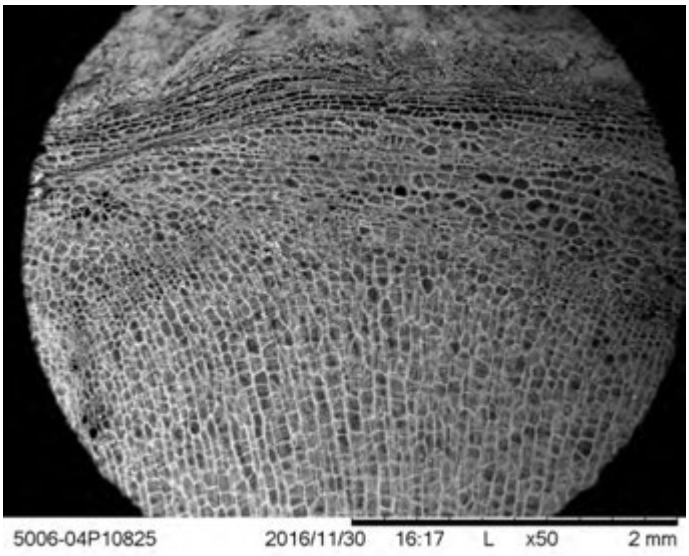


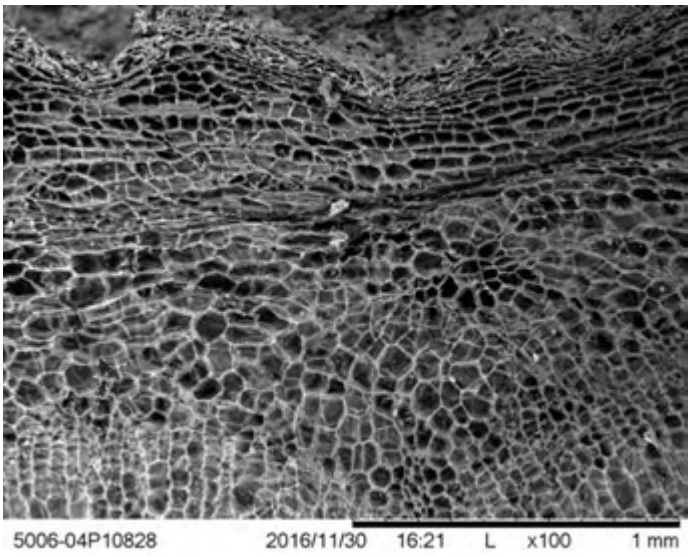


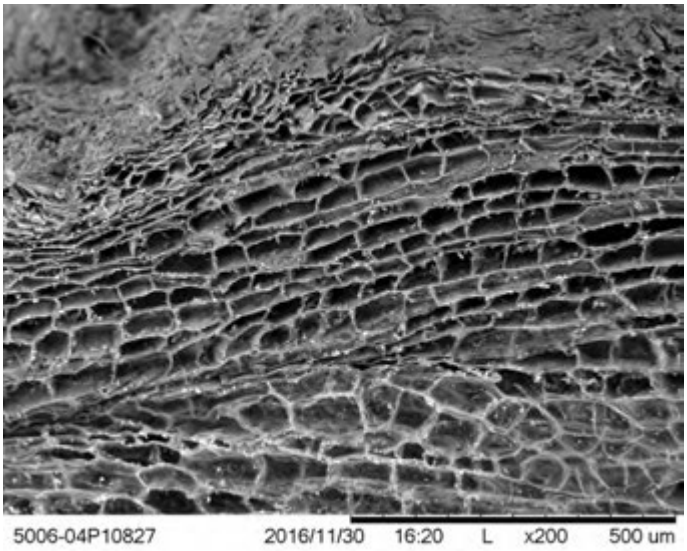


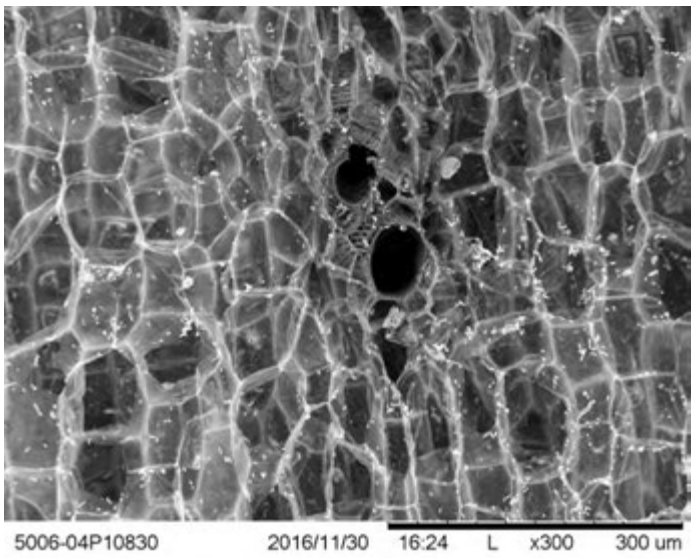


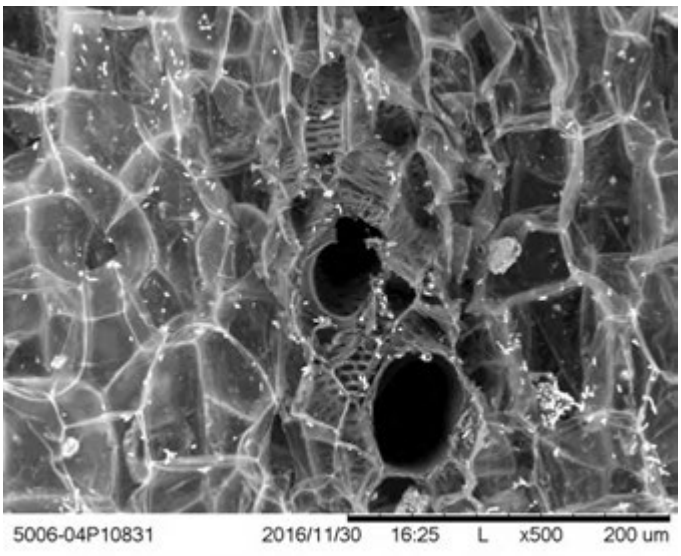
Smallanthus sonchifolius Common Name: Yacon Transverse Edge
ASTERACEAE Sample Type: Wet/Fresh

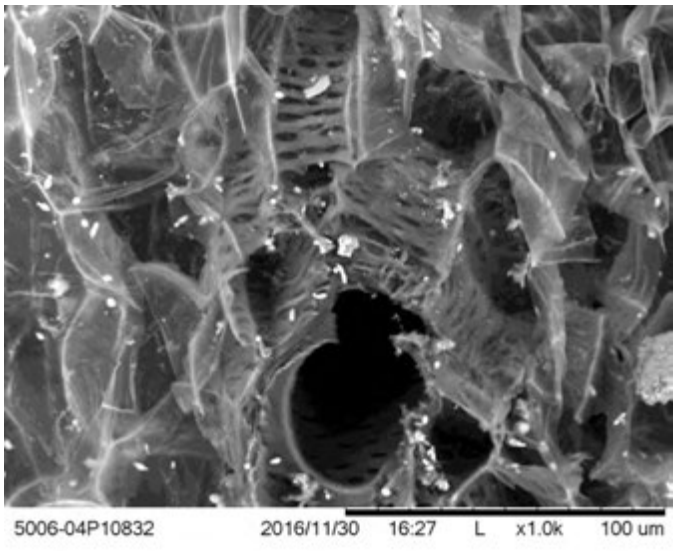




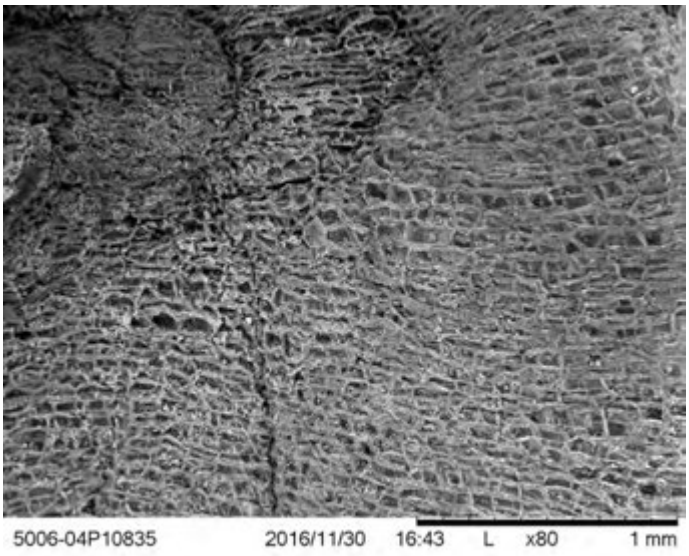


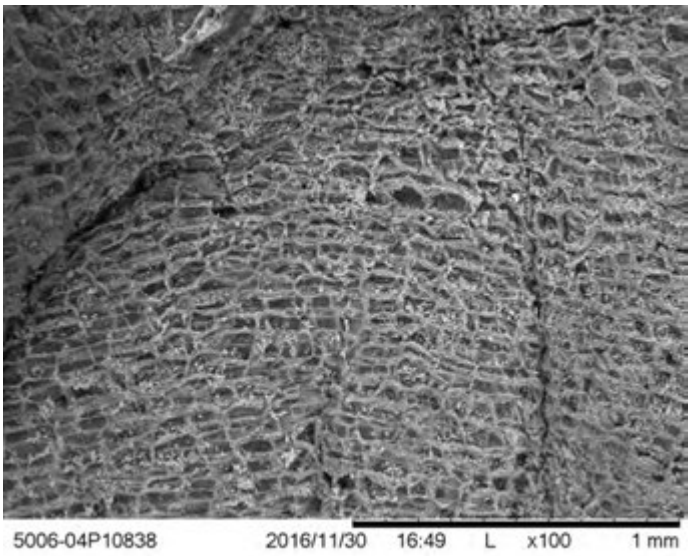


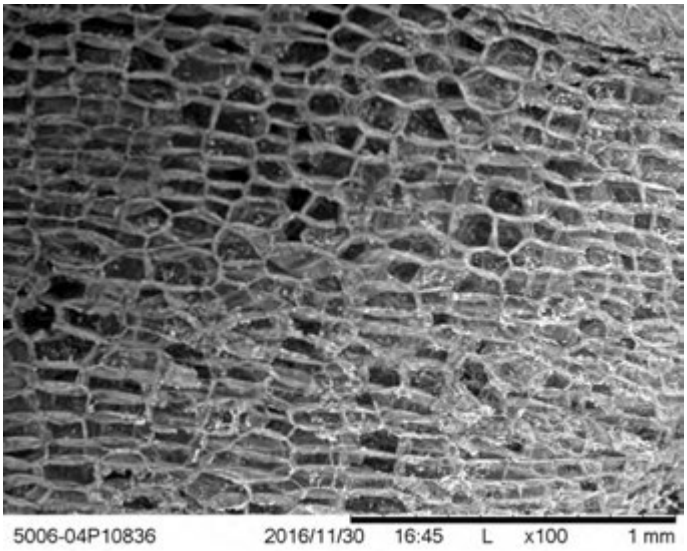


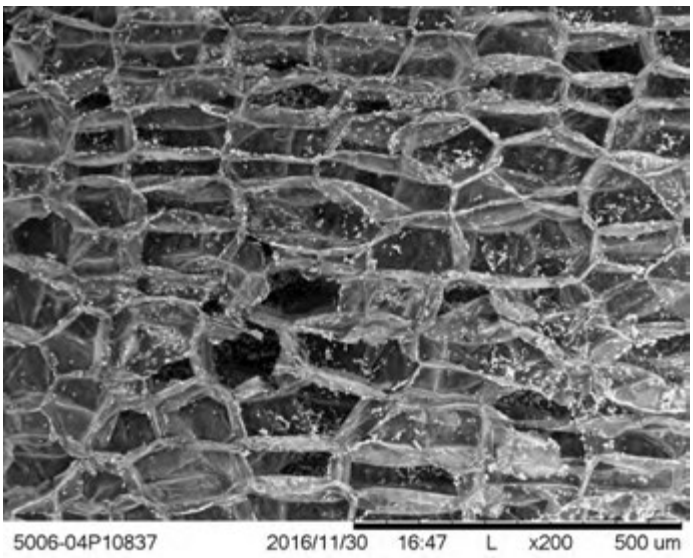


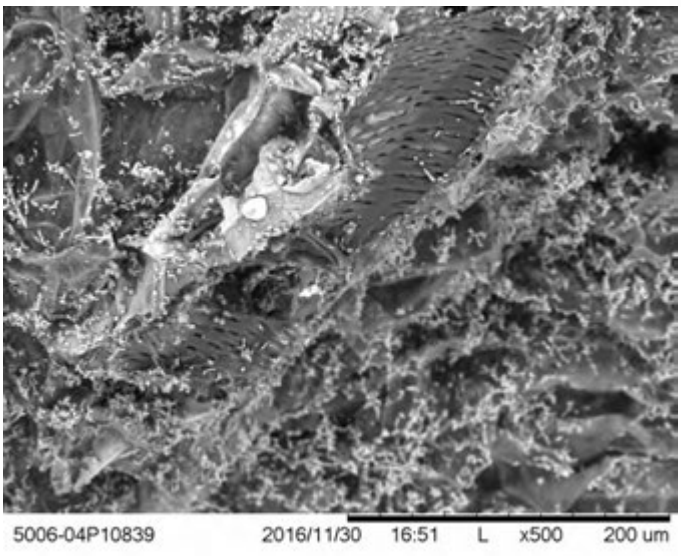
Smallanthus sonchifolius Common Name: Yacon Tangential Center
ASTERACEAE Sample Type: Wet/Fresh

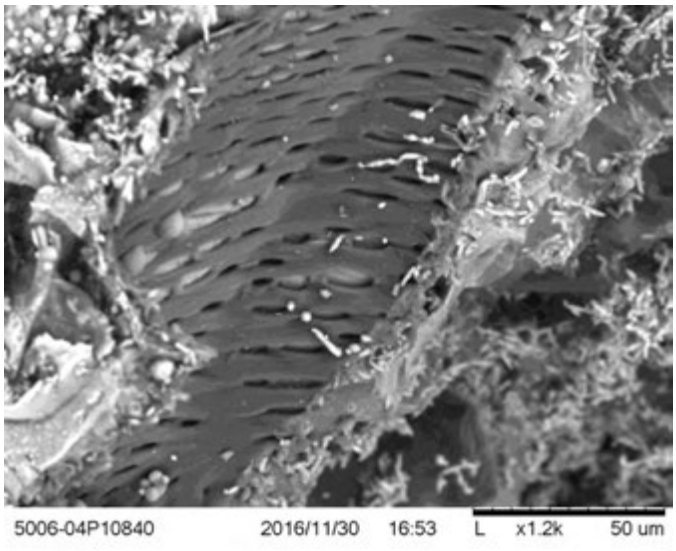




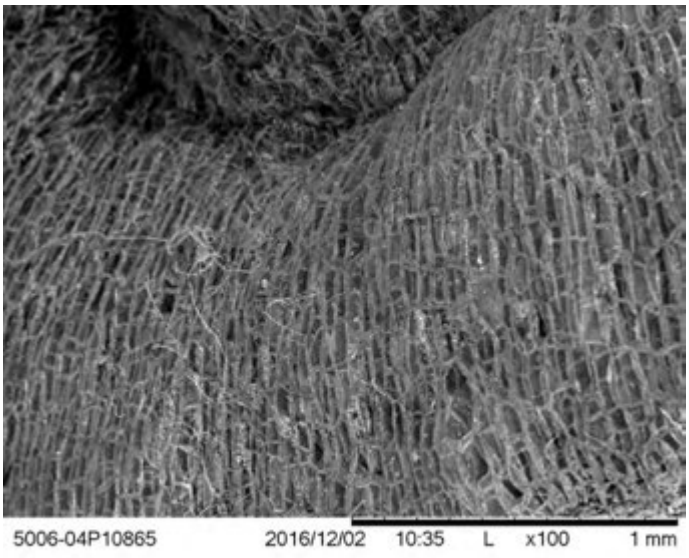


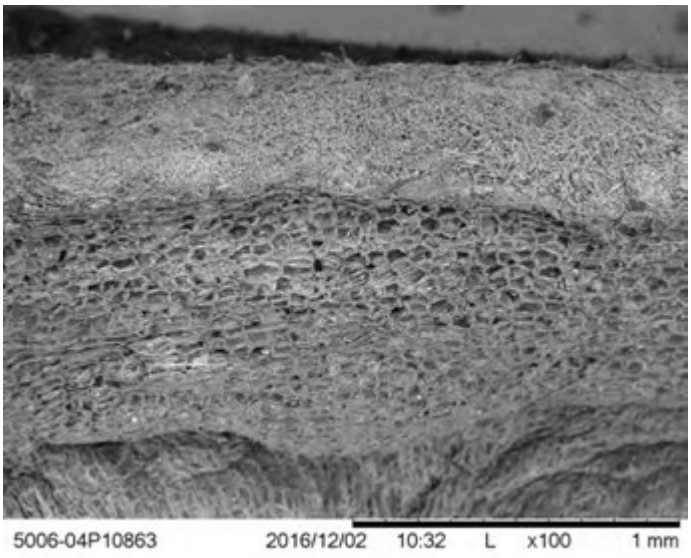


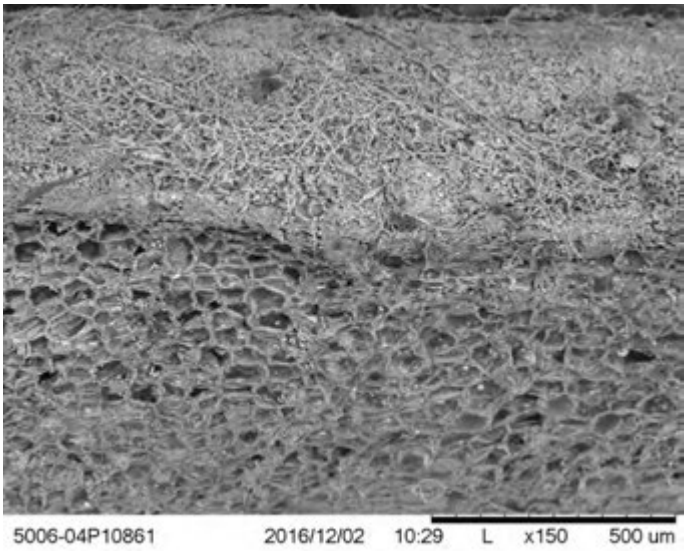


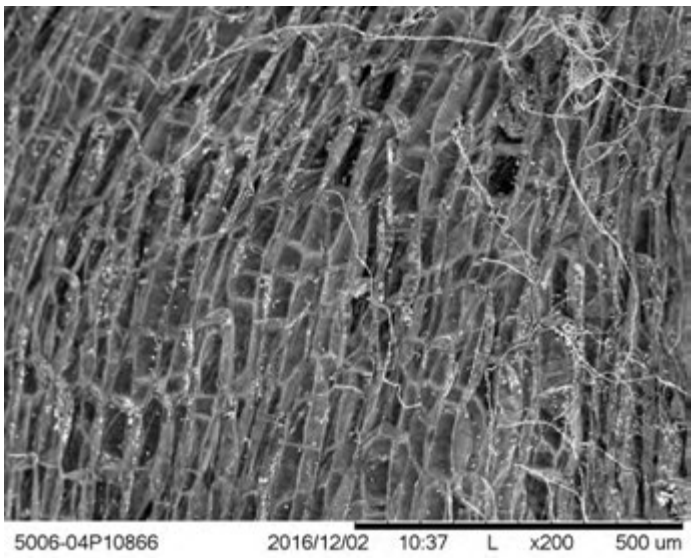


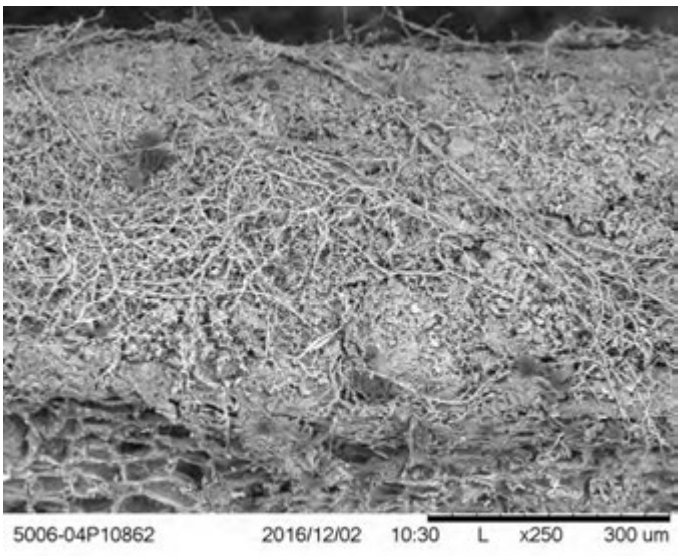
Smallanthus sonchifolius Common Name: Yacon Tangential Edge
ASTERACEAE Sample Type: Wet/Fresh

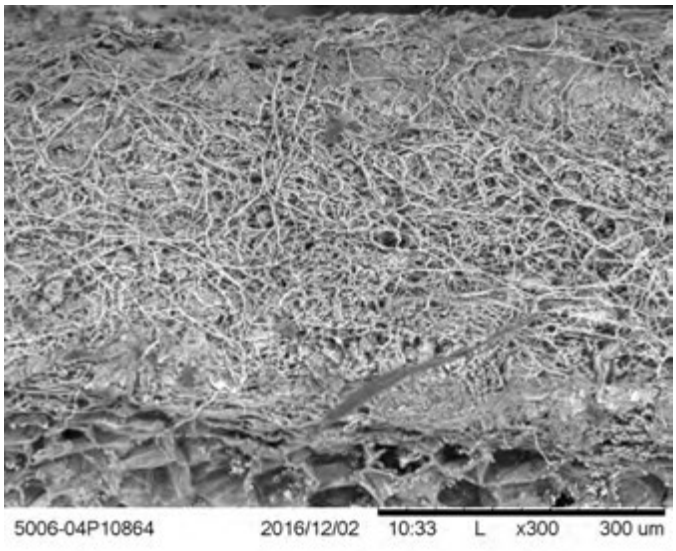




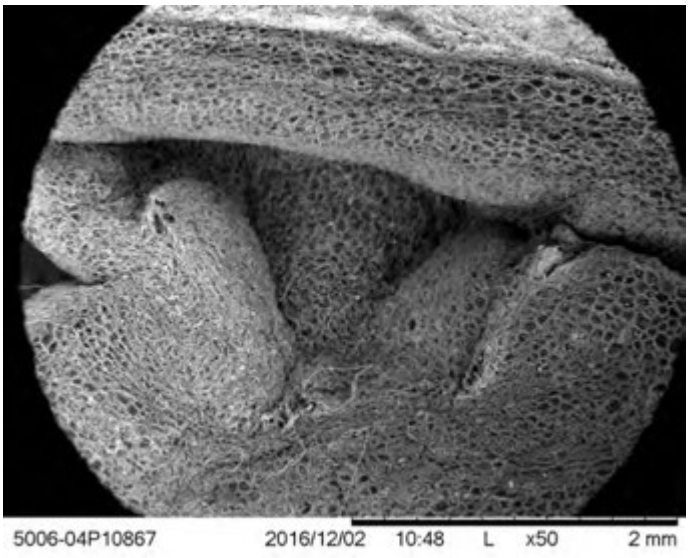


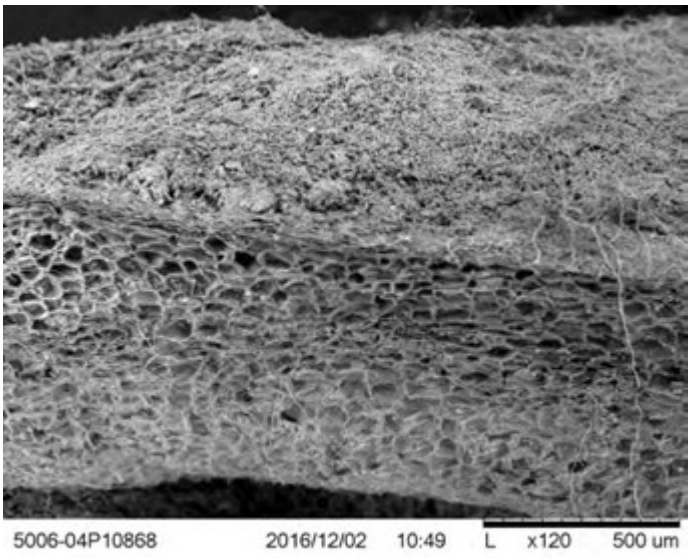


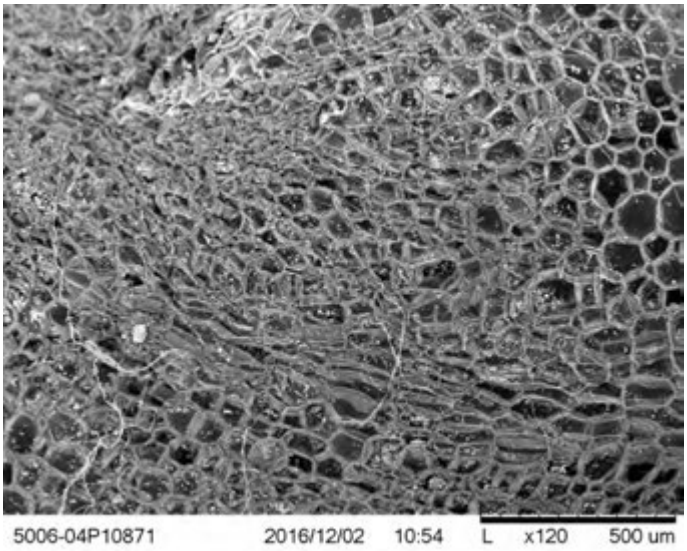


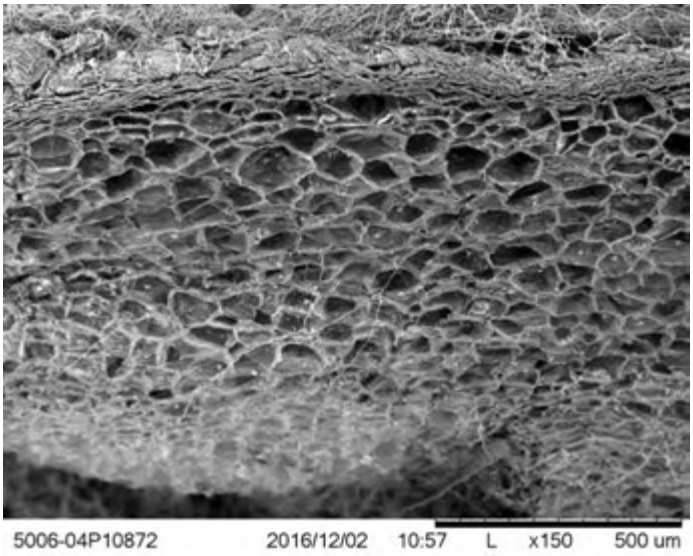


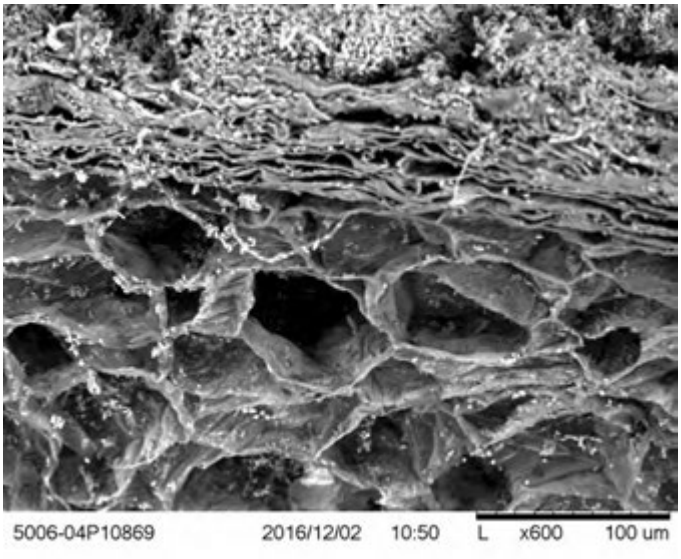
Smallanthus sonchifolius Common Name: Yacon Radial
ASTERACEAE Sample Type: Wet/Fresh

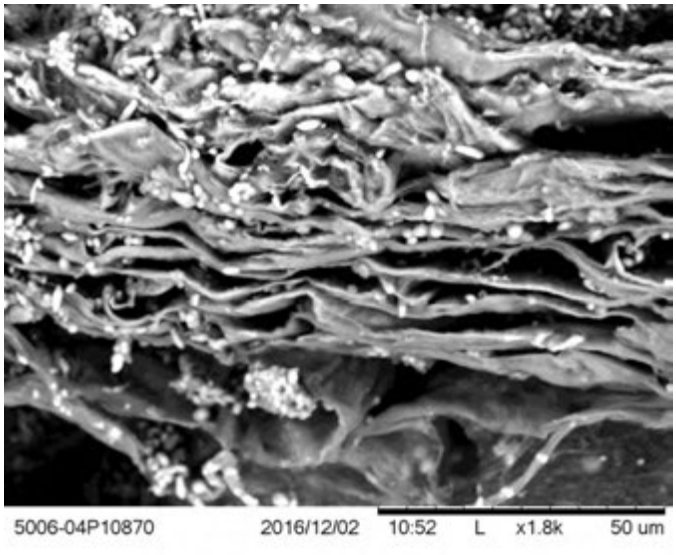








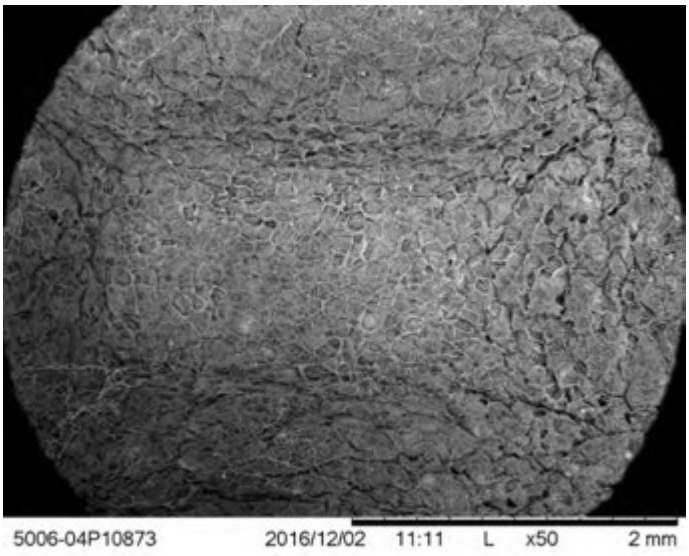


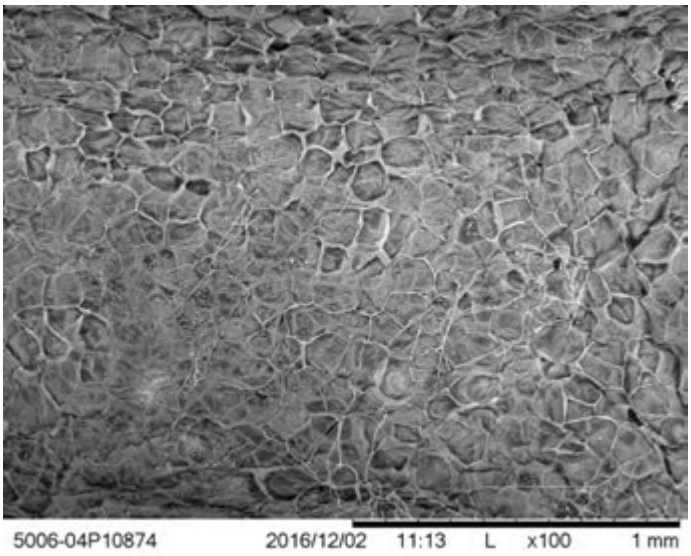


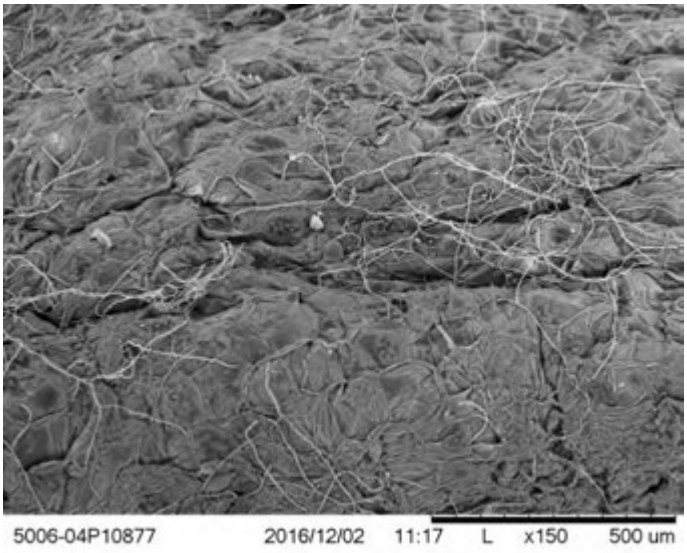
Solanum
SOLANACEAE

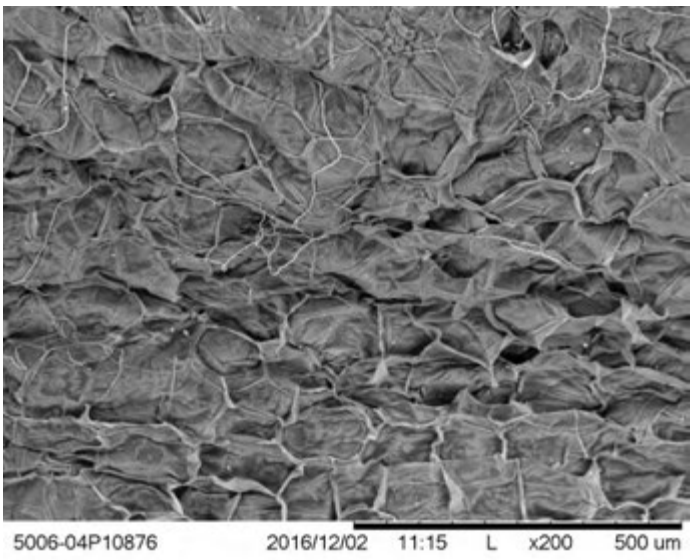
Common Name: Papa
Sample Type: Wet/Fresh

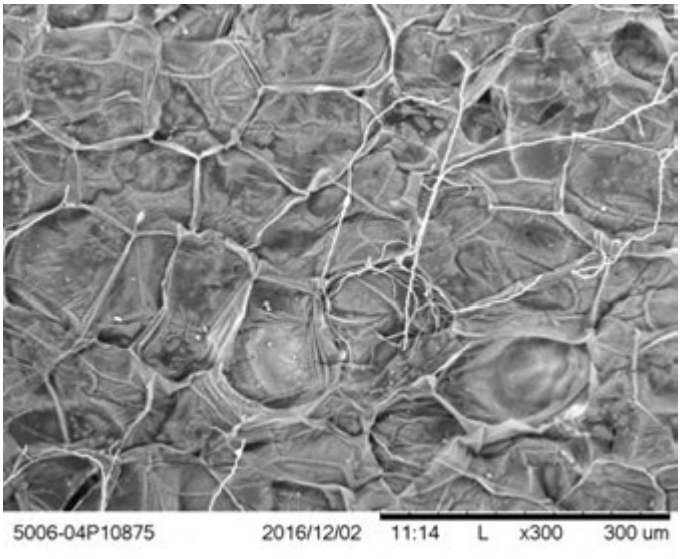
Transverse Center

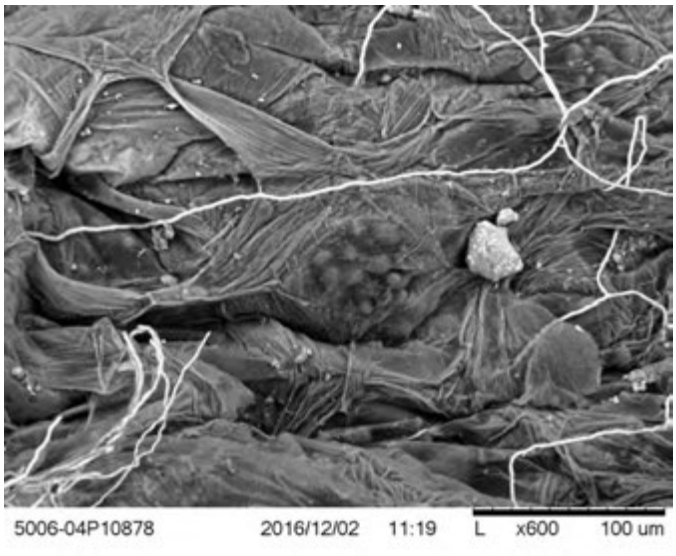








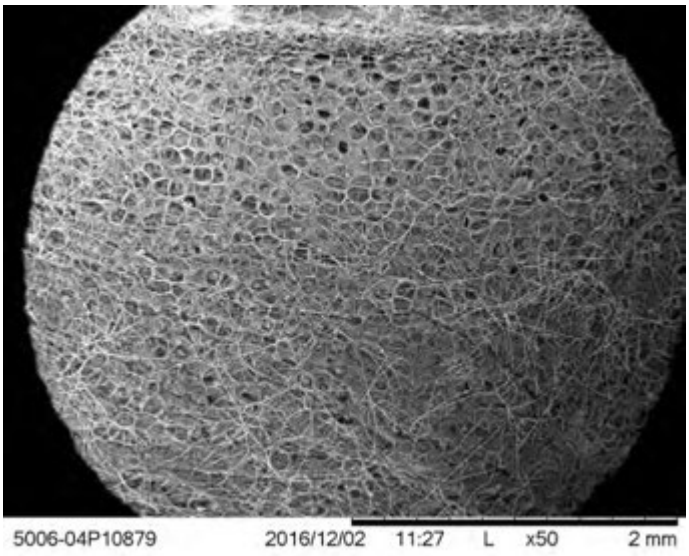


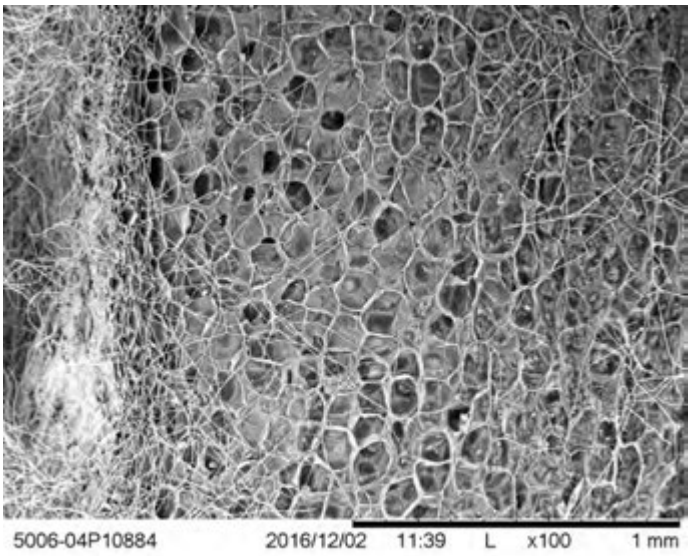


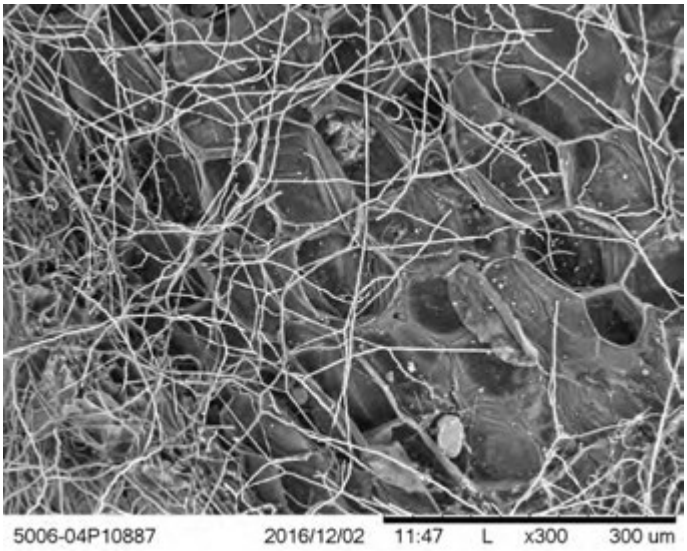
Solanum
SOLANACEAE

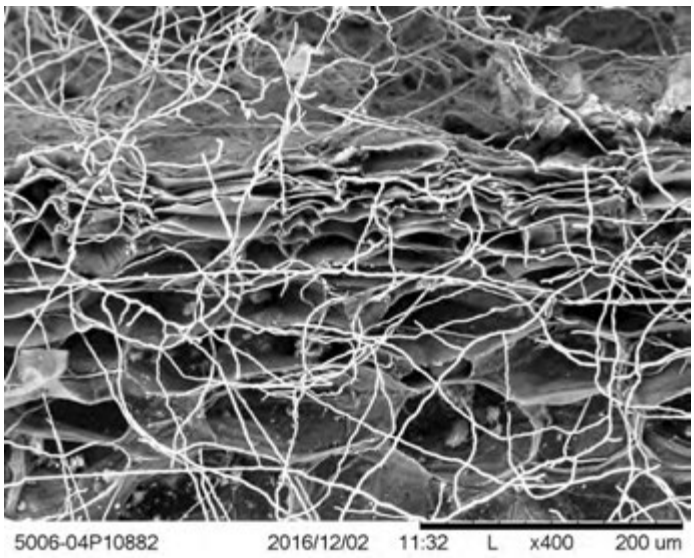
Common Name: Papa
Sample Type: Wet/Fresh

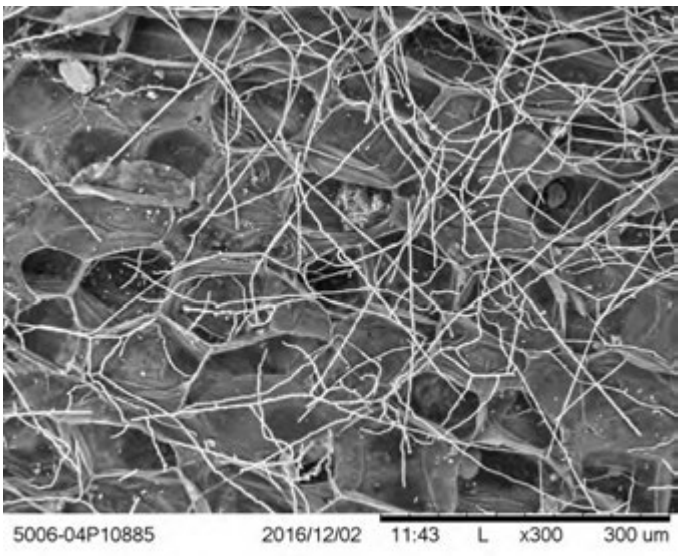
Transverse Edge

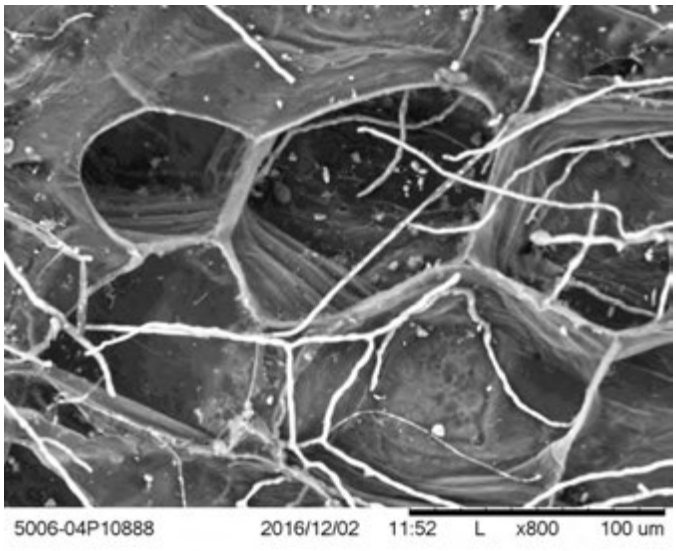








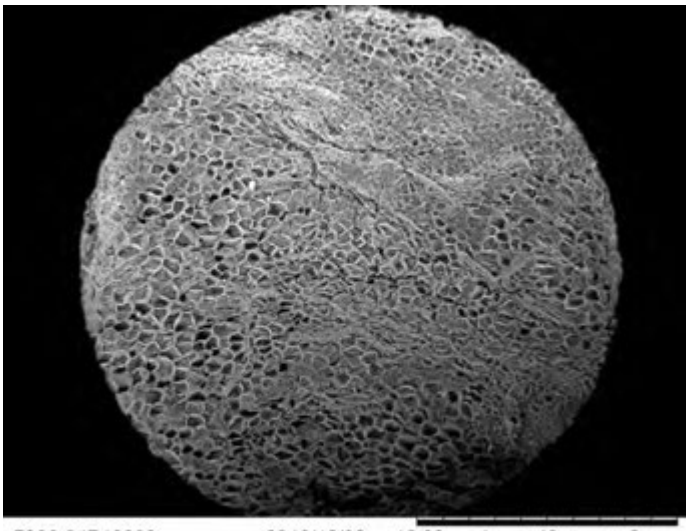


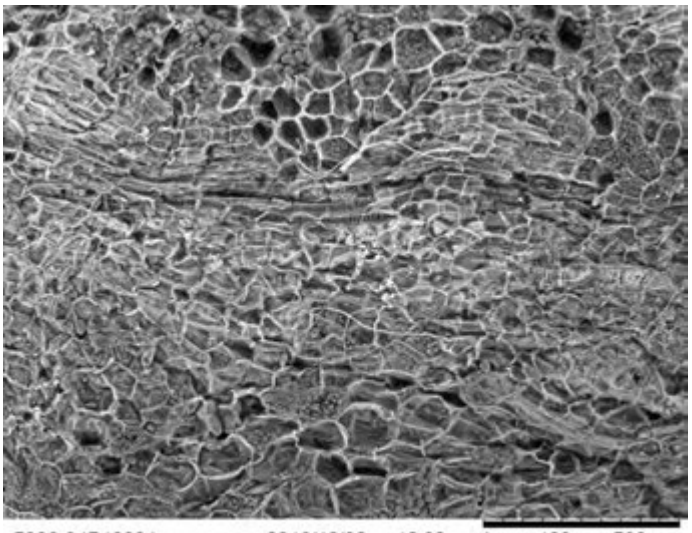


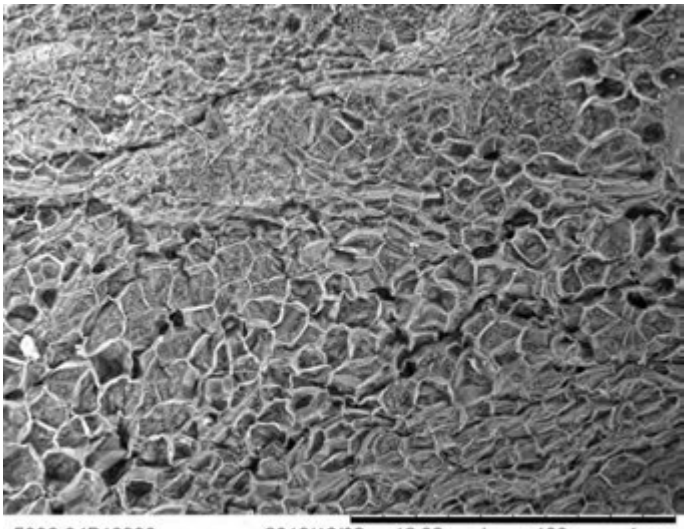
Solanum
SOLANACEAE

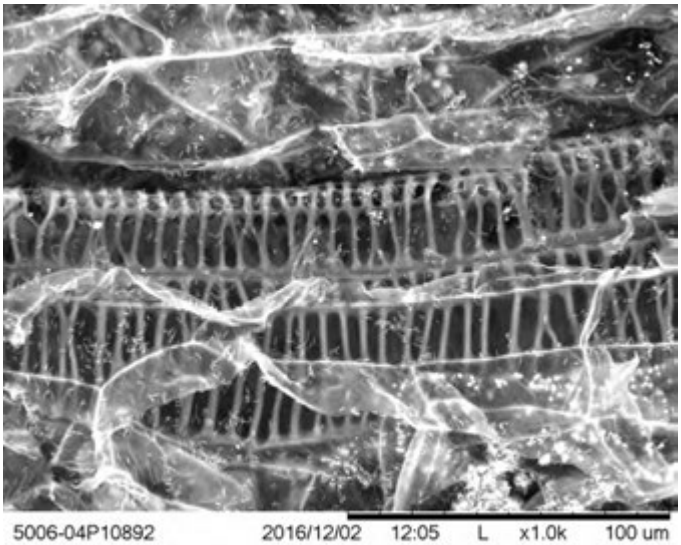
Common Name: Papa
Sample Type: Wet/Fresh

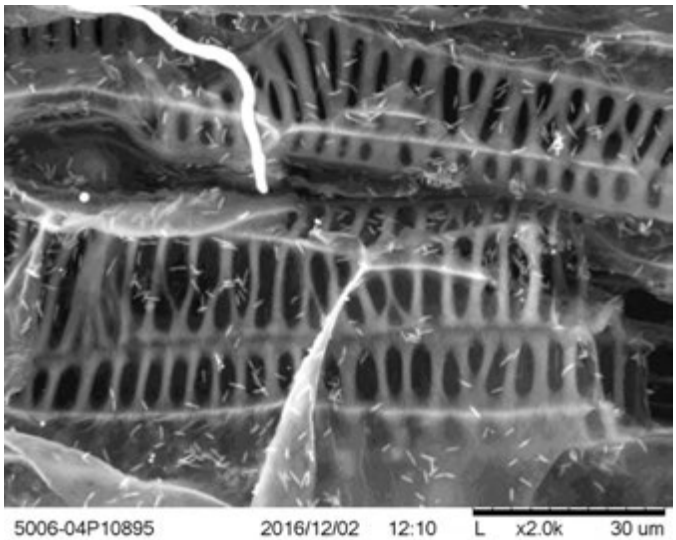
Tangential Center







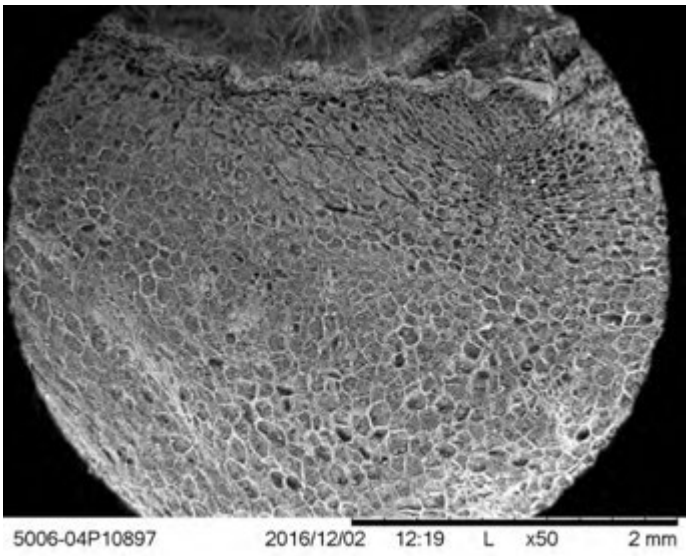


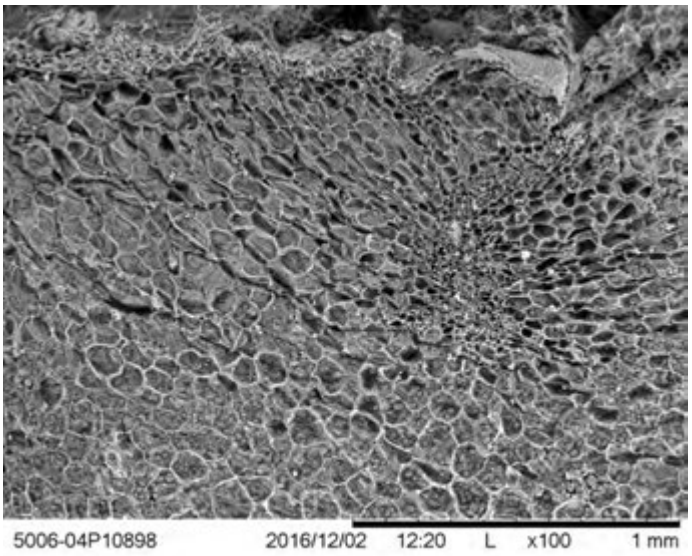


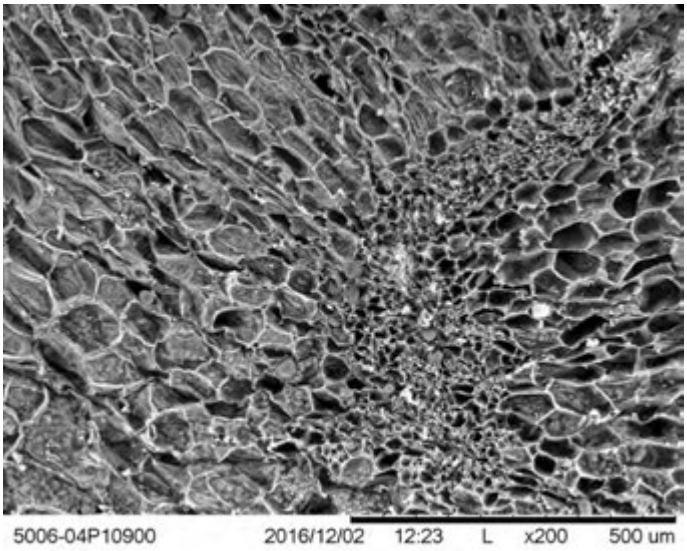
Solanum
SOLANACEAE

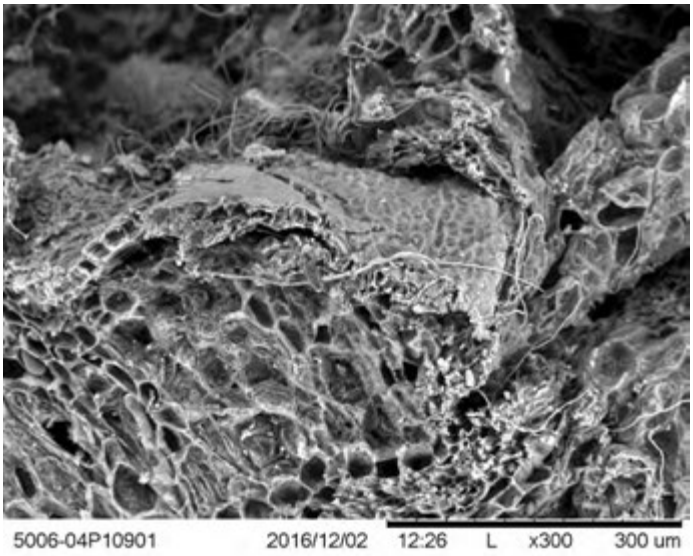
Common Name: Papa
Sample Type: Wet/Fresh

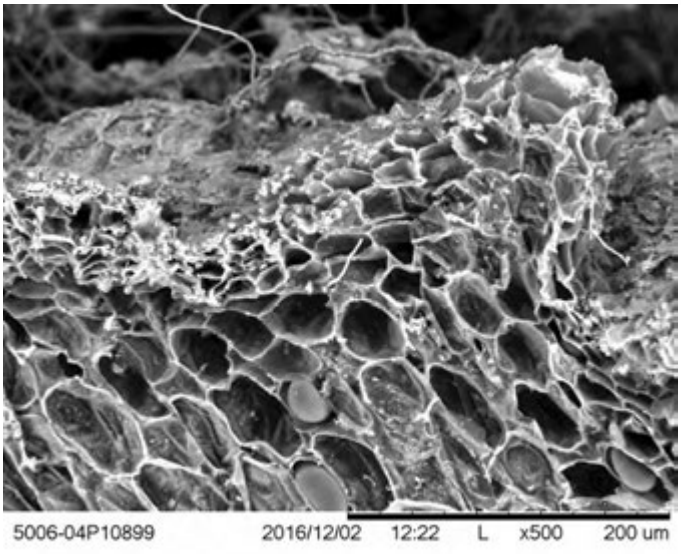
Tangential Edge







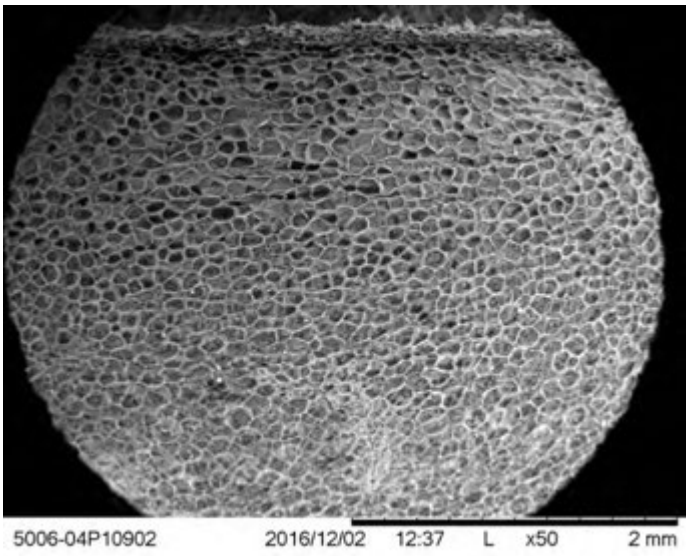


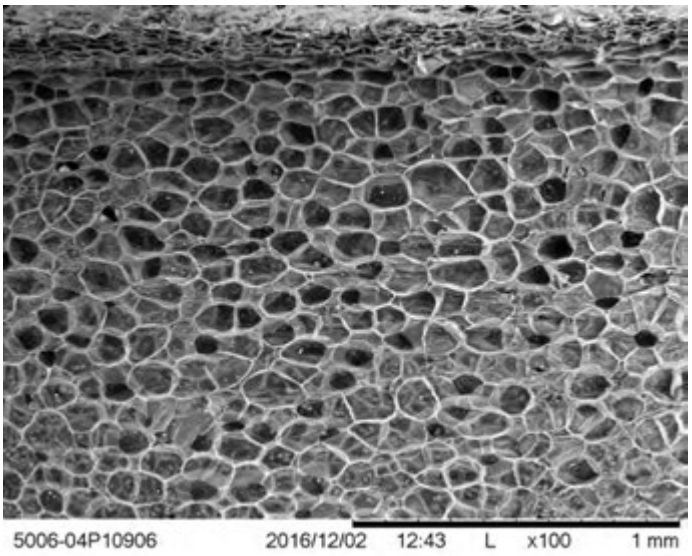


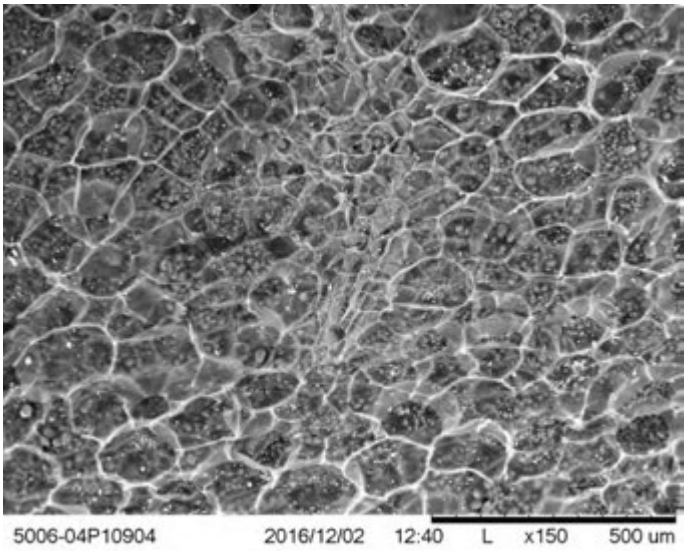
Solanum
SOLANACEAE

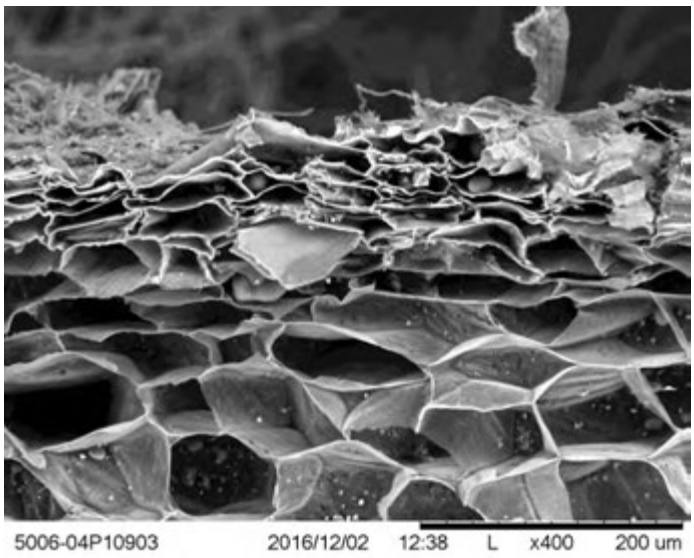
Common Name: Papa
Sample Type: Wet/Fresh

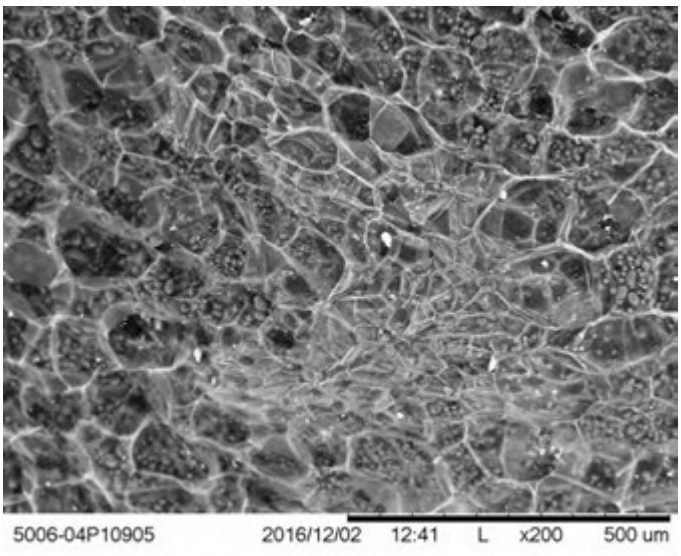
Radial







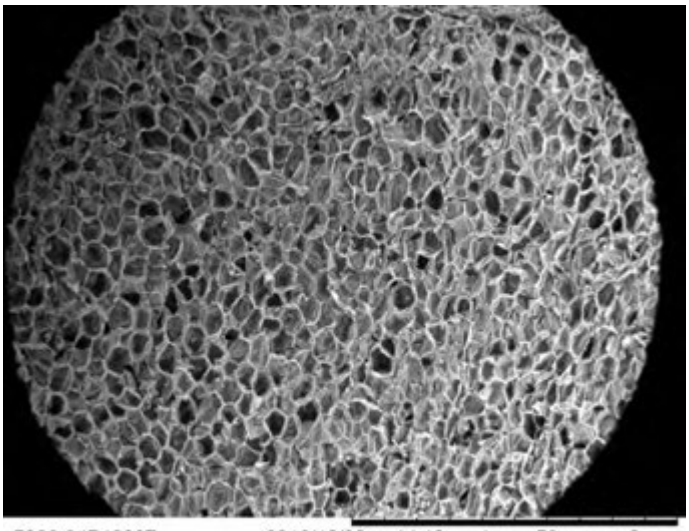


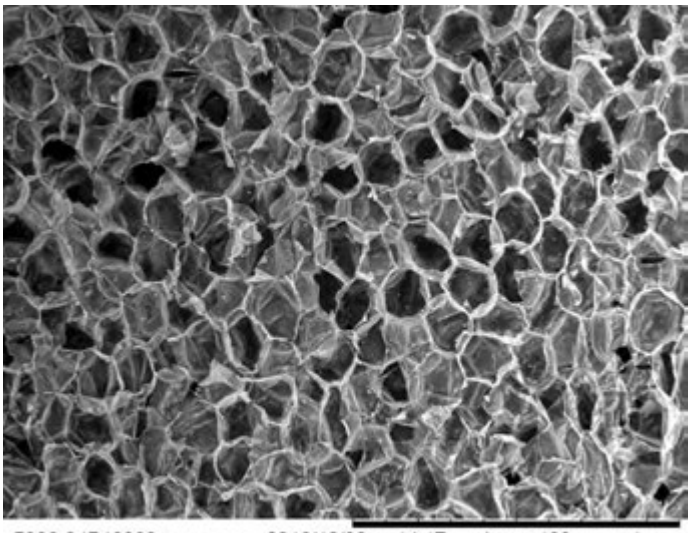


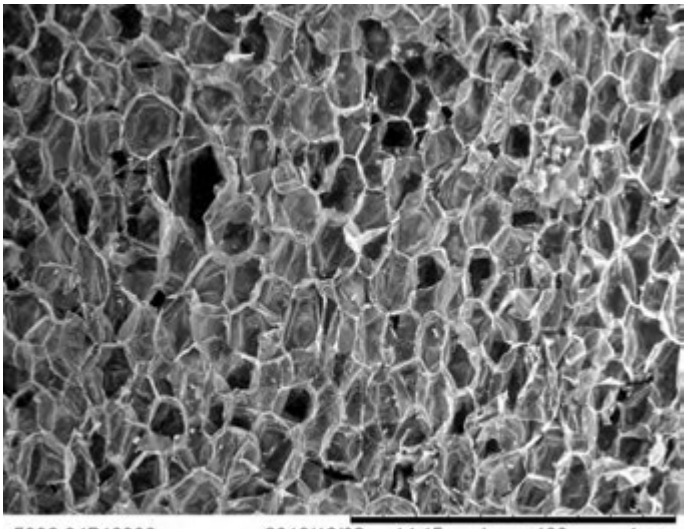
Tropaeolum tuberosum
TROPAEOLACEAE

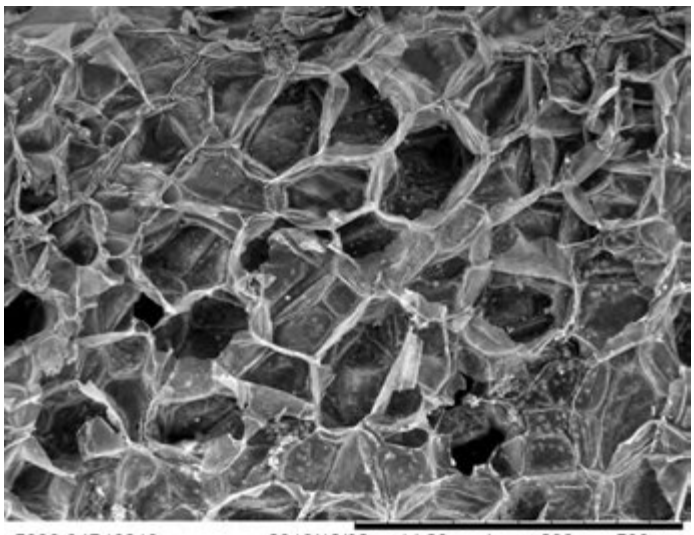
Common Name: Mashua
Sample Type: Wet/Fresh

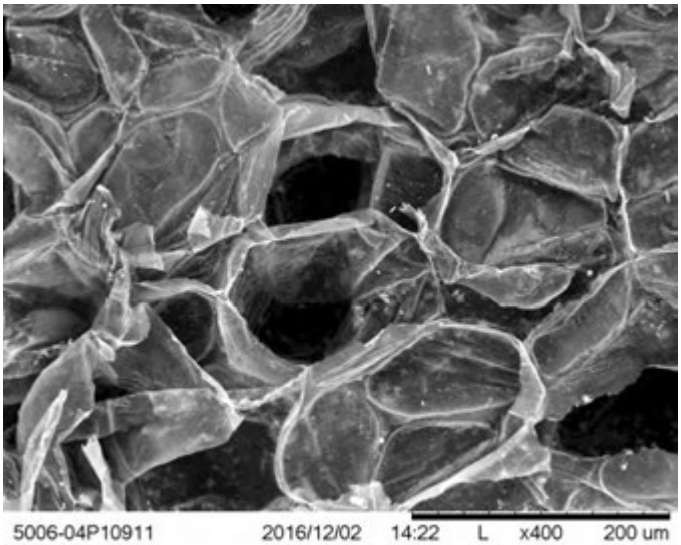
Transverse Center

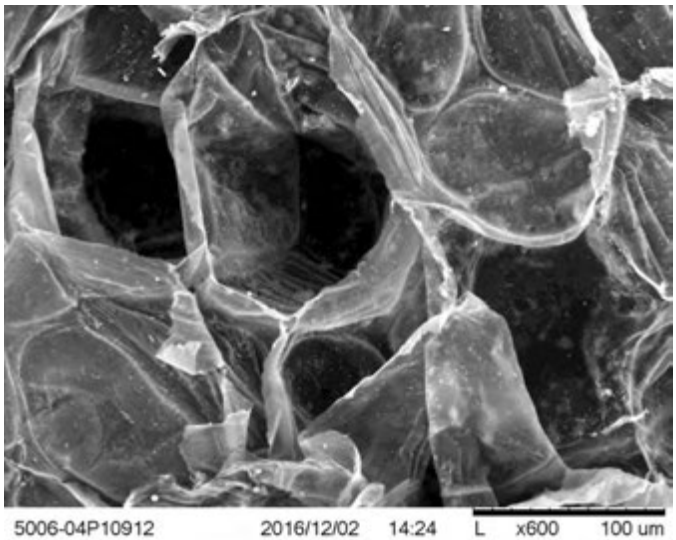




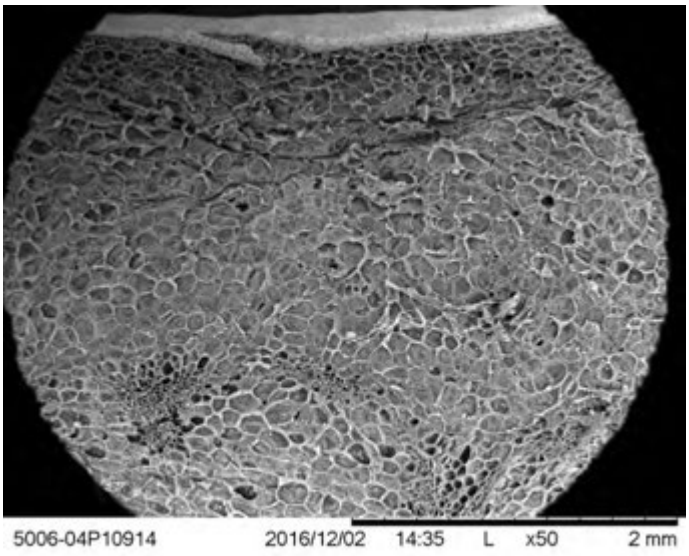


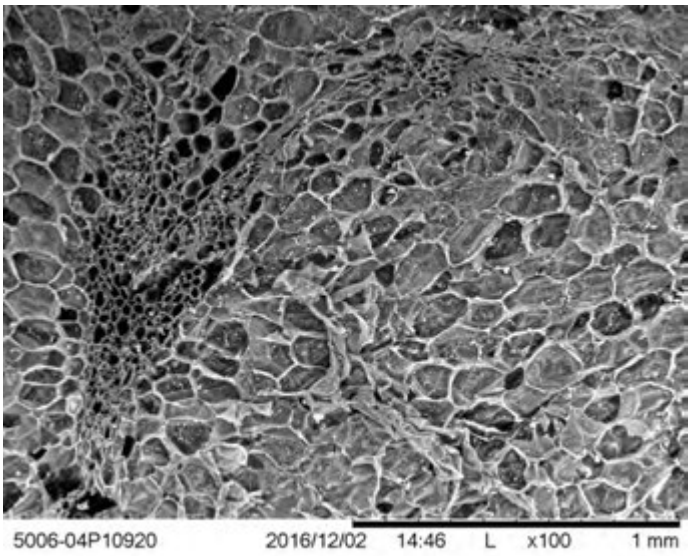


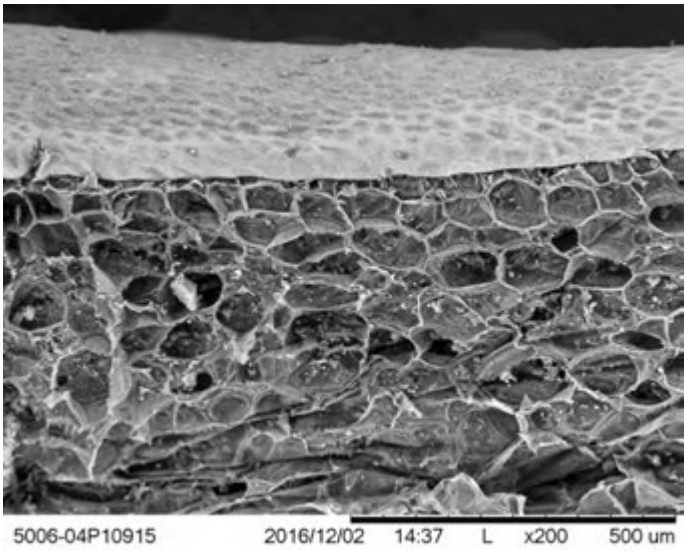


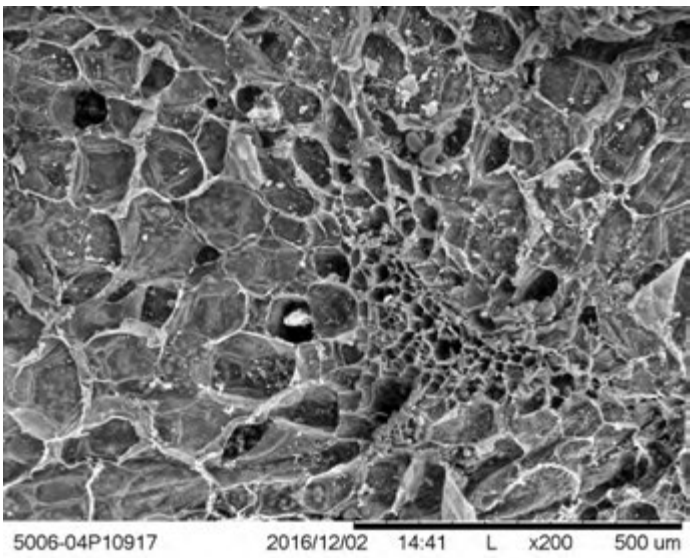


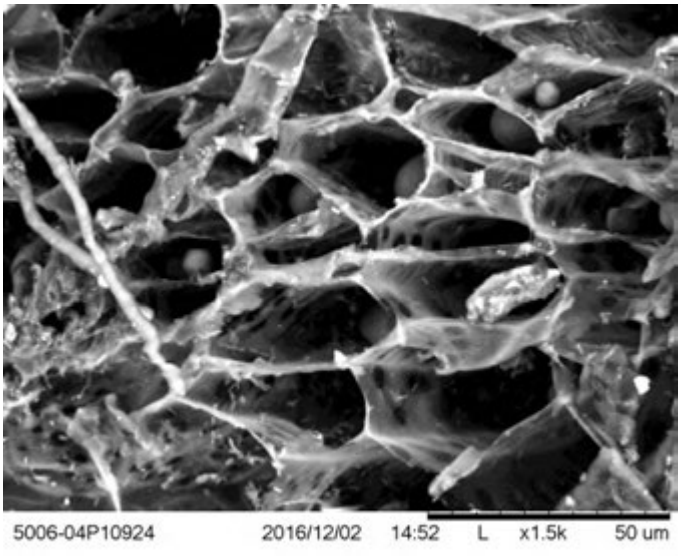
Tropaeolum tuberosum Common Name: Mashua Transverse Edge
TROPAEOLACEAE Sample Type: Wet/Fresh

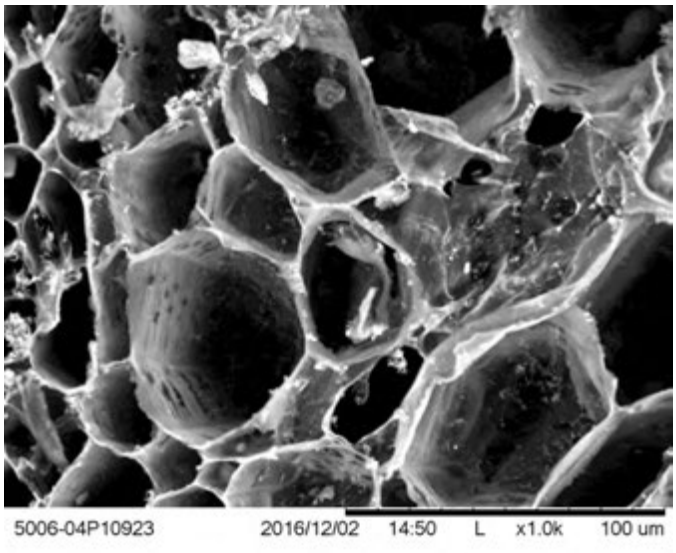








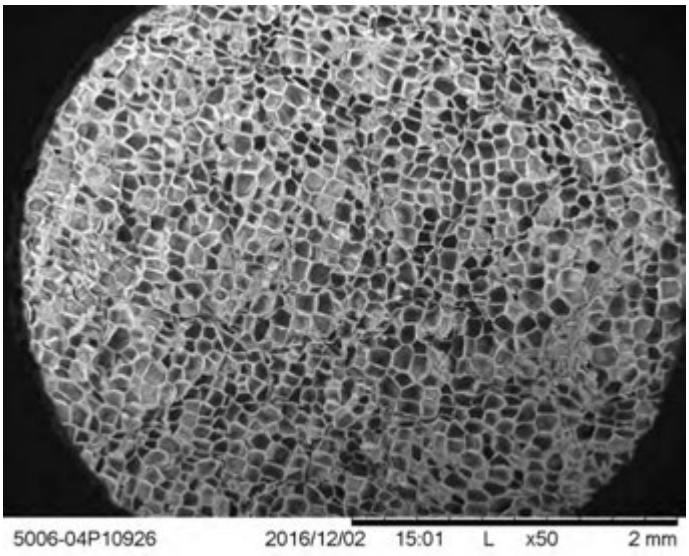


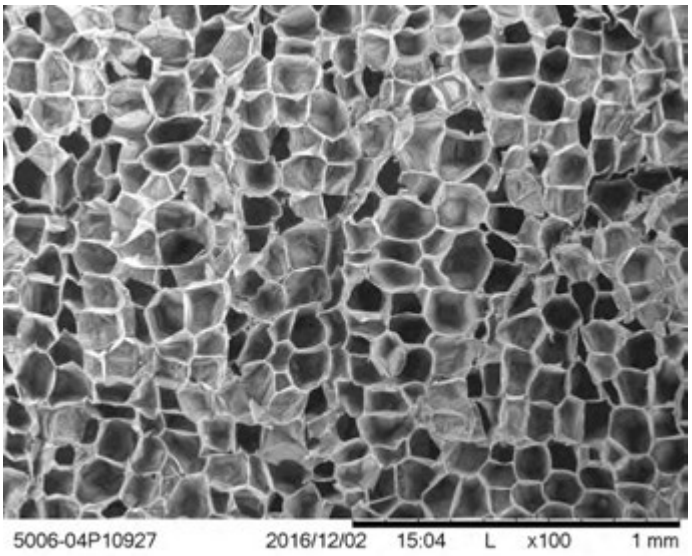


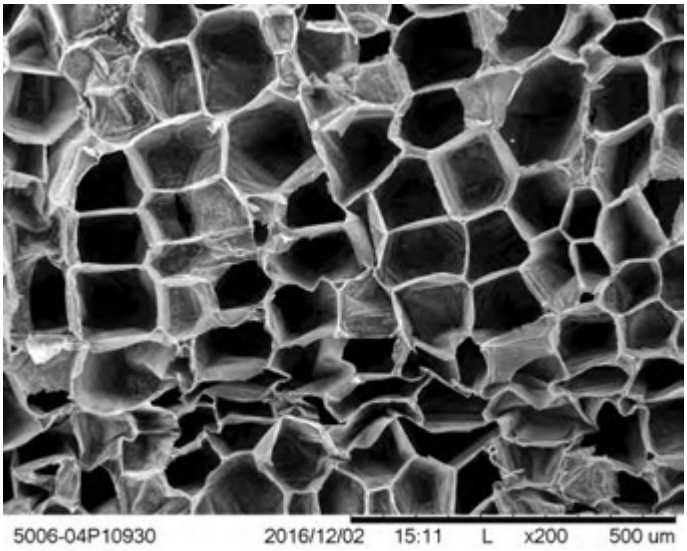
Tropaeolum tuberosum
TROPAEOLACEAE

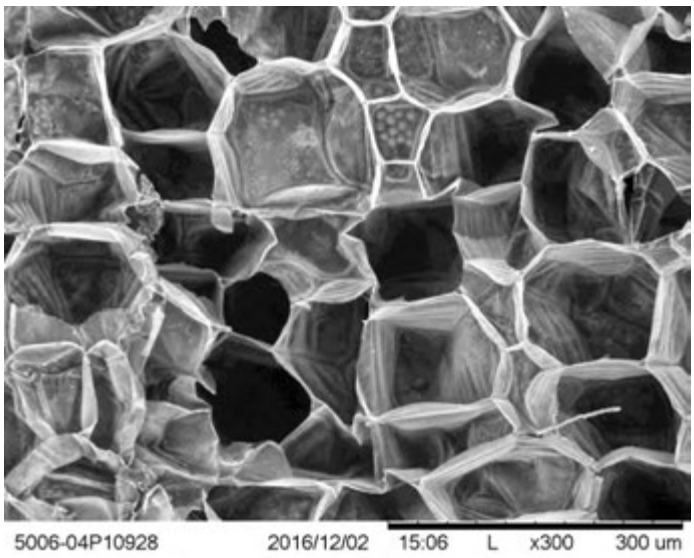
Common Name: Mashua
Sample Type: Wet/Fresh

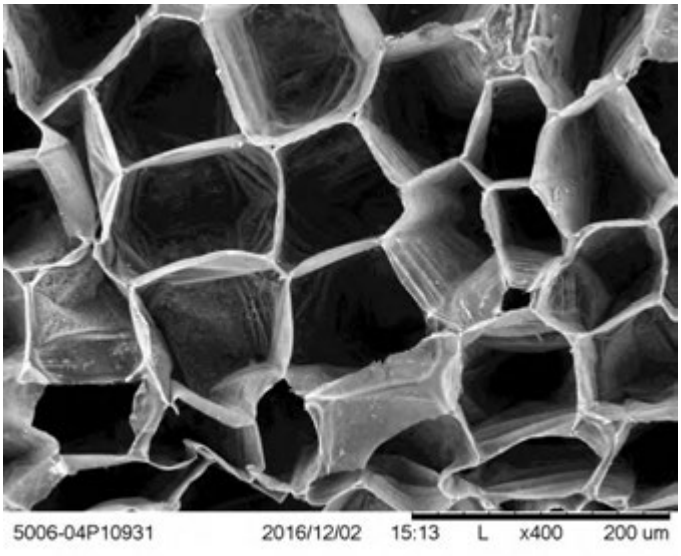
Tangential Center

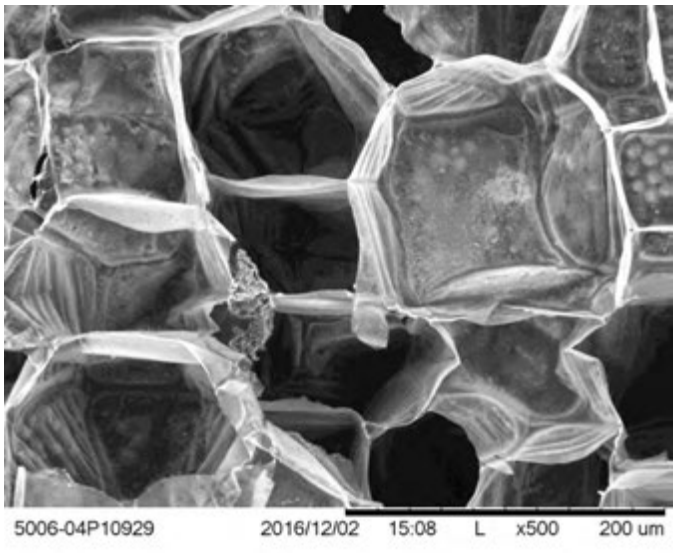




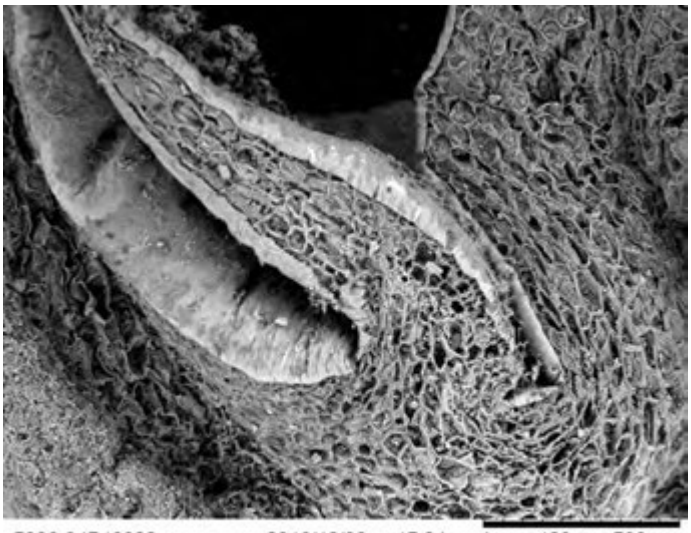


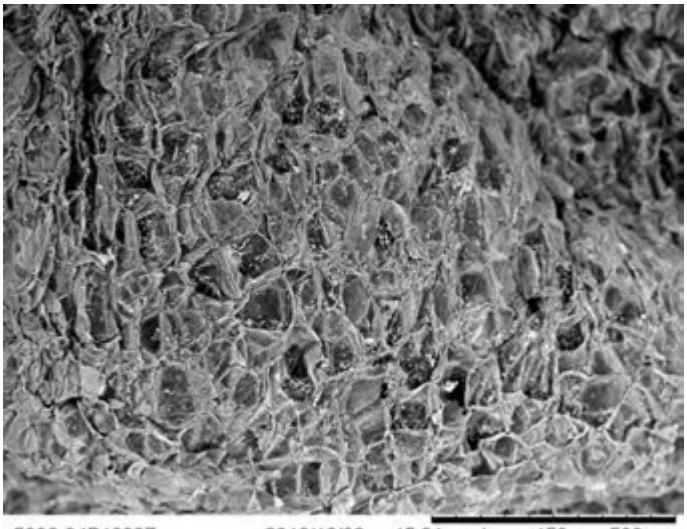


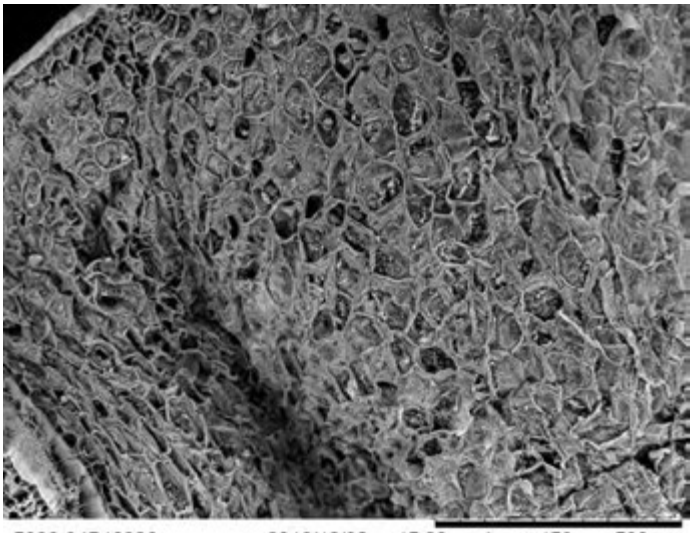


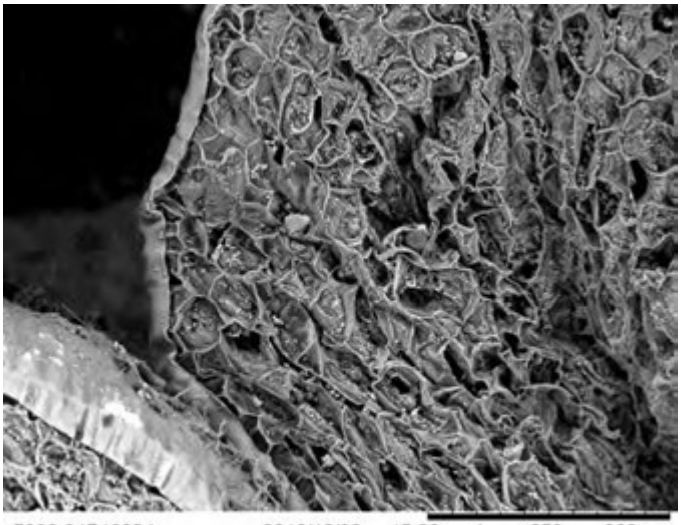


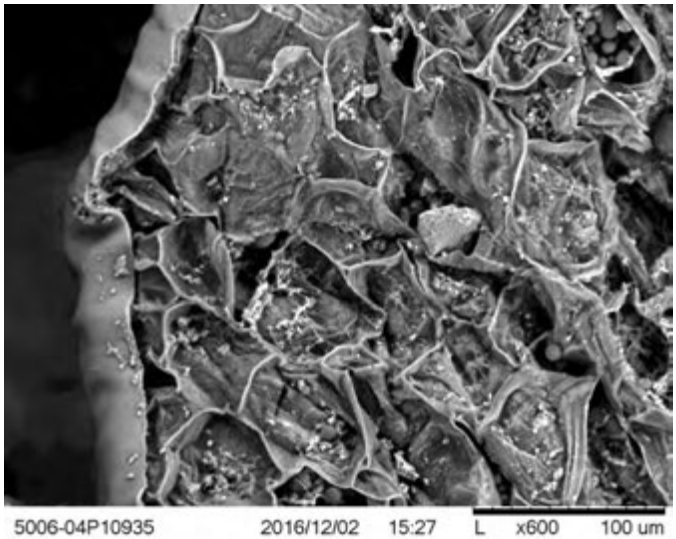
Tropaeolum tuberosum Common Name: Mashua Tangential Edge
TROPAEOLACEAE Sample Type: Wet/Fresh



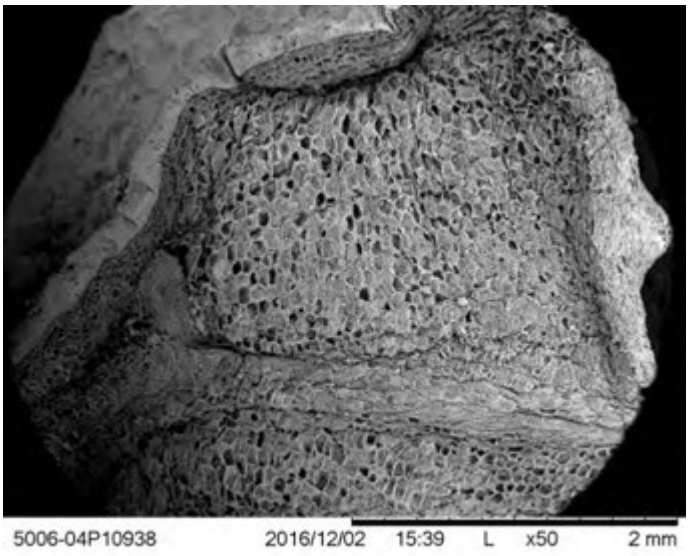


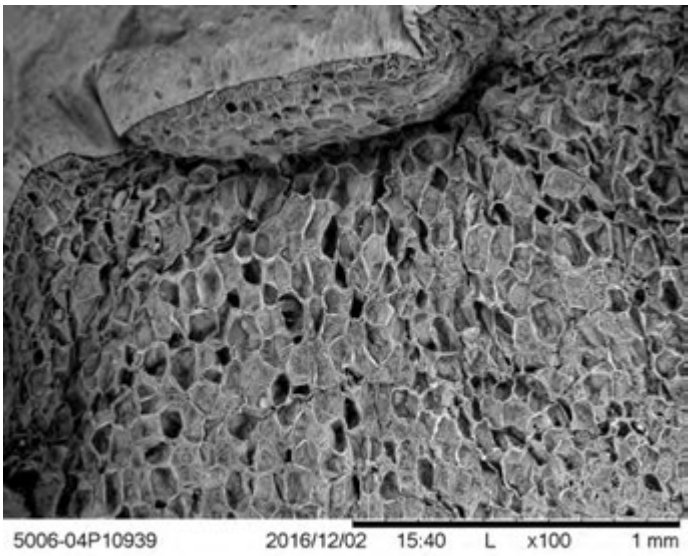


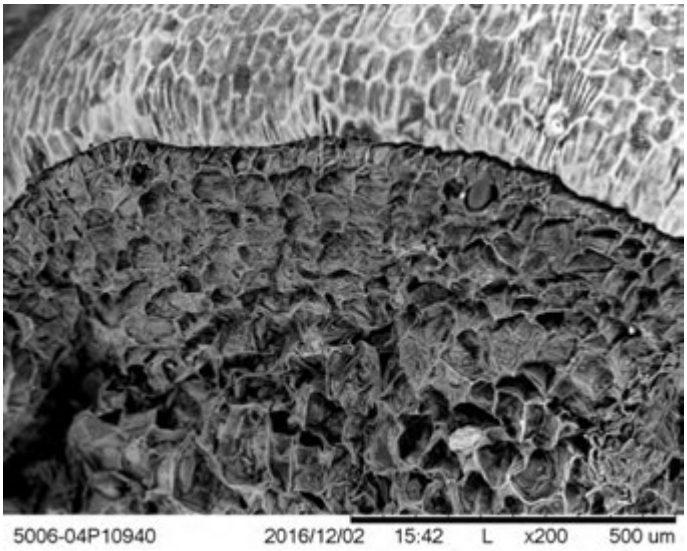


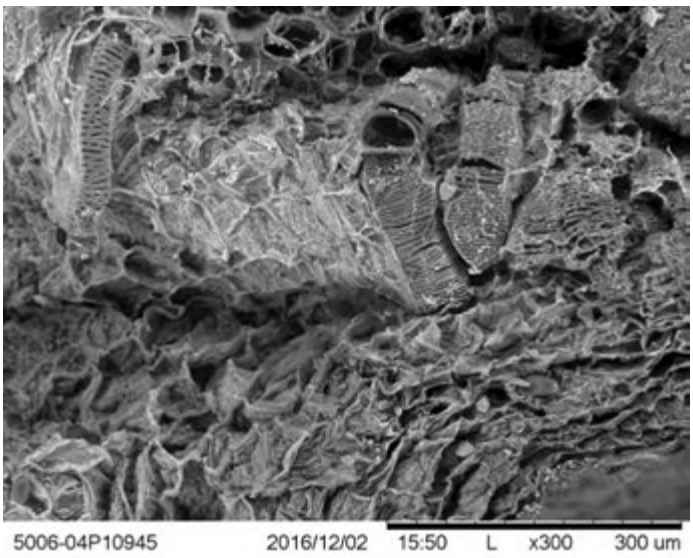


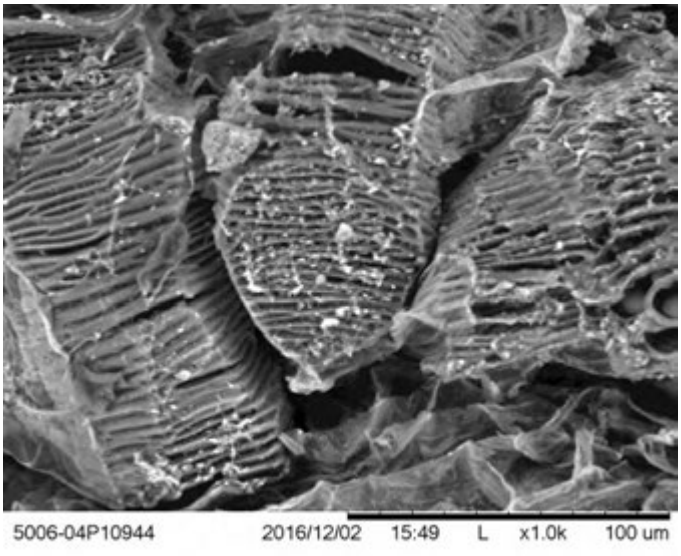
Tropaeolum tuberosum Common Name: Mashua Radial
TROPAEOLACEAE Sample Type: Wet/Fresh

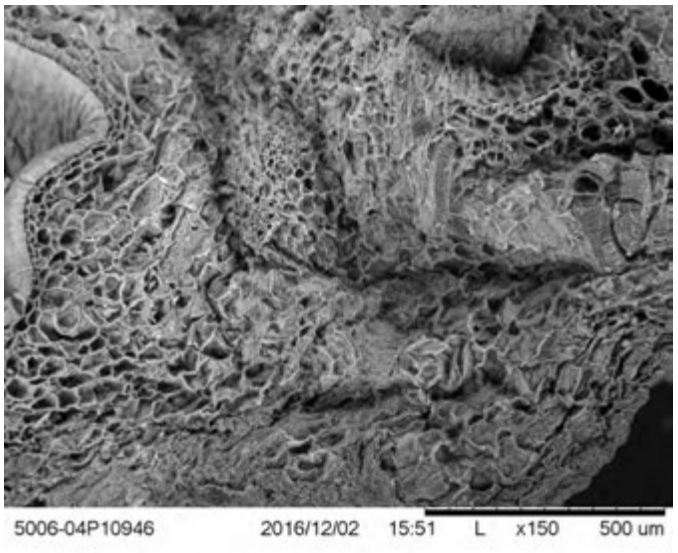








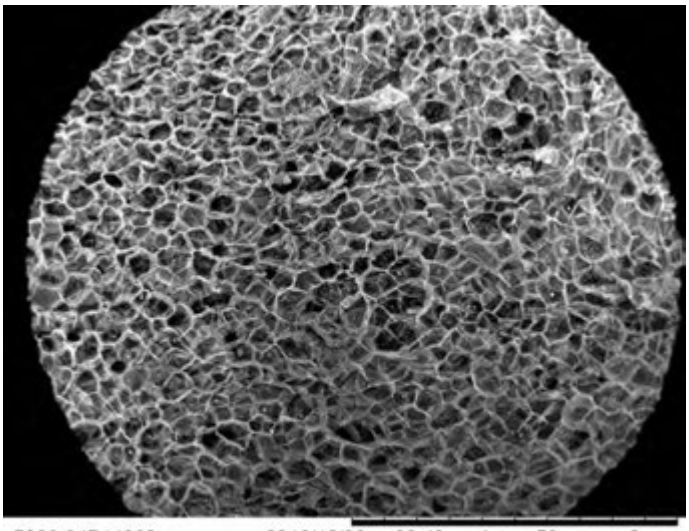


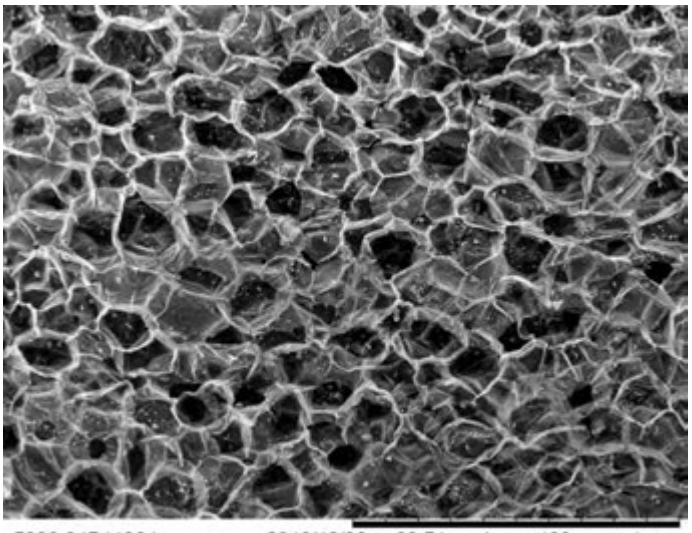


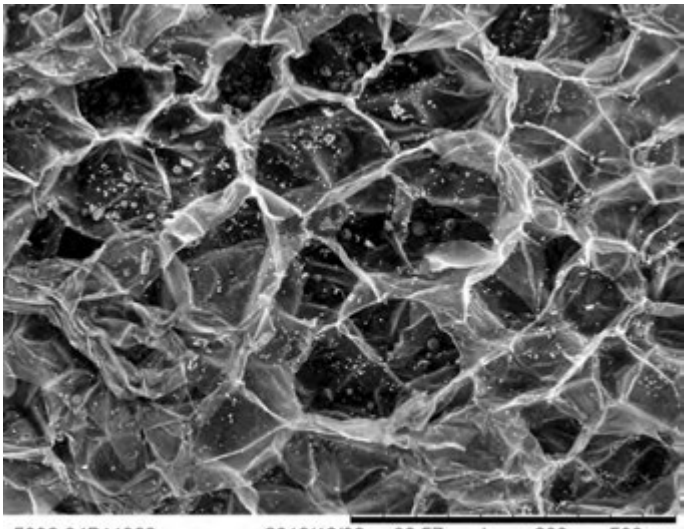
Ullucus tuberosus
BASELLACEAE

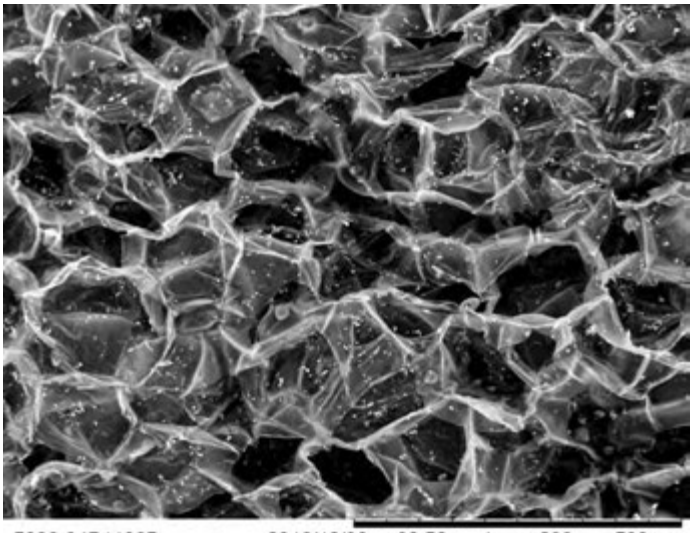
Common Name: Papalisa/Ollucu
Sample Type: Wet/Fresh

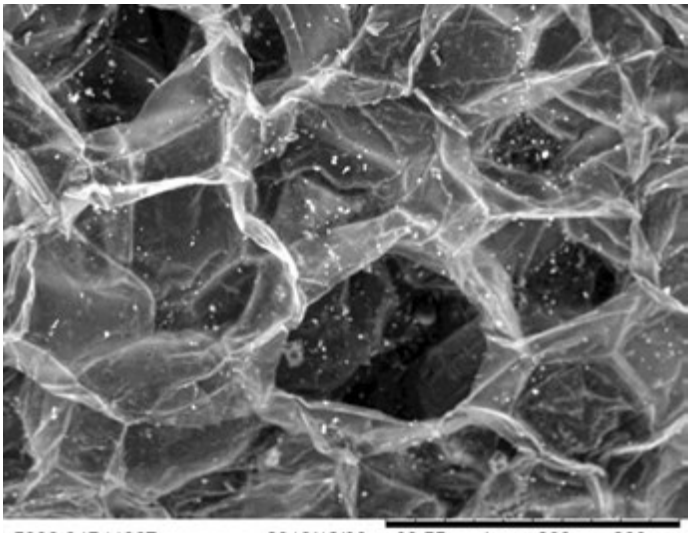
Transverse Center

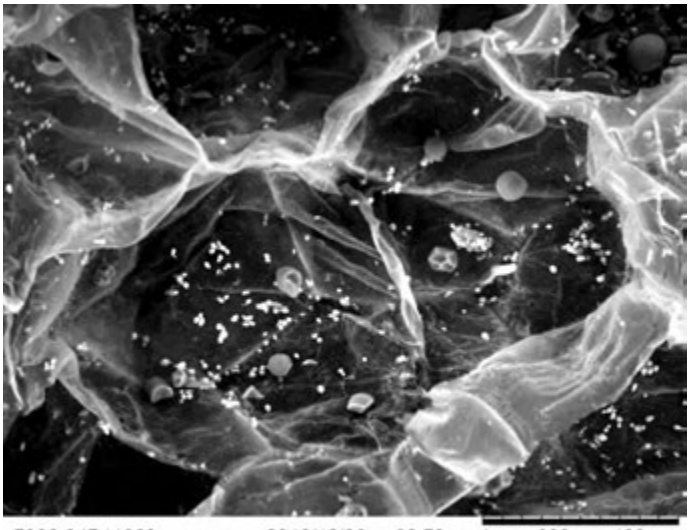








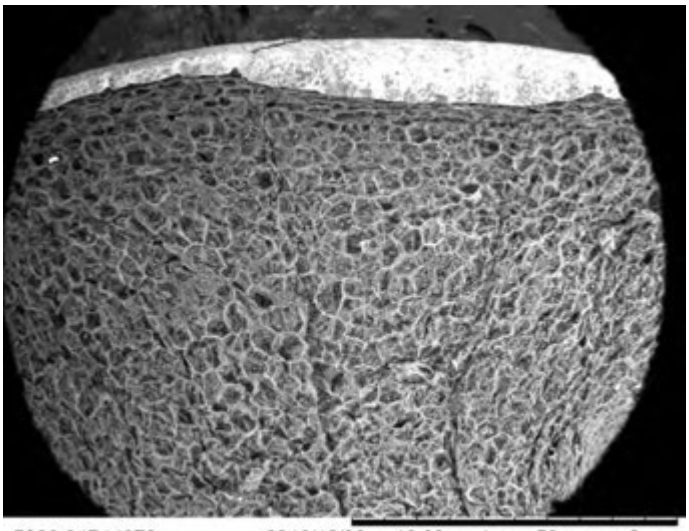


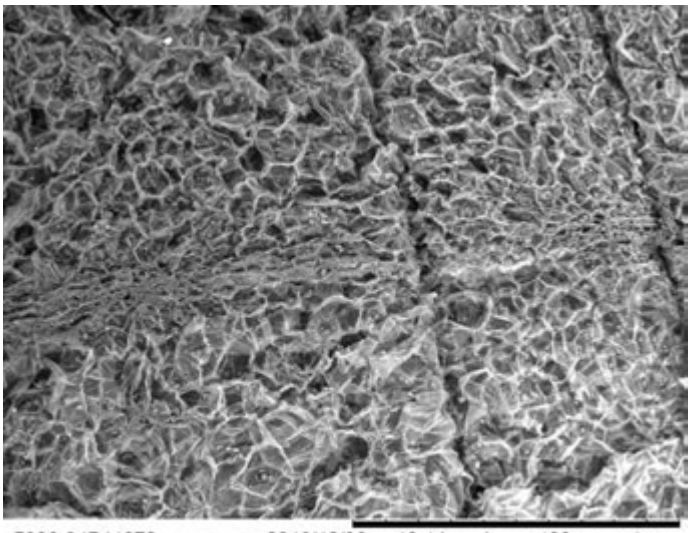


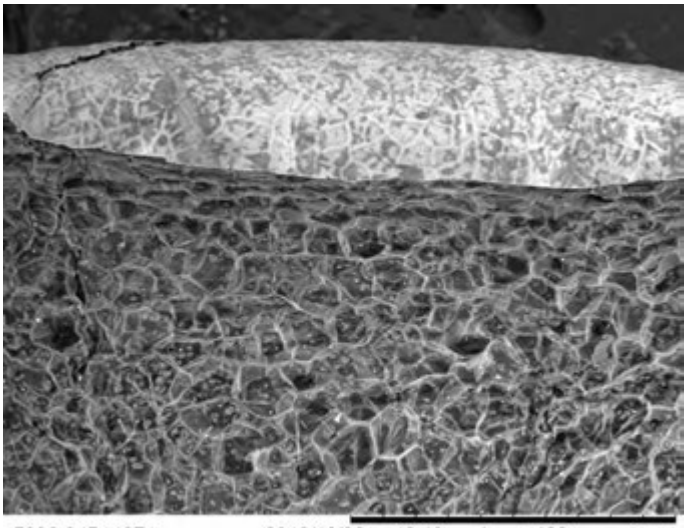
Ullucus tuberosus
BASELLACEAE

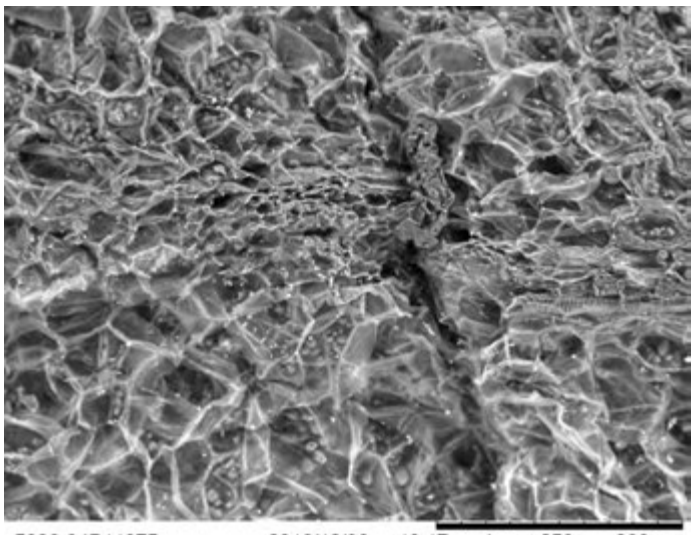
Common Name: Papalisa/Ollucu
Sample Type: Wet/Fresh

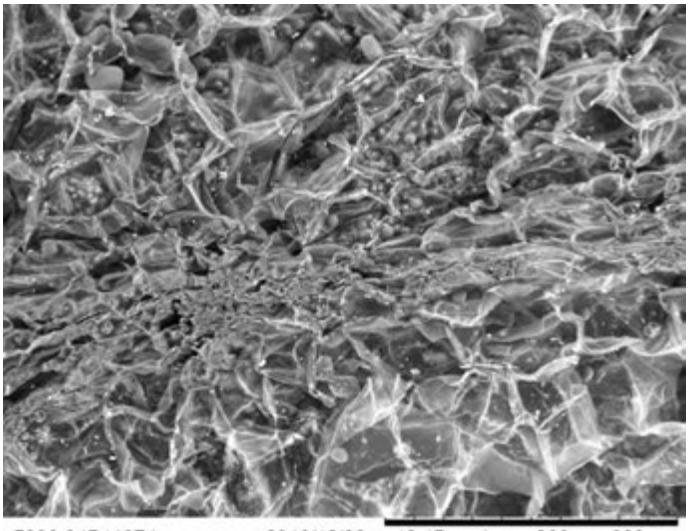
Transverse Edge

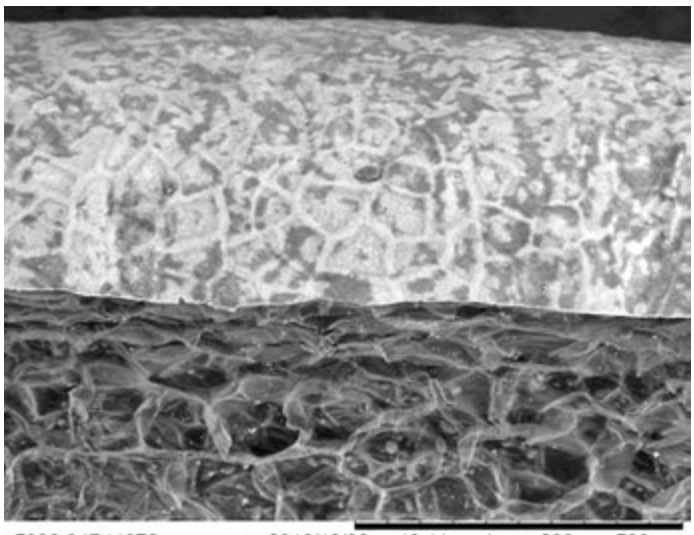








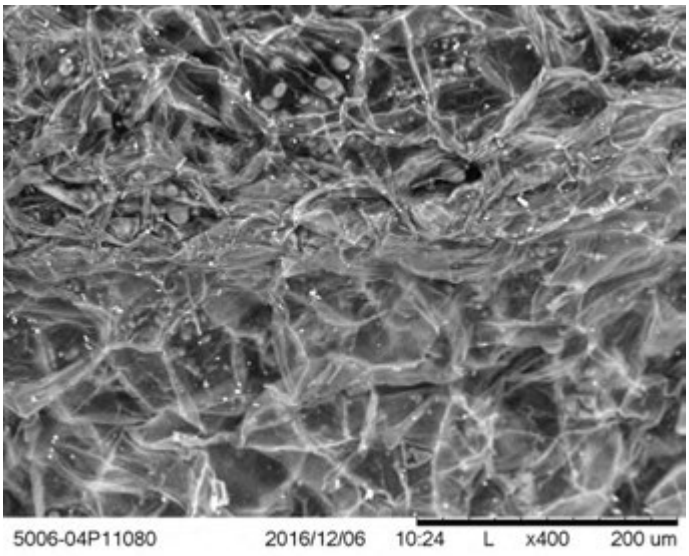


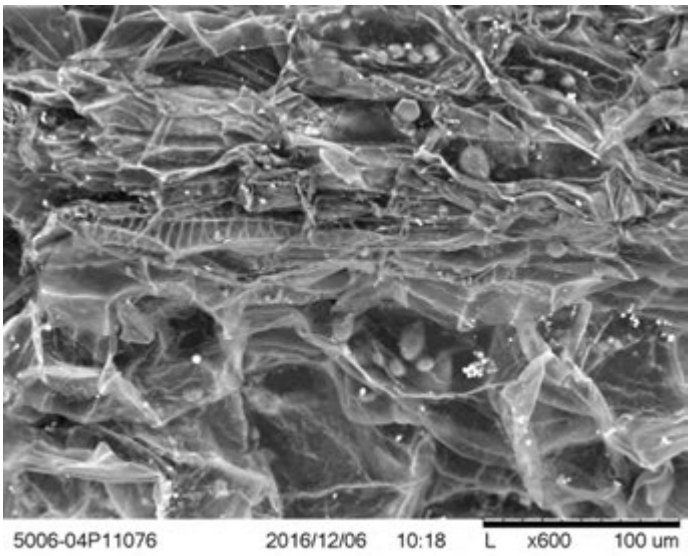


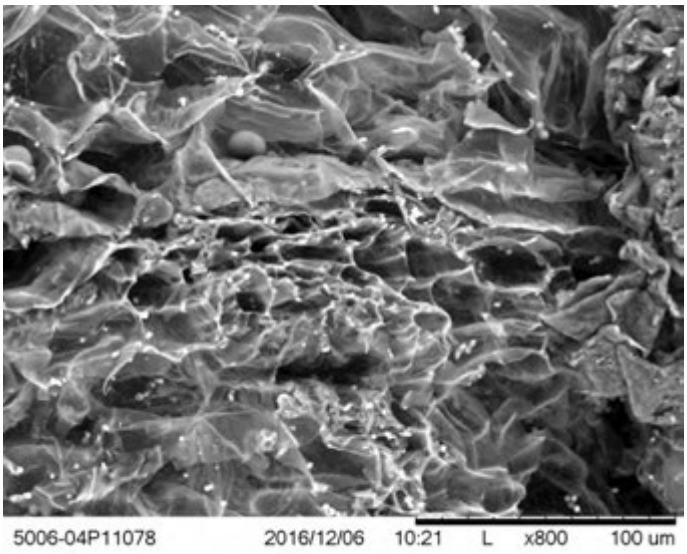
Ullucus tuberosus
BASELLACEAE

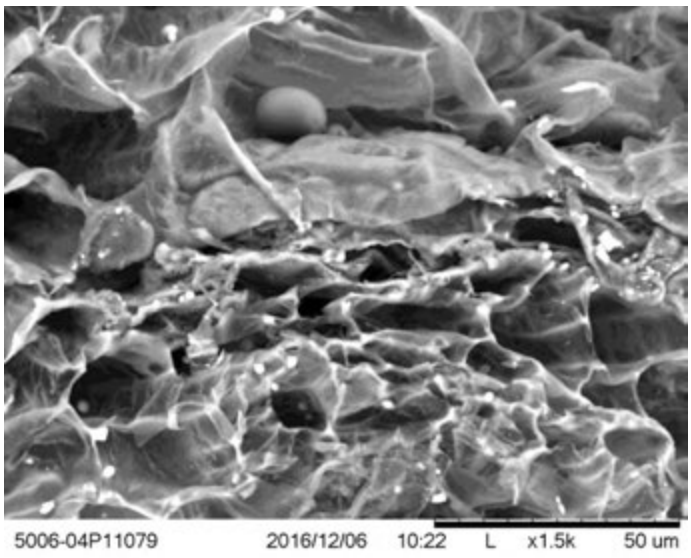
Common Name: Papalisa/Ollucu
Sample Type: Wet/Fresh

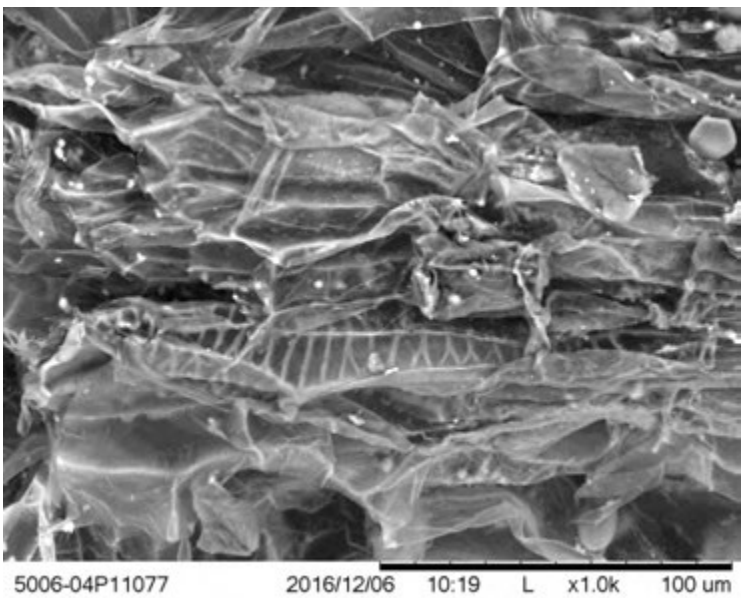
Transverse Edge (continued)







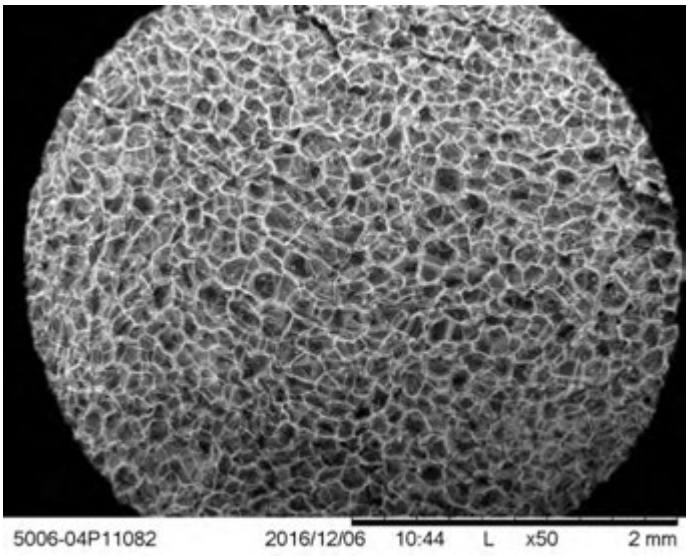


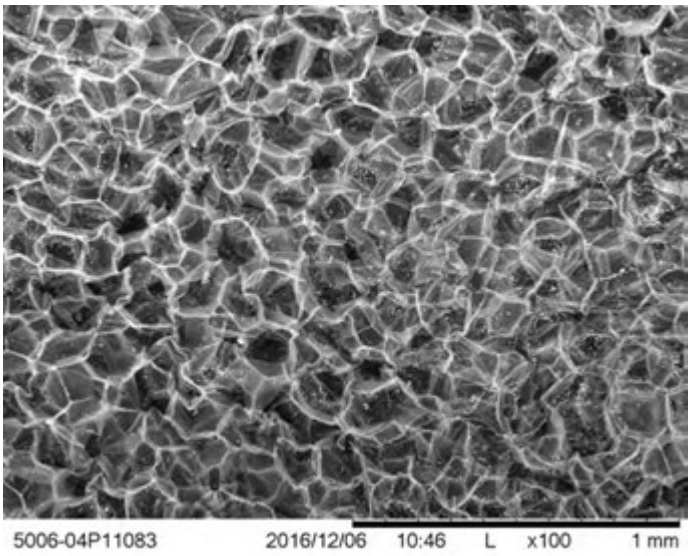


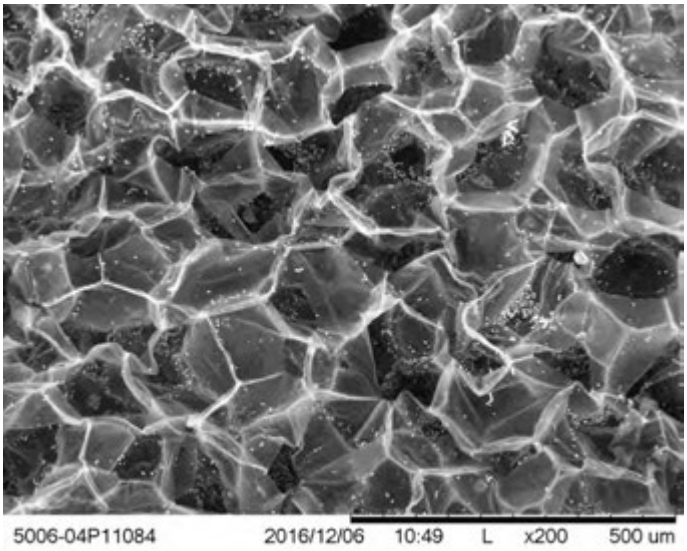
Ullucus tuberosus
BASELLACEAE

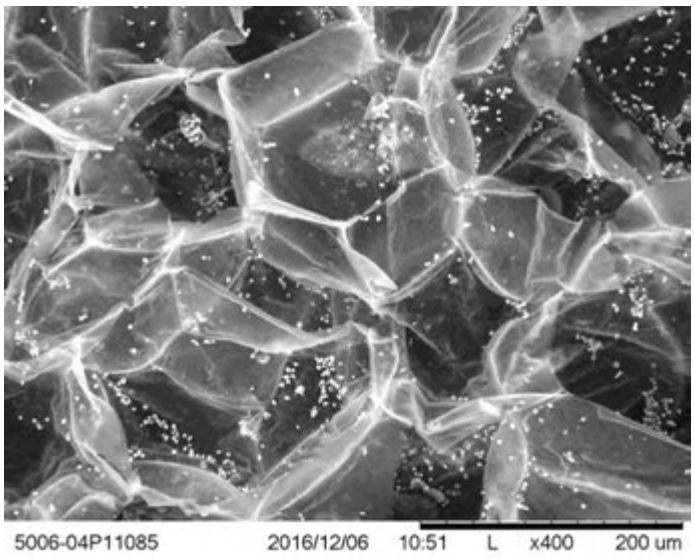
Common Name: Papalisa/Ollucu
Sample Type: Wet/Fresh

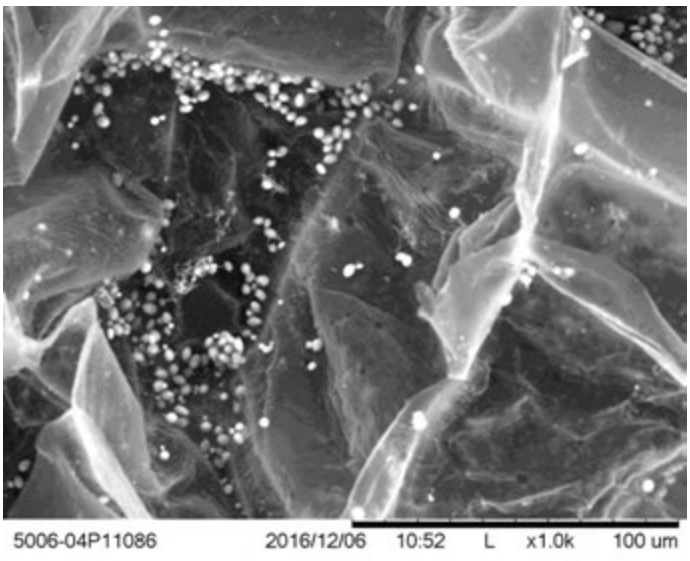
Tangential Center







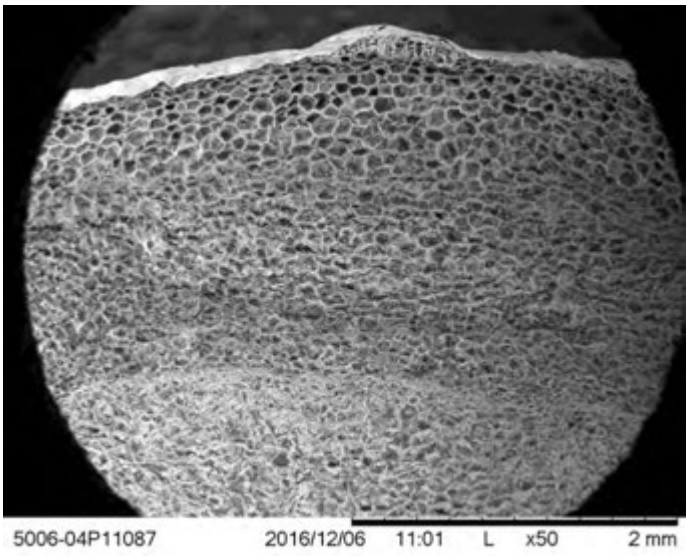


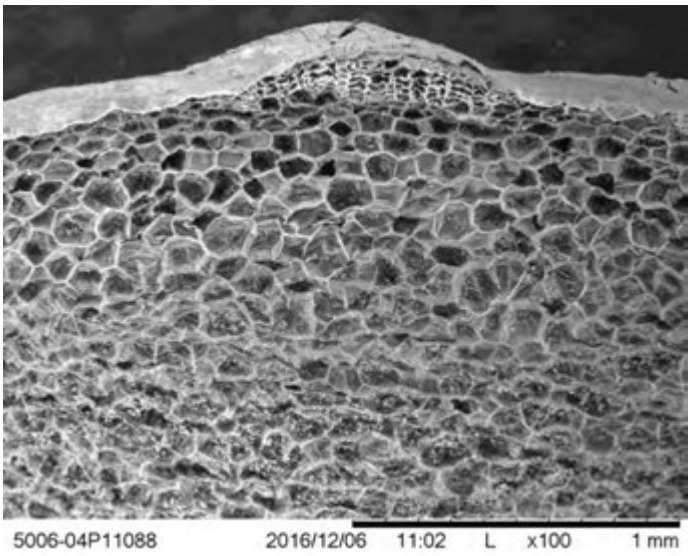


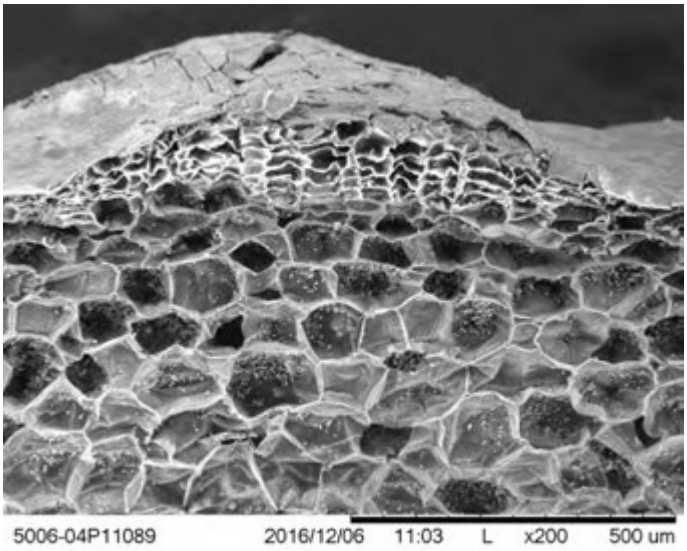
Ullucus tuberosus
BASELLACEAE

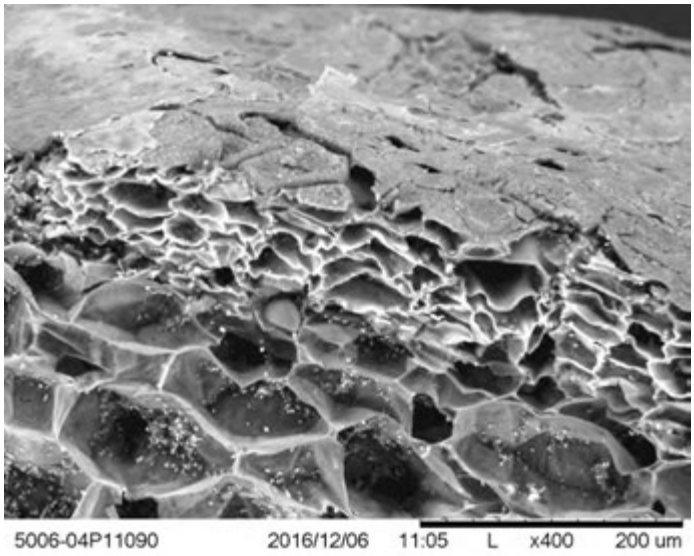
Common Name: Papalisa/Ollucu
Sample Type: Wet/Fresh

Tangential Edge



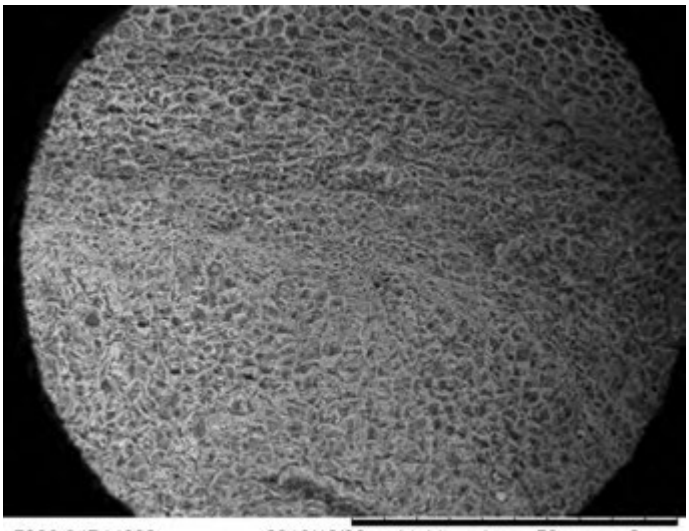


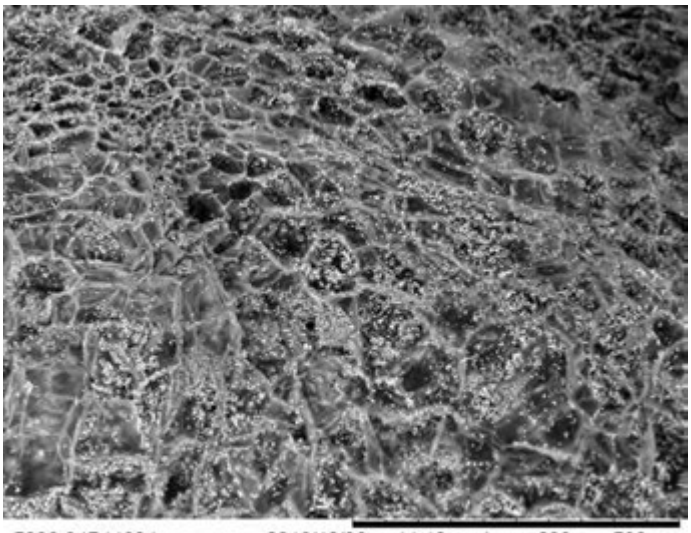


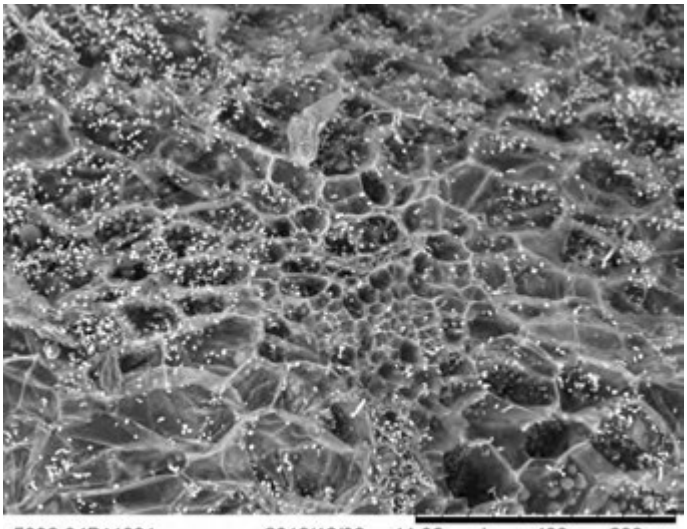


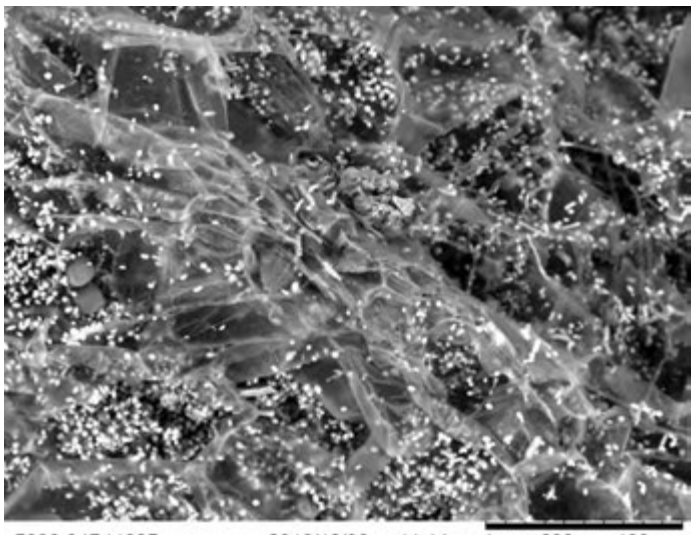
Ullucus tuberosus
BASELLACEAE

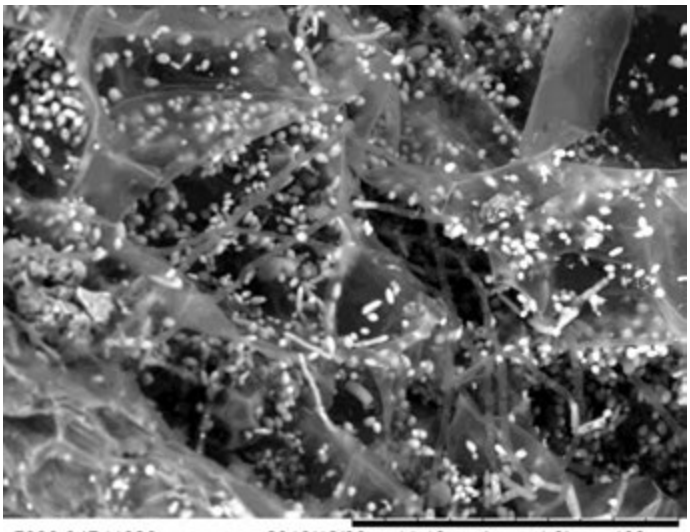
Common Name: Papalisa/Ollucu
Sample Type: Wet/Fresh

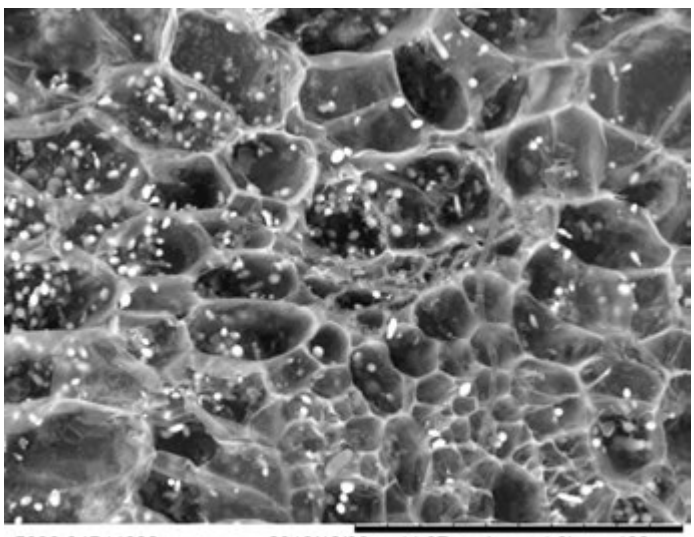




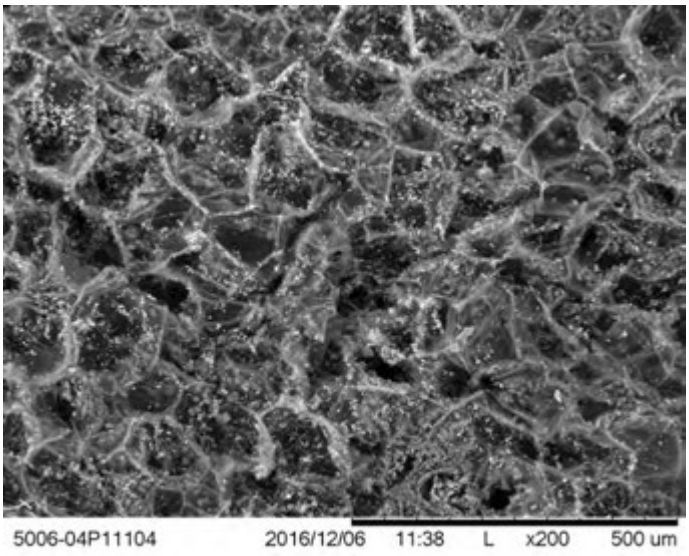


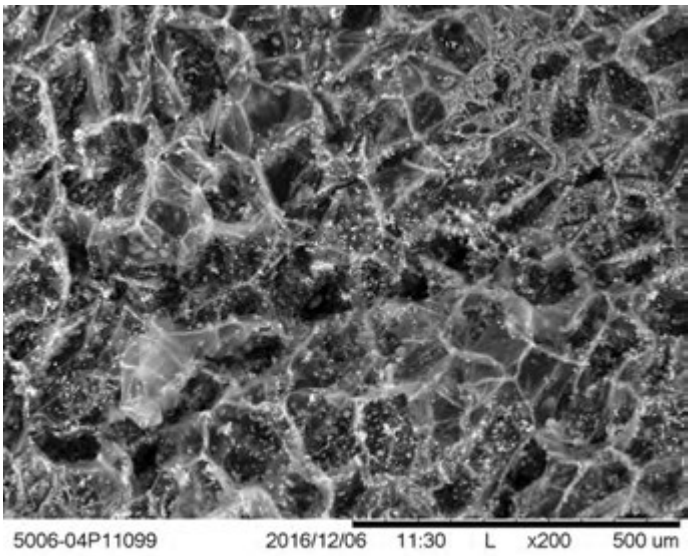


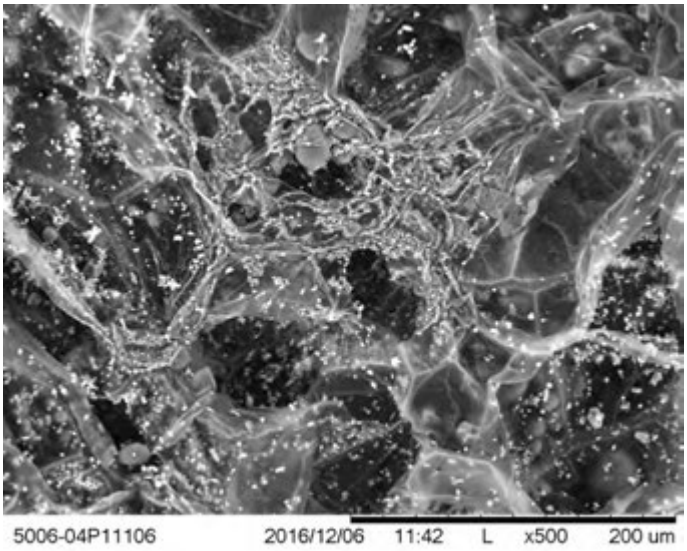


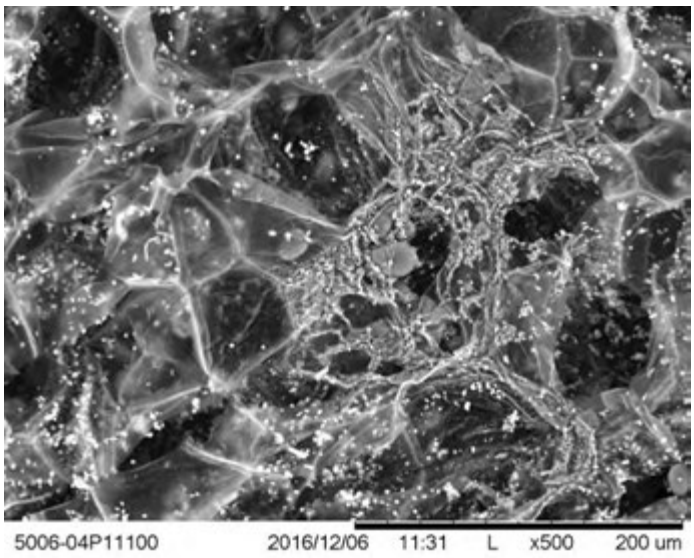


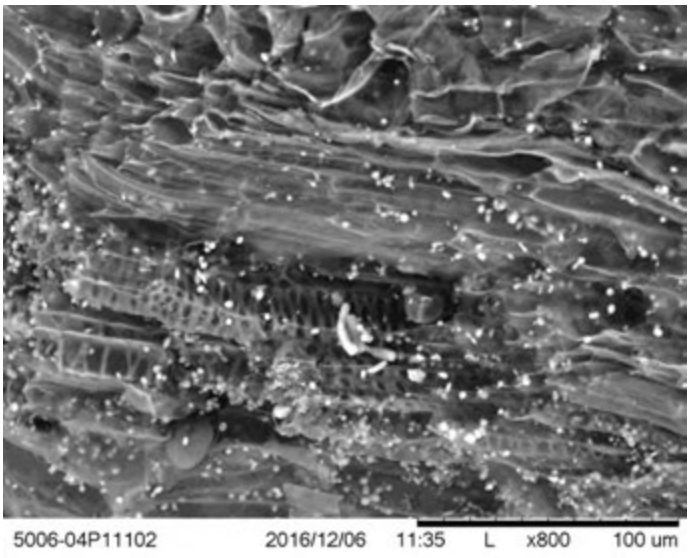
Ullucus tuberosus Common Name: Papalisa/Ollucu Radial
BASELLACEAE Sample Type: Wet/Fresh

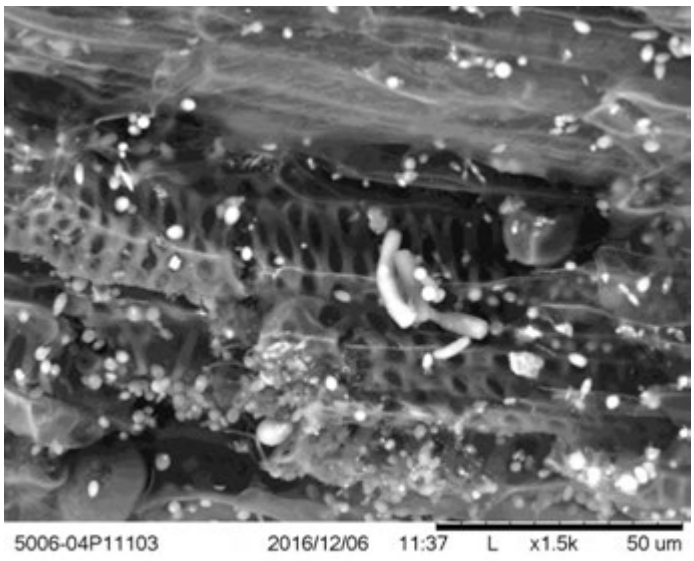




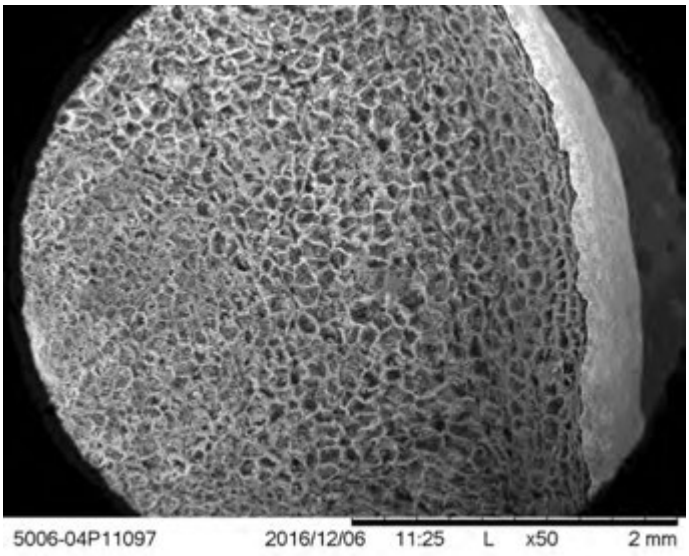


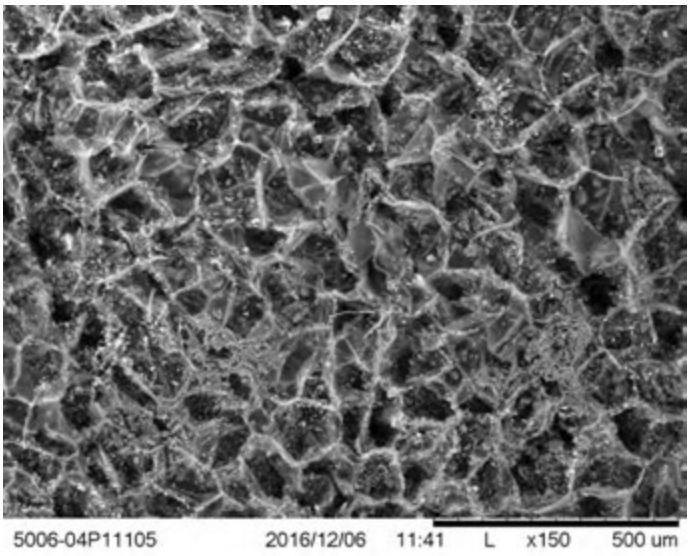


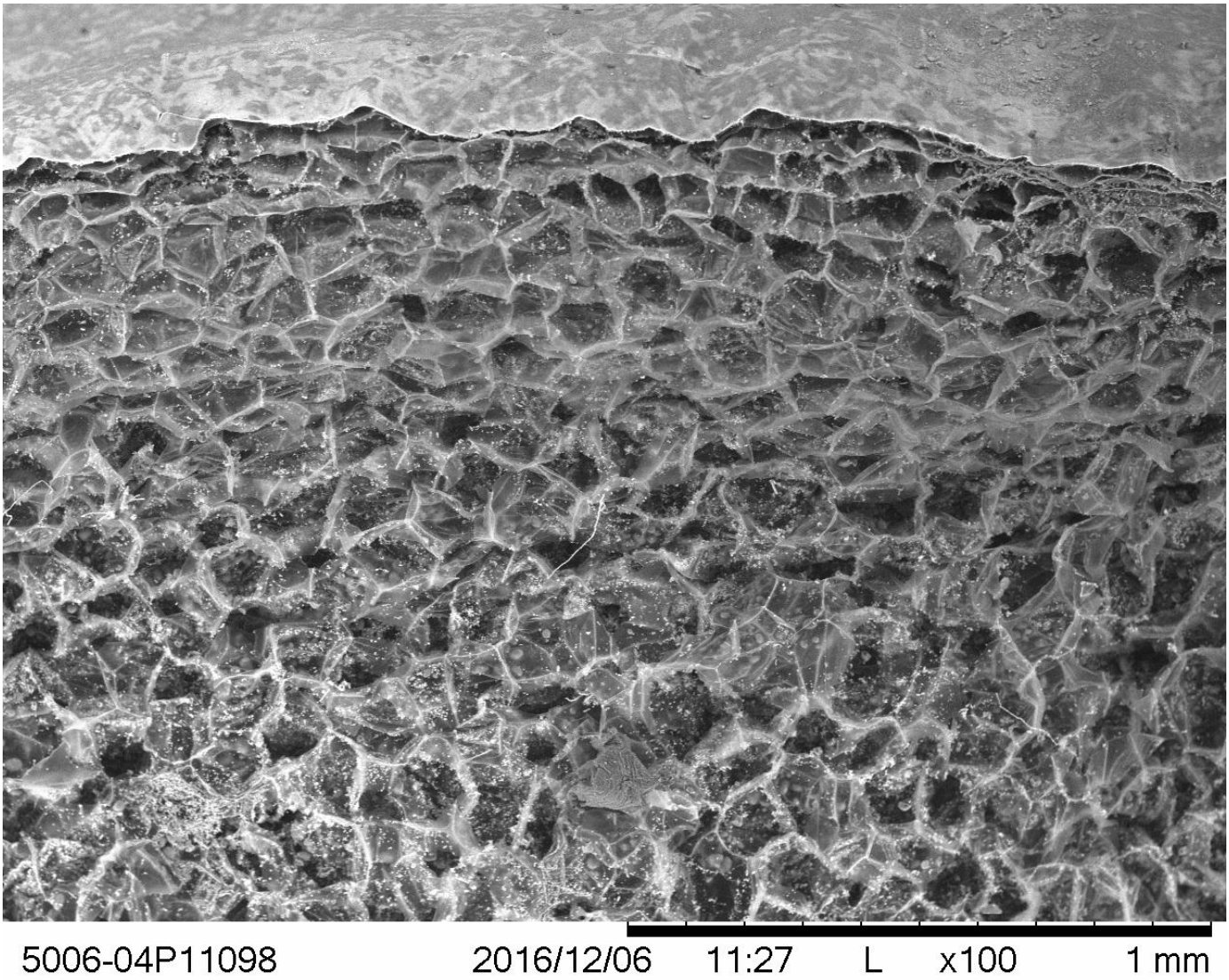




Ullucus tuberosus Common Name: Papalisa/Ollucu Radial Edge
BASELLACEAE Sample Type: Wet/Fresh





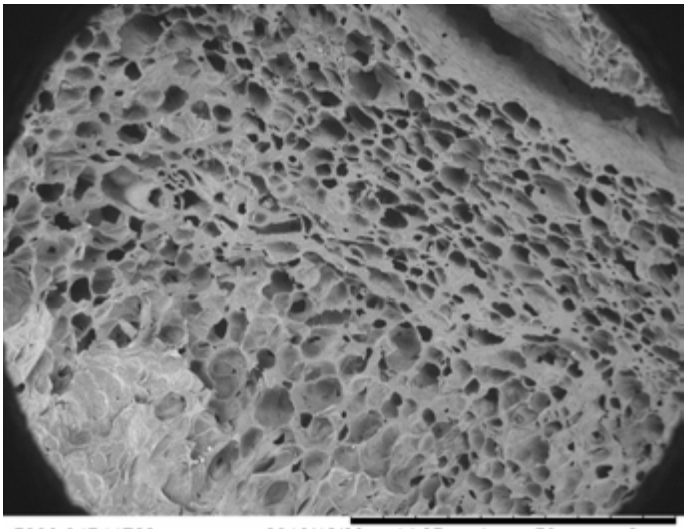


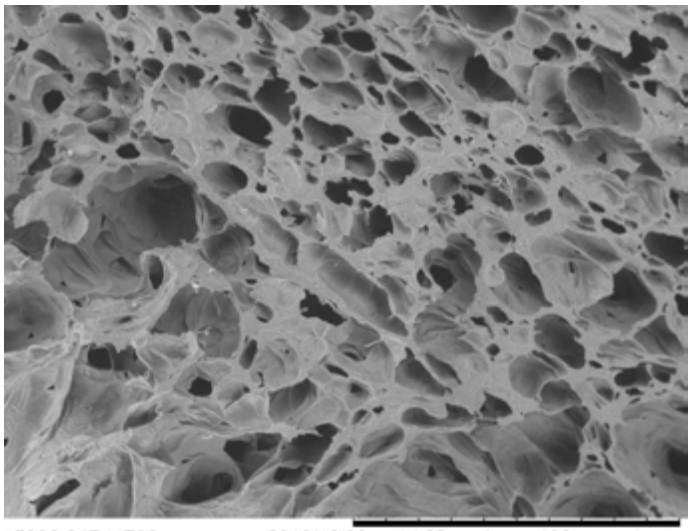
Charred Specimen

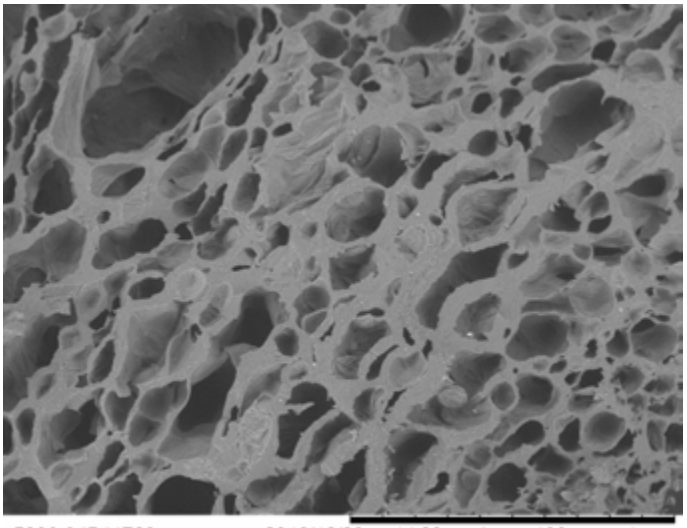
Ipomoea batatas
CONVULVULACEAE

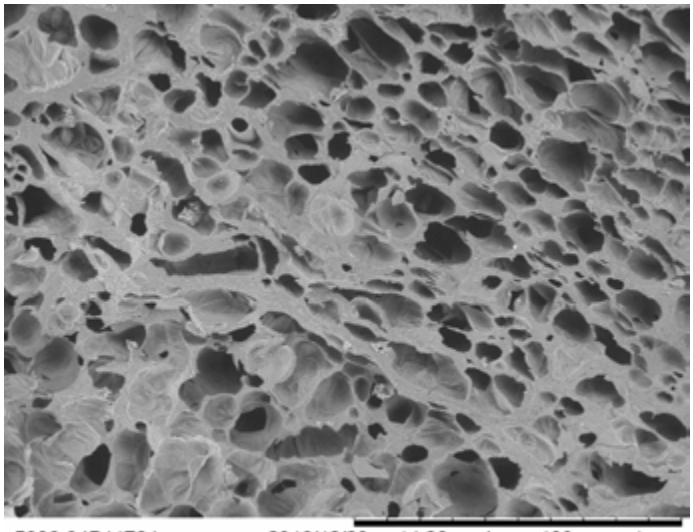
Common Name: Sweet Potato
Sample Type: Charred

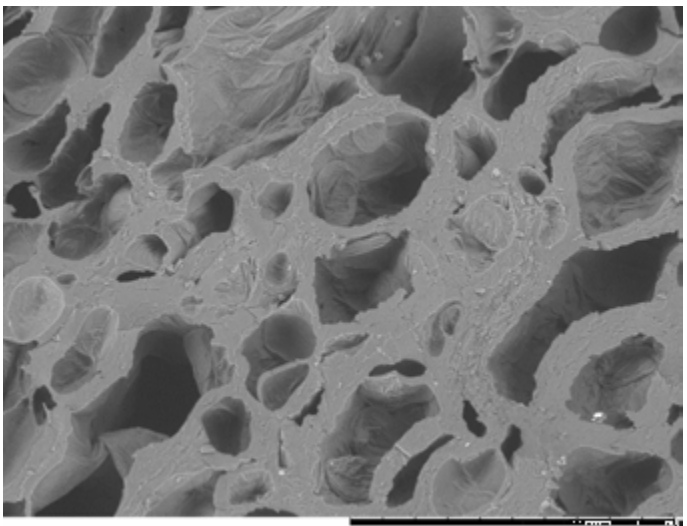
Tangential

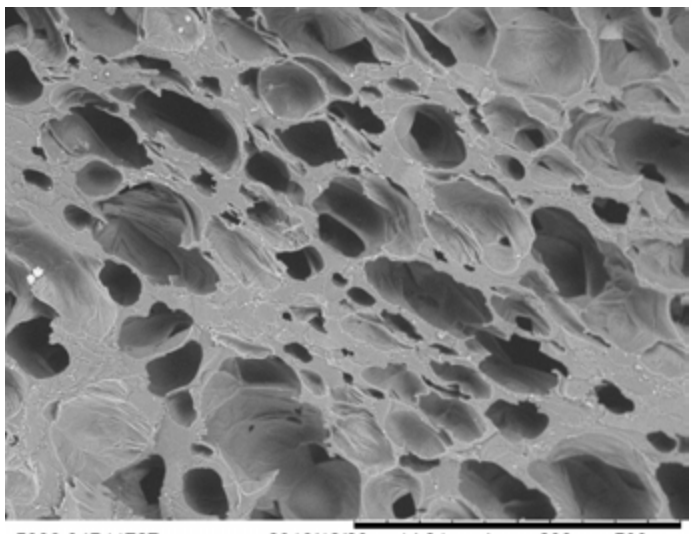








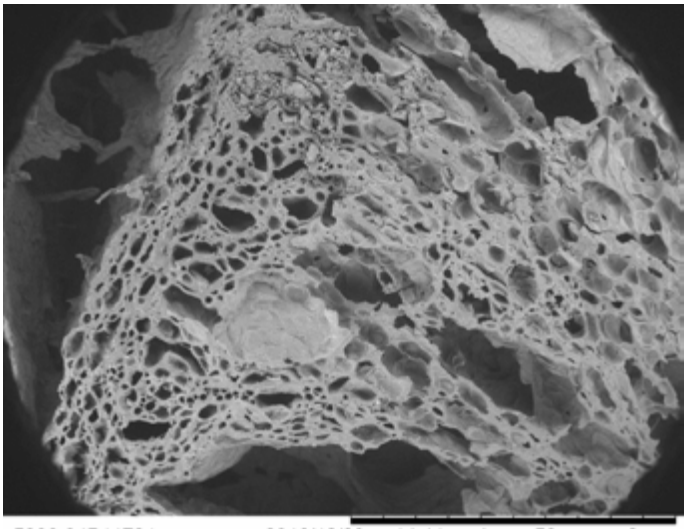




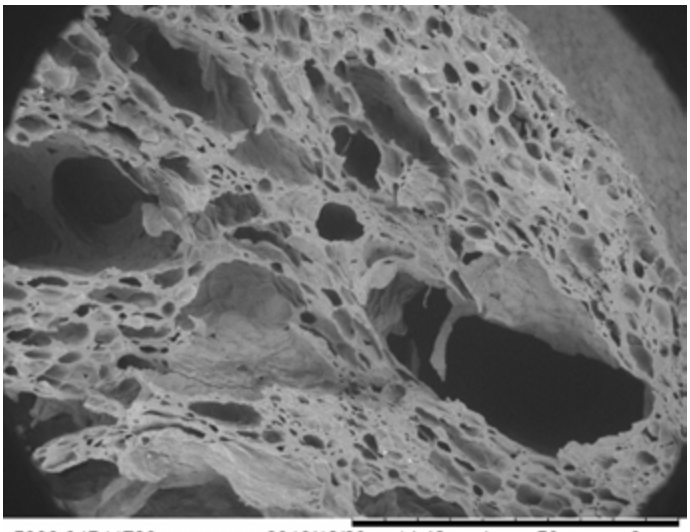
Ipomoea batatas
CONVULVULACEAE

Common Name: Sweet Potato
Sample Type: Charred

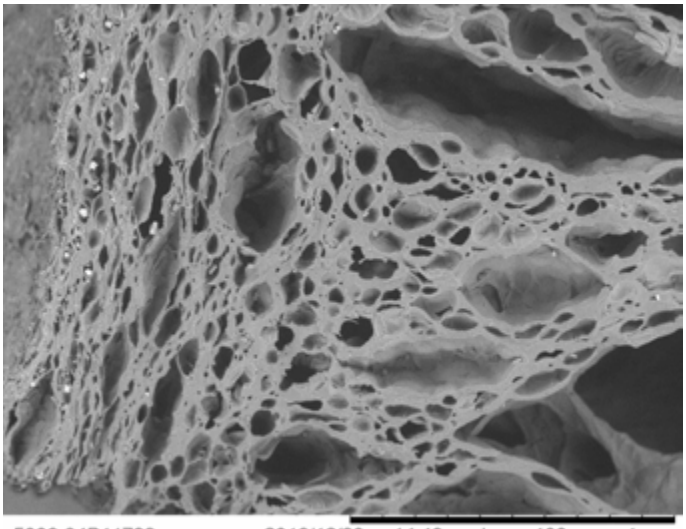
Transverse



5006-04P11731 2016/12/20 14:44 L x50 2 mm



5006-04P11730 2016/12/20 14:42 L x50 2 mm



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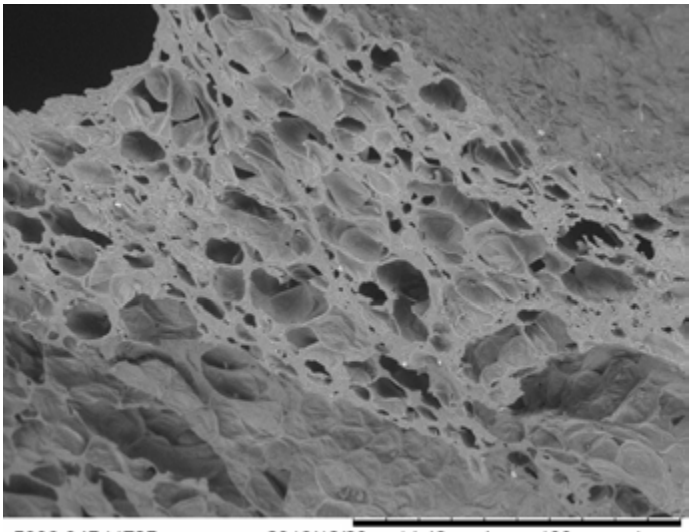
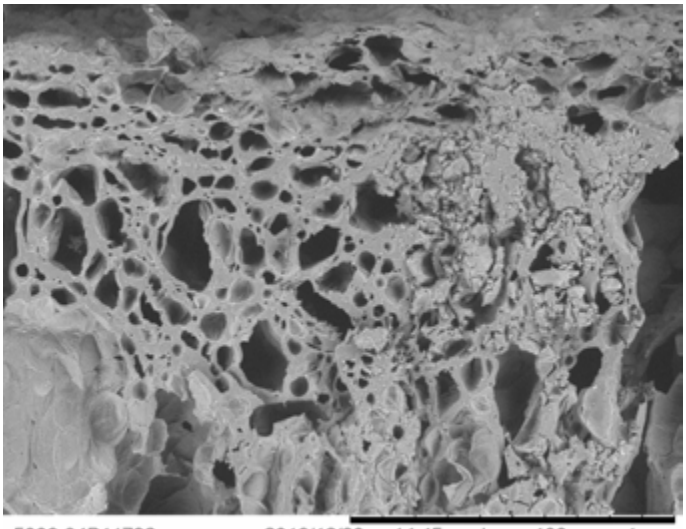
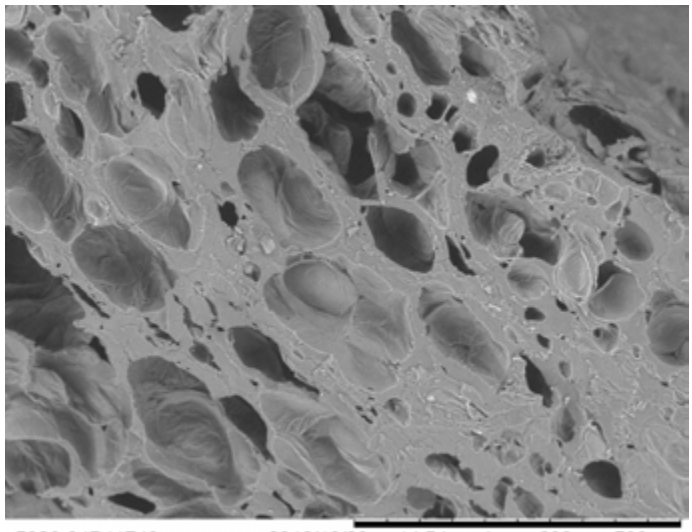


5006-04P11735 2016/12/20 14:48 L x100 1 mm



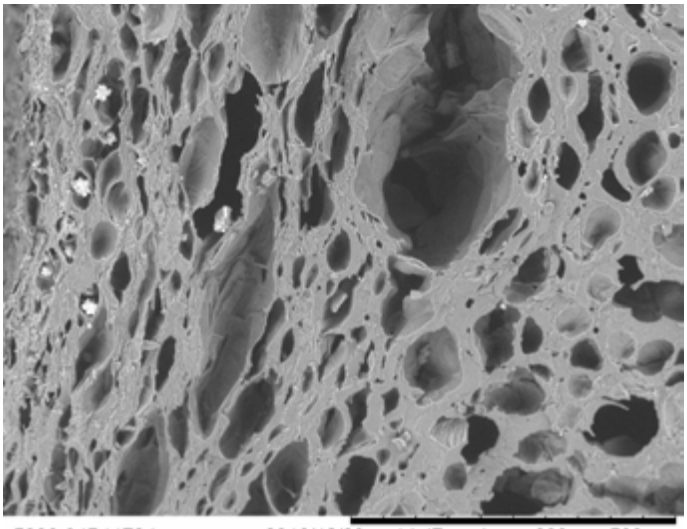
5006-04P11732 2016/12/20 14:45 L x100 1 mm

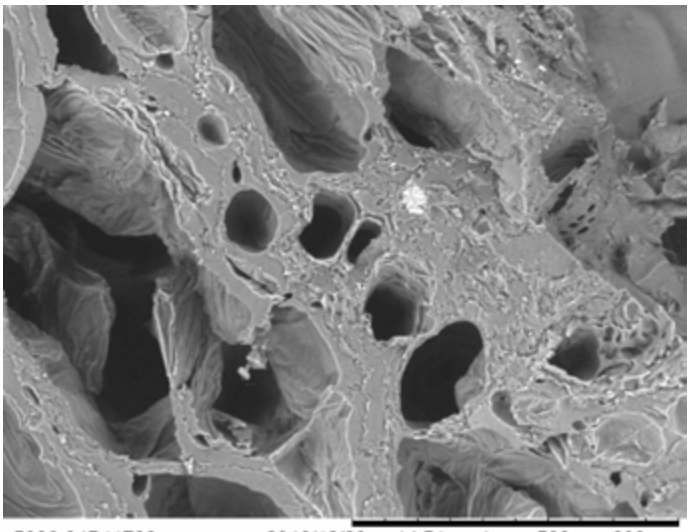


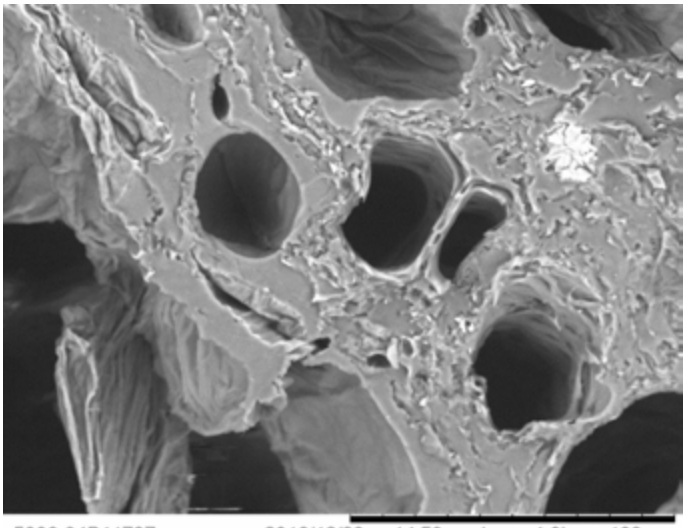
5006-04P11740 2016/12/20 14:54 L x200 500 um

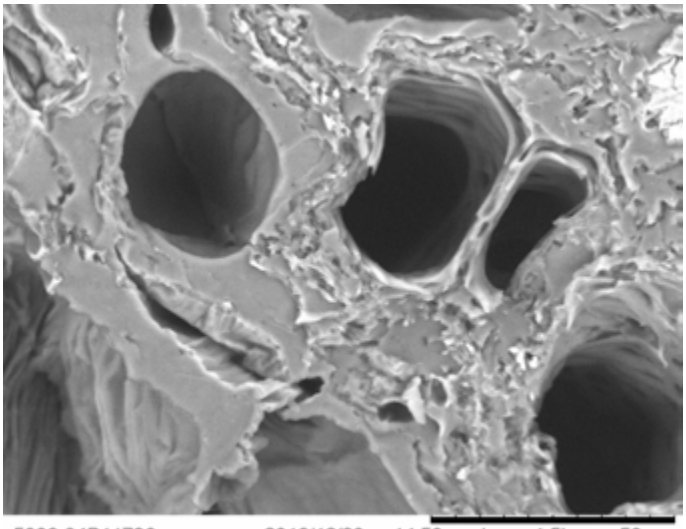
Ipomoea batatas
CONVULVULACEAE

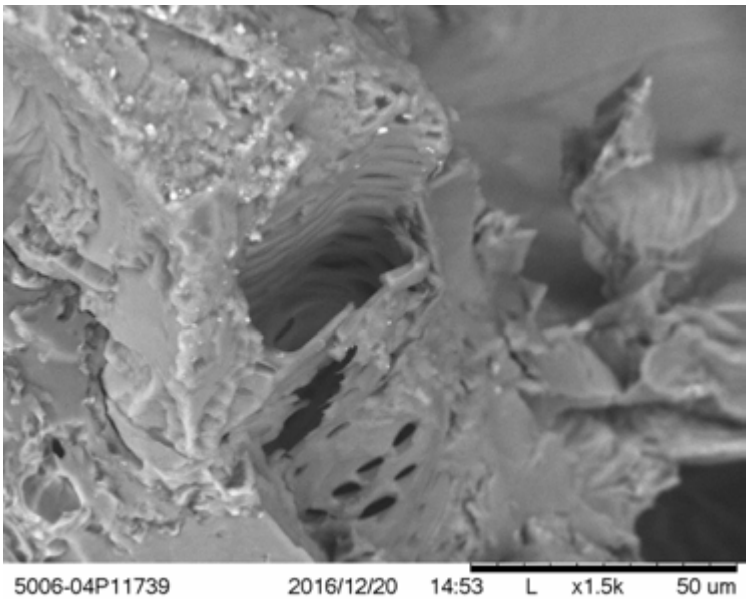
Common Name: Sweet Potato
Sample Type: Charred



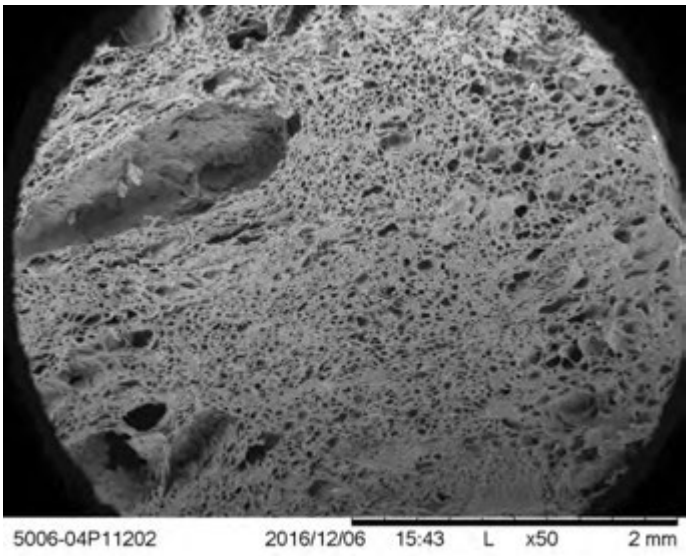


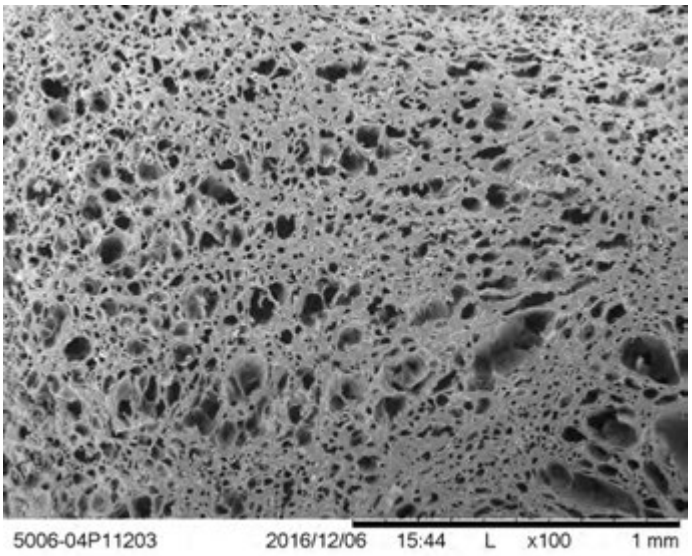


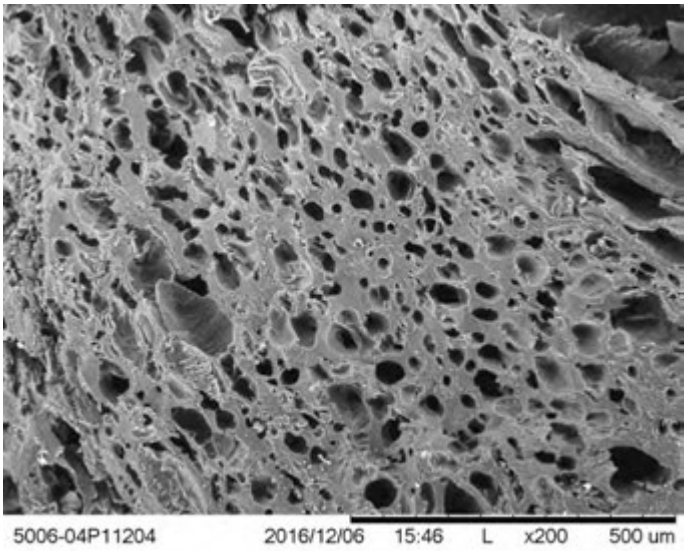


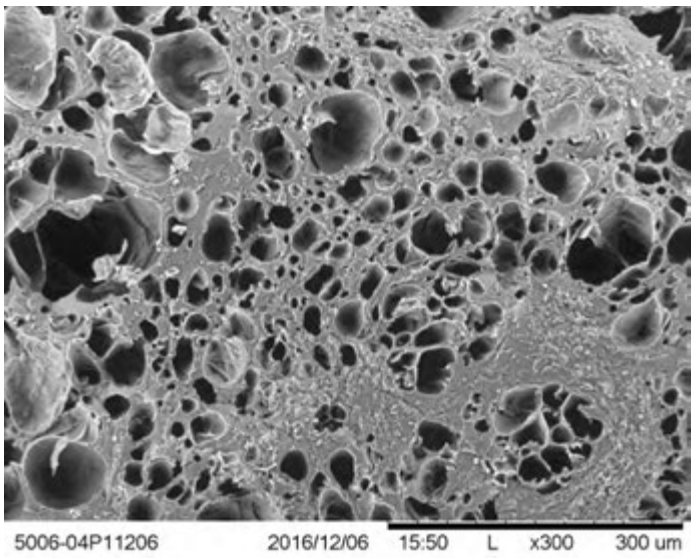


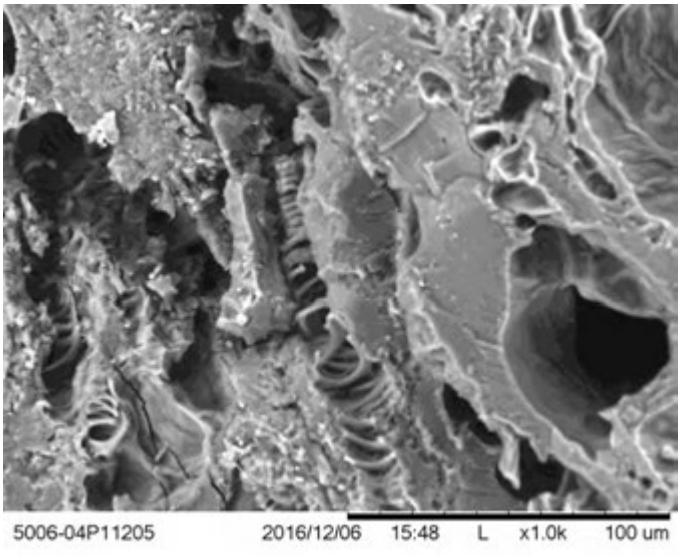
Lepidium meyenii Common Name: Maca Transverse
BRASSICACEAE Sample Type: Charred – 2.5 hours

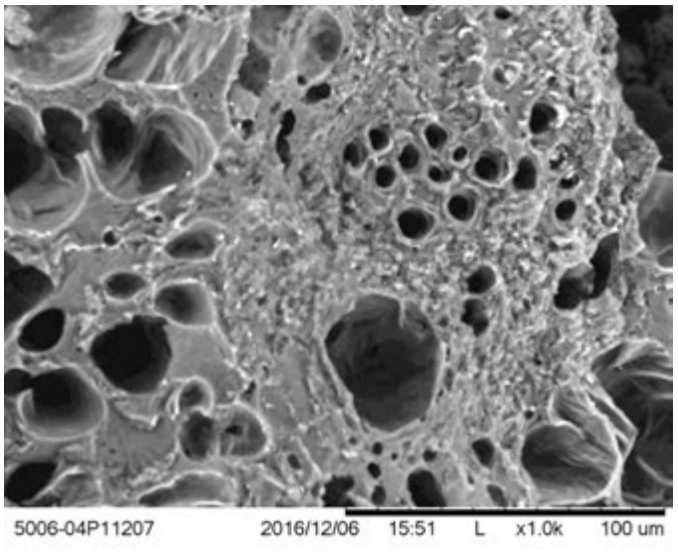




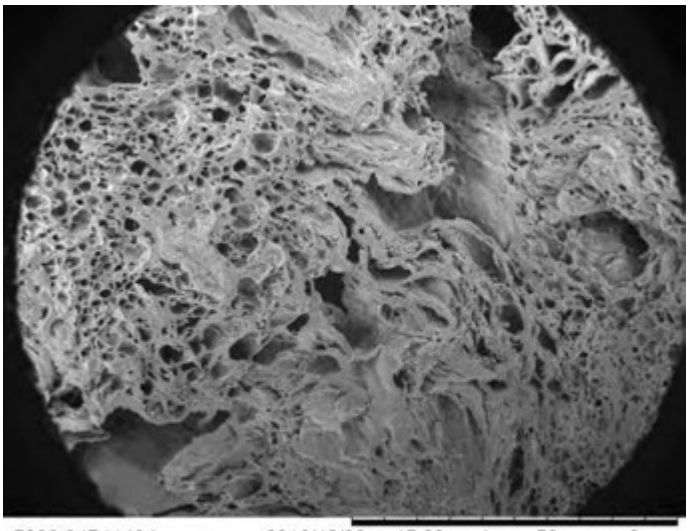


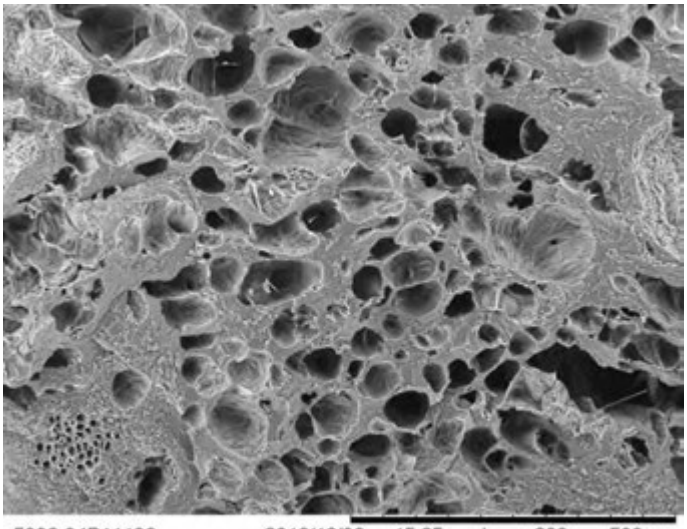


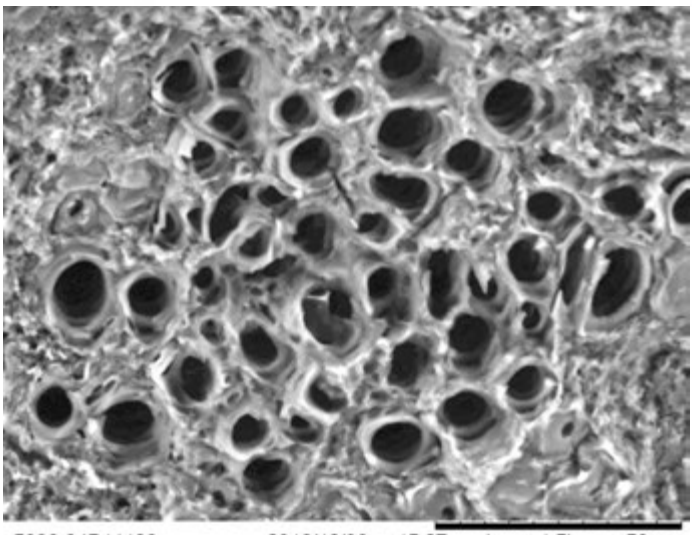


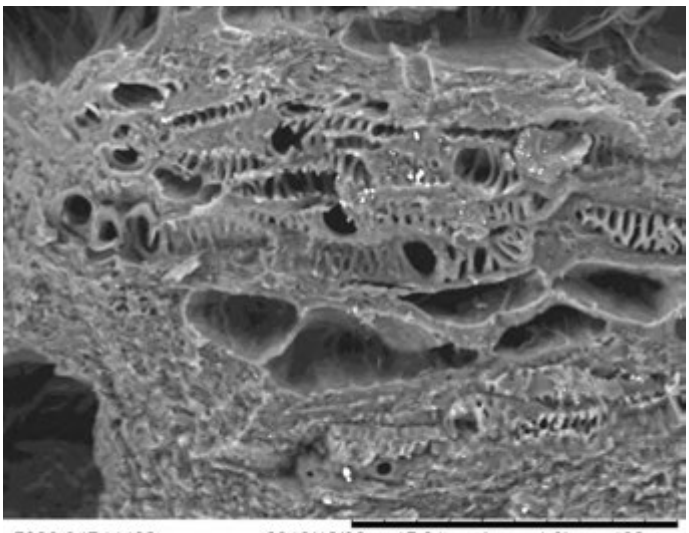


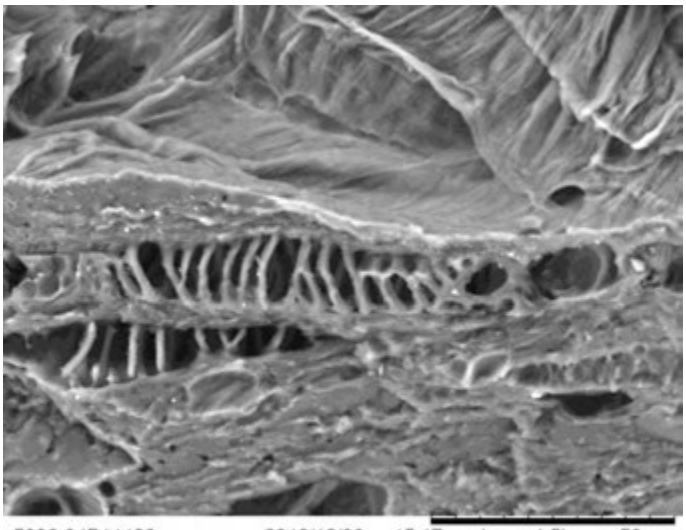
Lepidium meyenii Common Name: Maca Tangential
BRASSICACEAE Sample Type: Charred – 2.5 hours



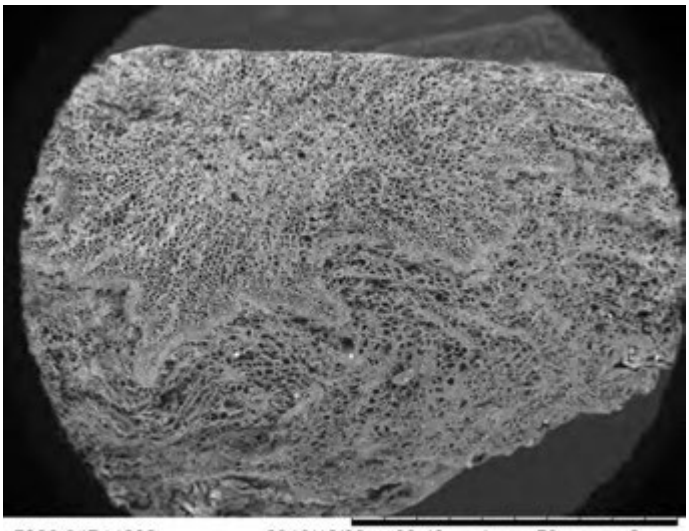


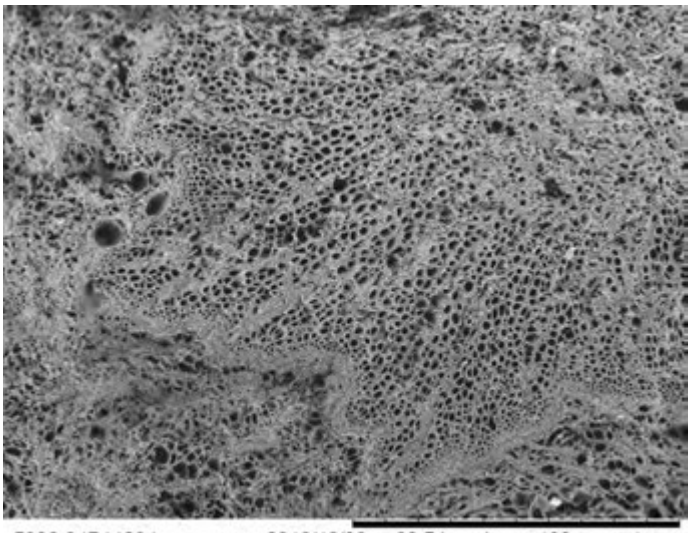


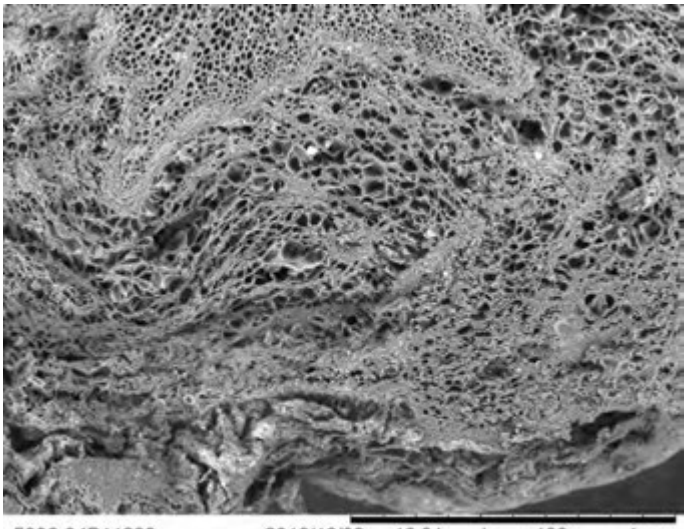


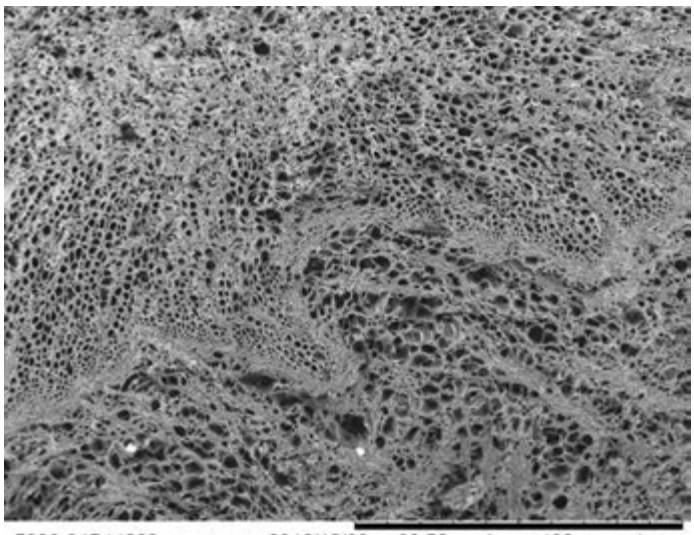


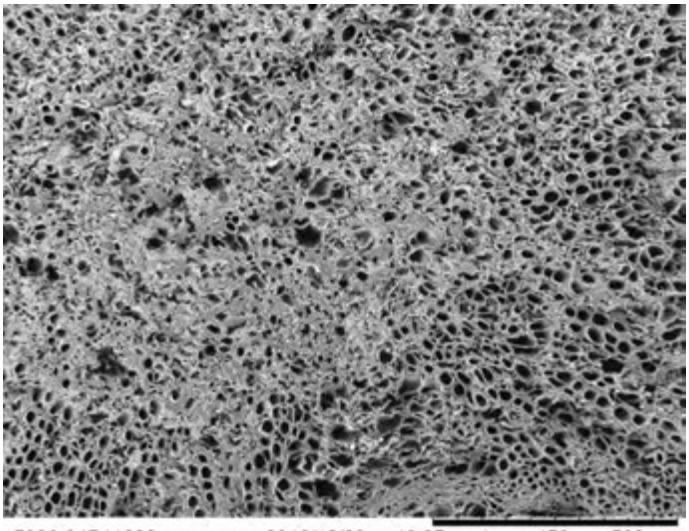
Lepidium meyenii Common Name: Maca Stem End
BRASSICACEAE Sample Type: Charred

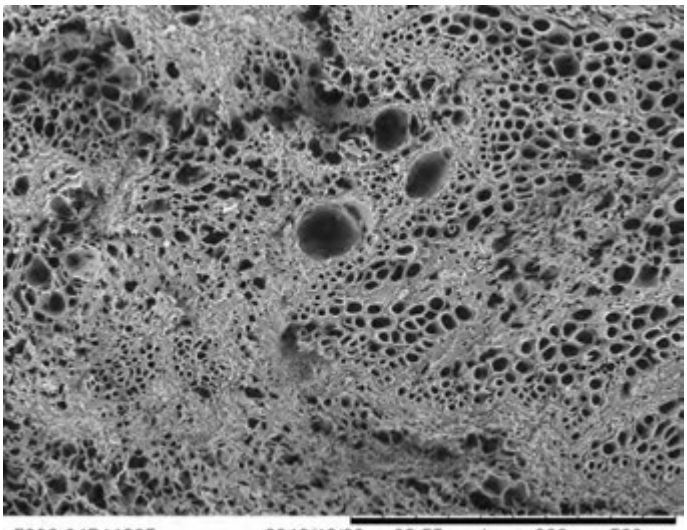








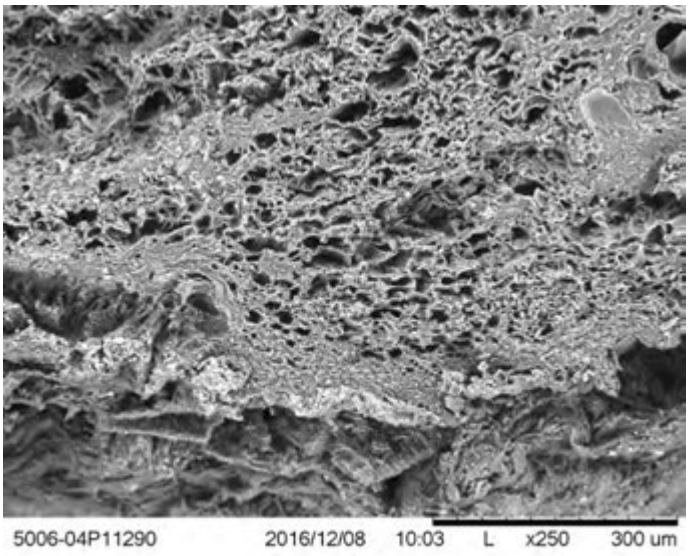


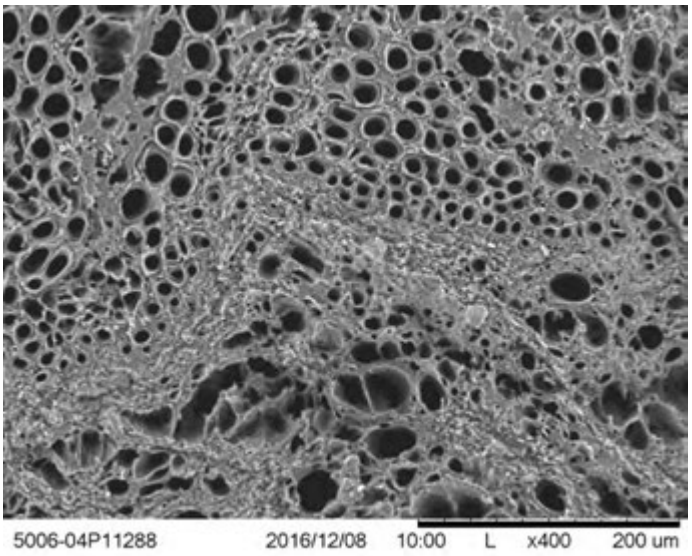


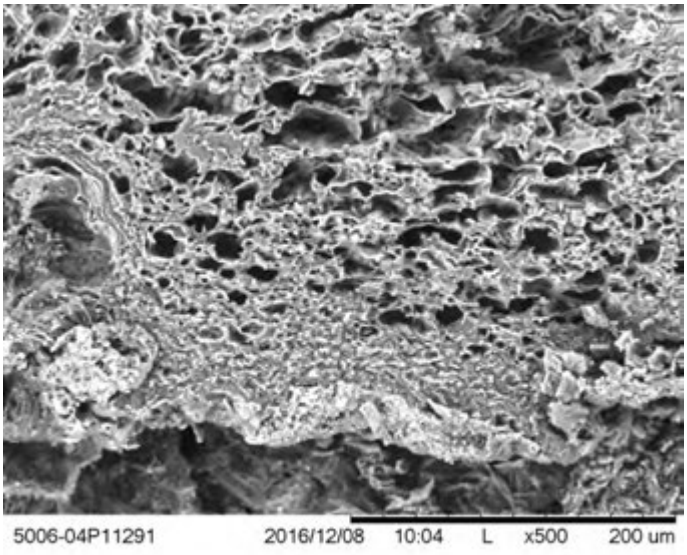
Lepidium meyenii
BRASSICACEAE

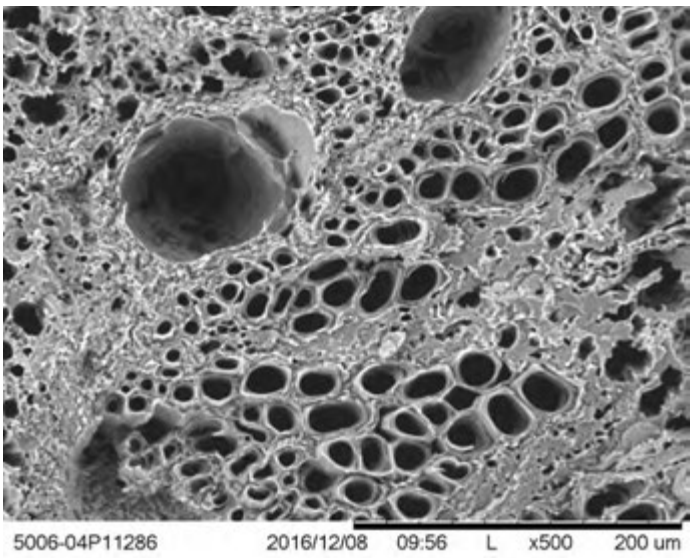
Common Name: Maca
Sample Type: Charred

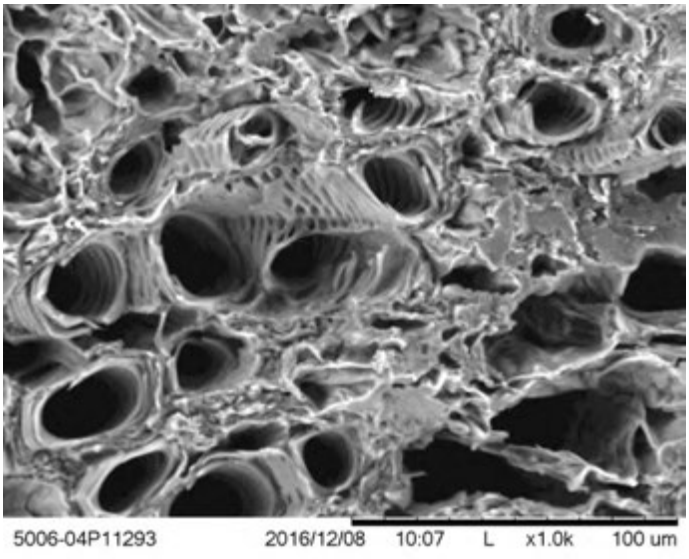
Stem End (Continued)

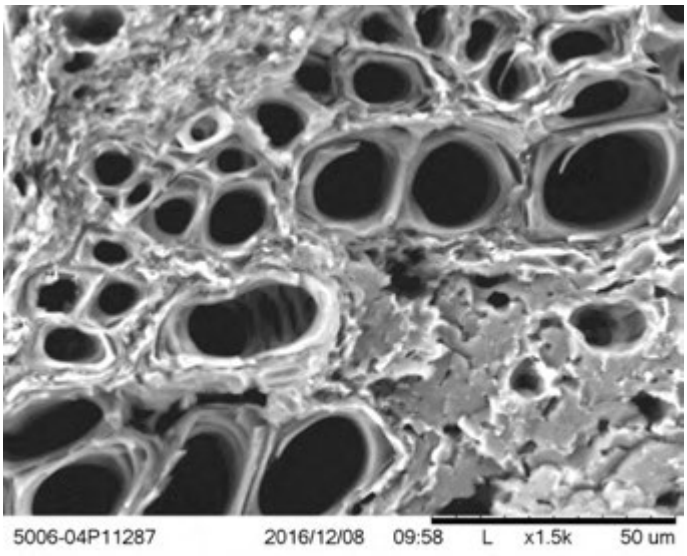








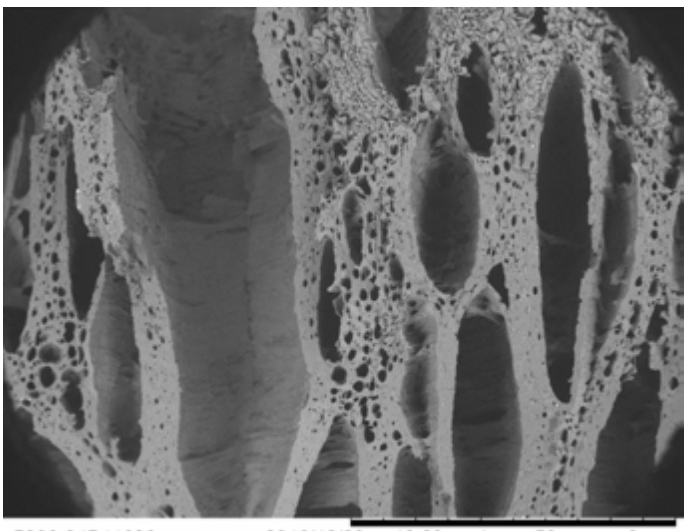


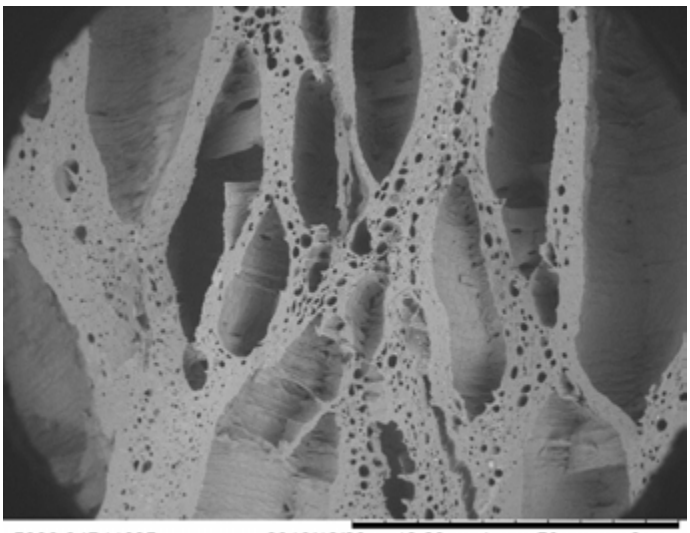


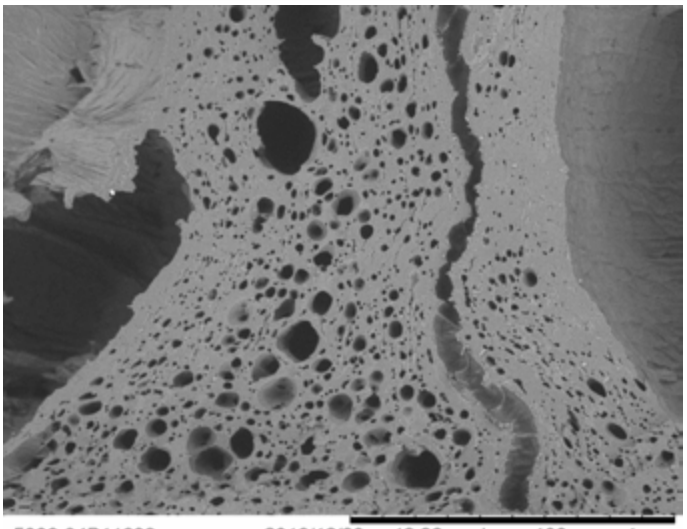
Manihot esculenta
EUPHORBIACEAE

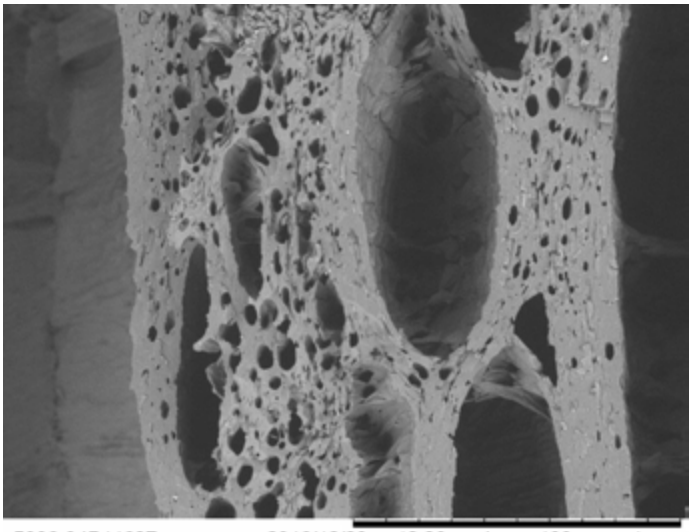
Common Name: Manioc
Sample Type: Charred

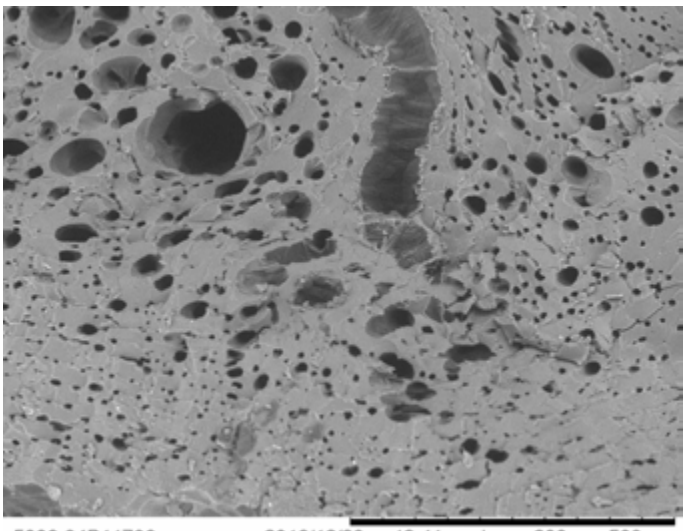
Tangential

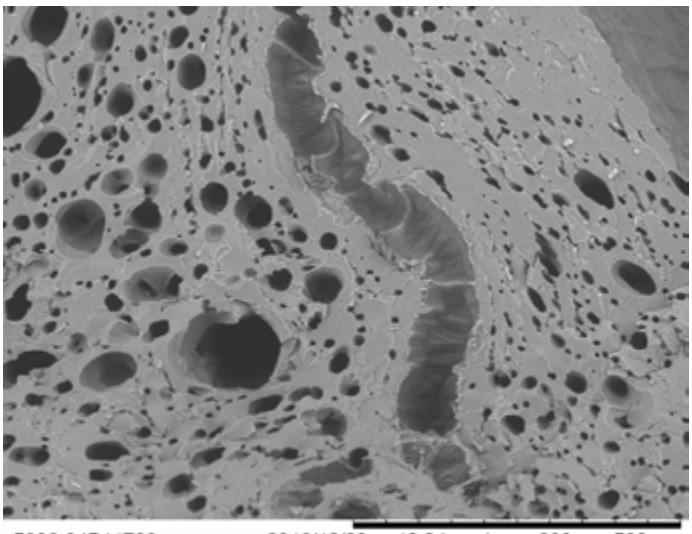






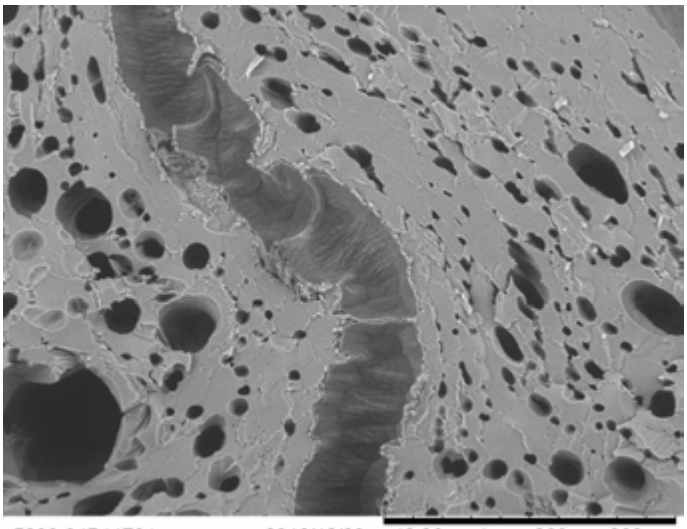


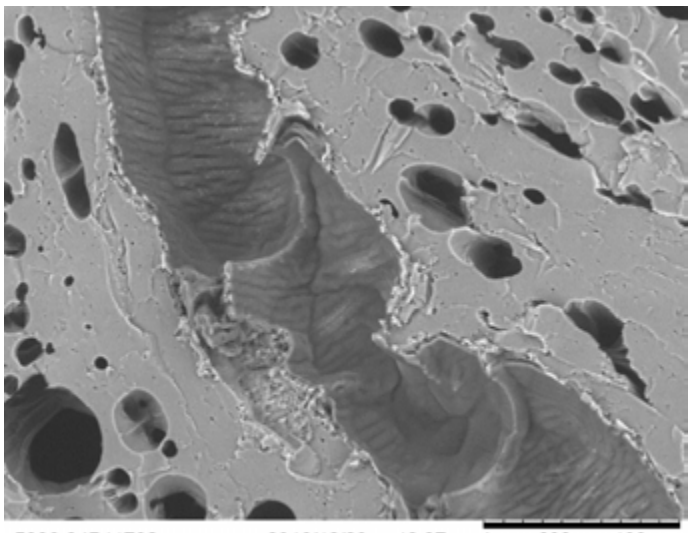


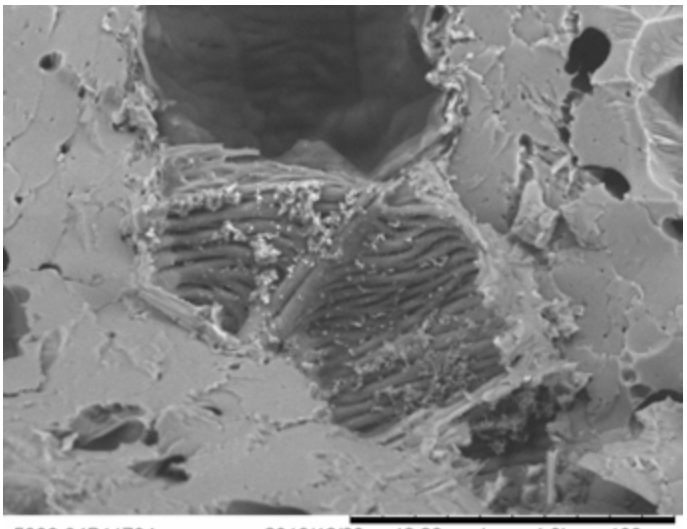


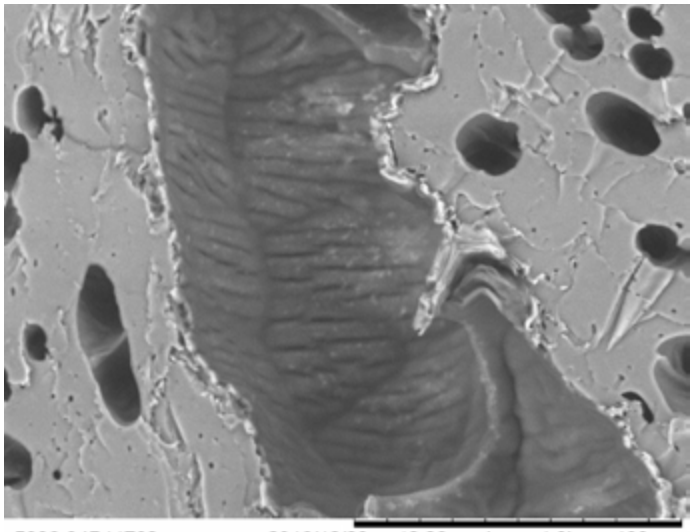
Manihot esculenta
EUPHORBIACEAE

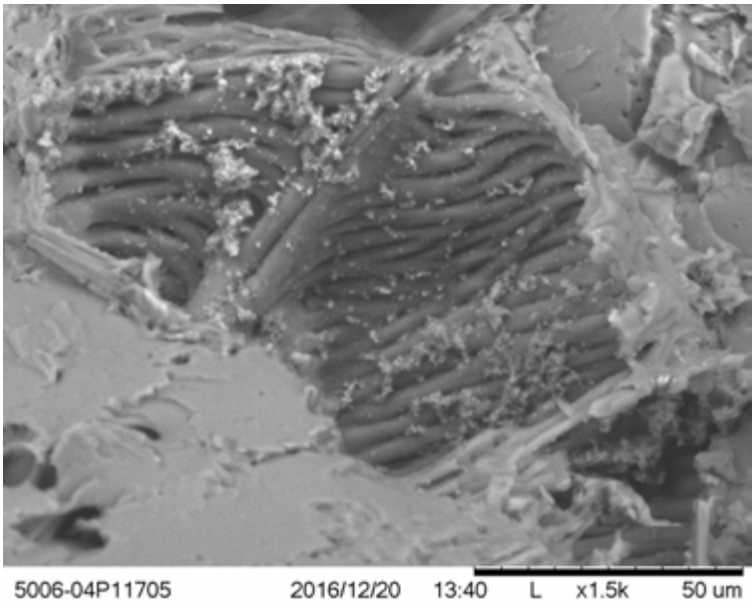
Common Name: Manioc
Sample Type: Charred







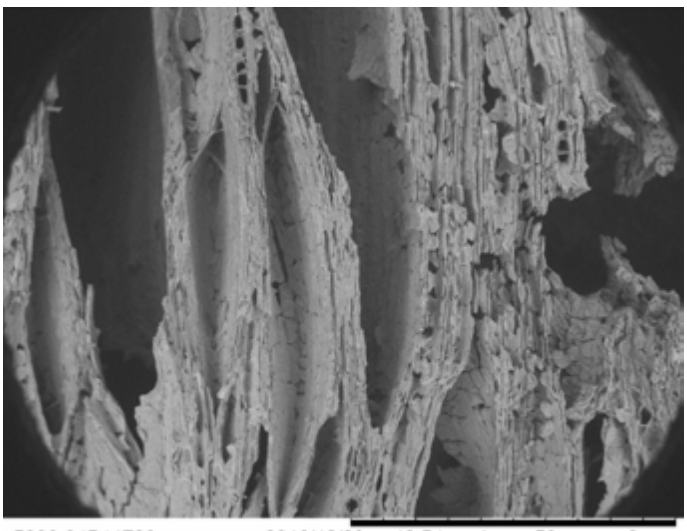


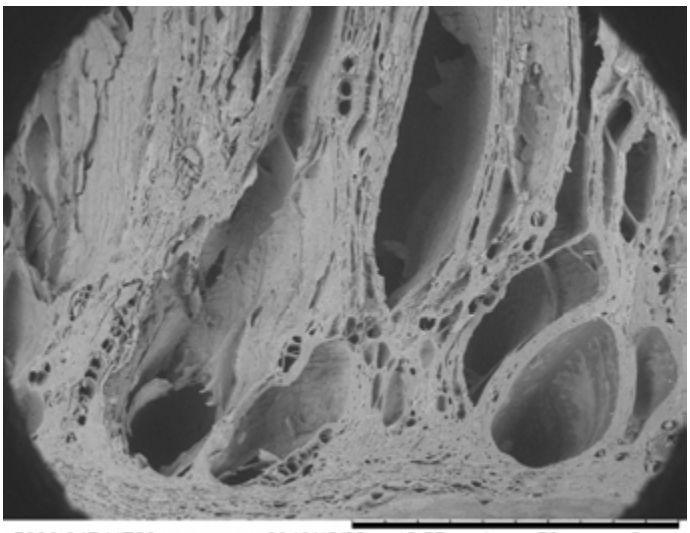


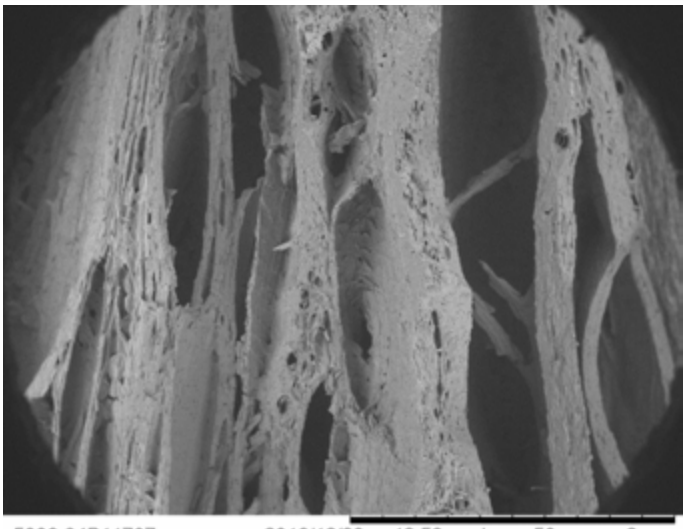
Manihot esculenta
EUPHORBIACEAE

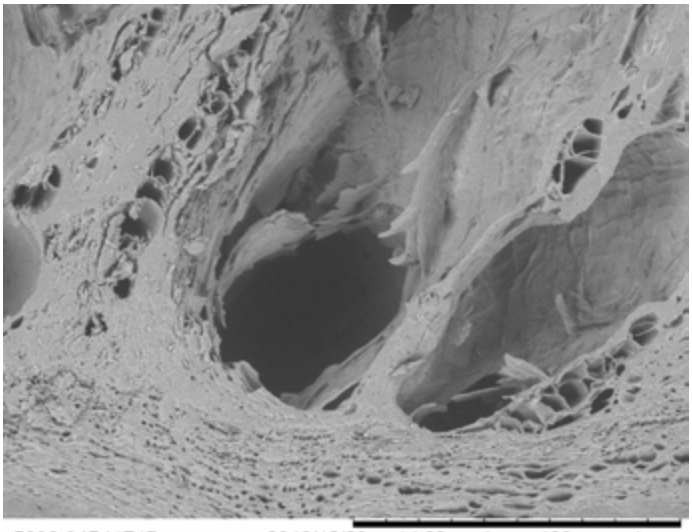
Common Name: Manioc
Sample Type: Charred

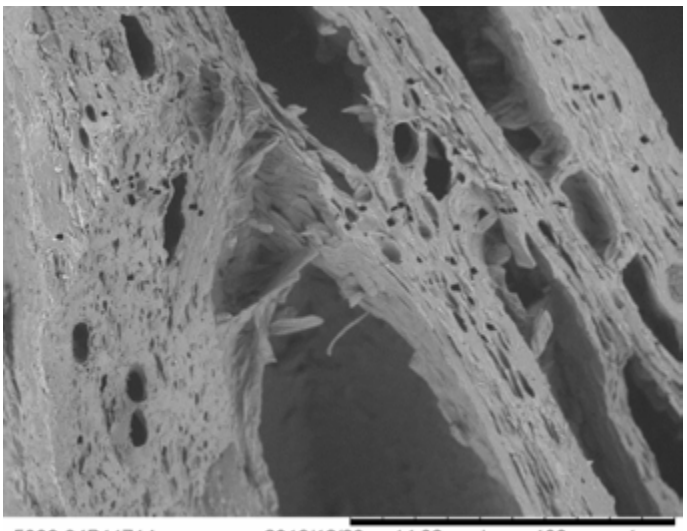
Transverse

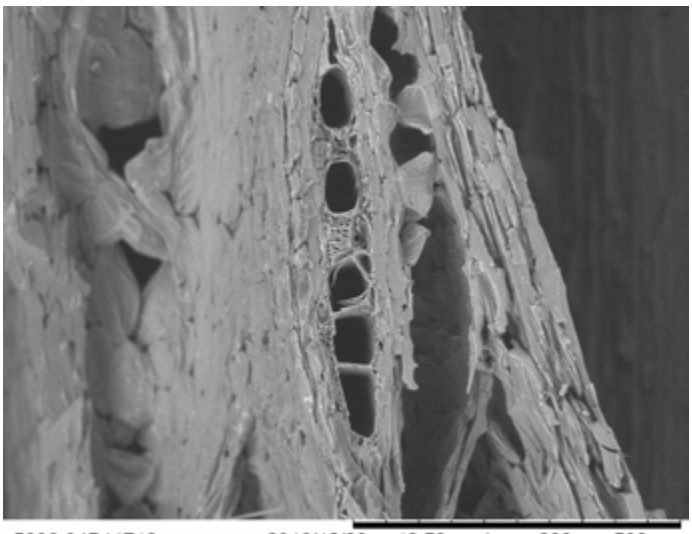






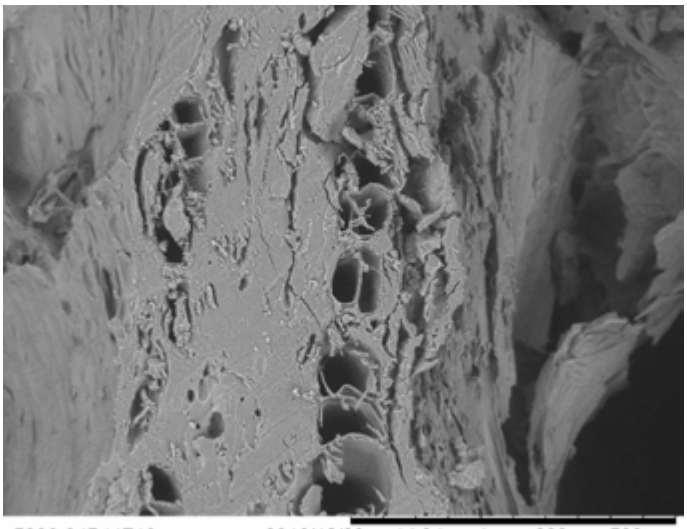


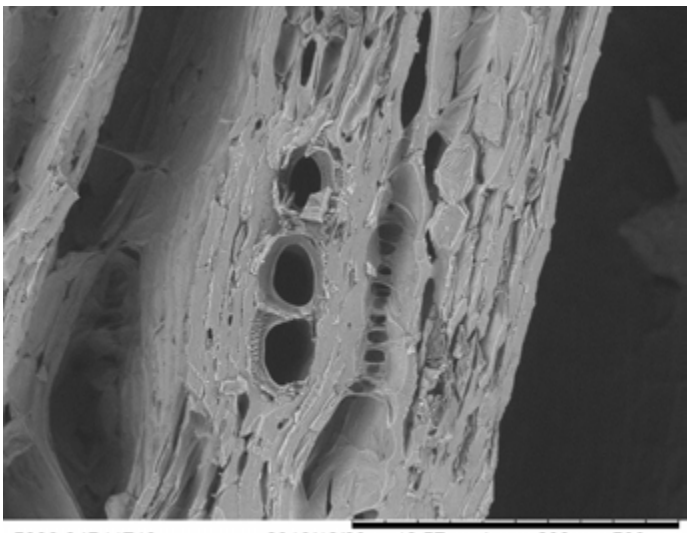


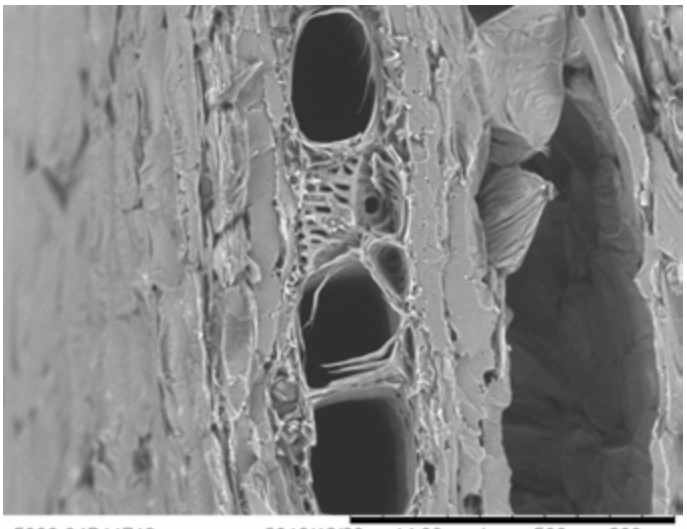


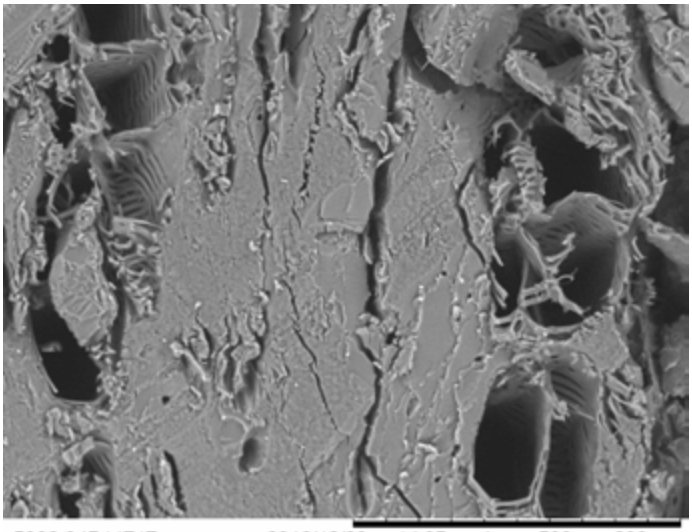
Manihot esculenta
EUPHORBIACEAE

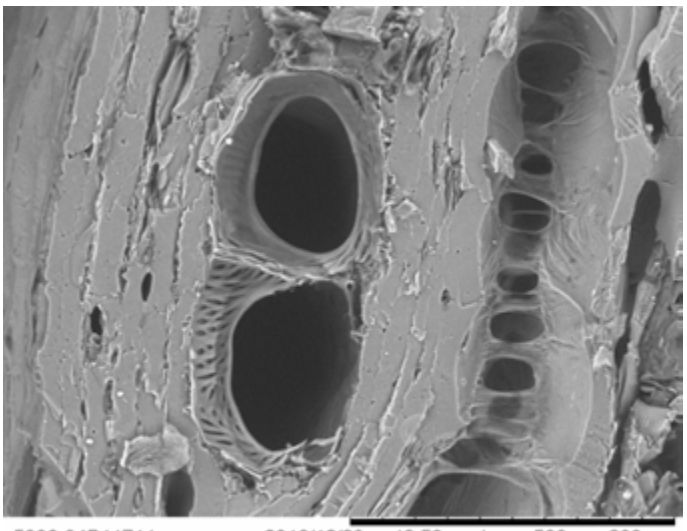
Common Name: Manioc
Sample Type: Charred

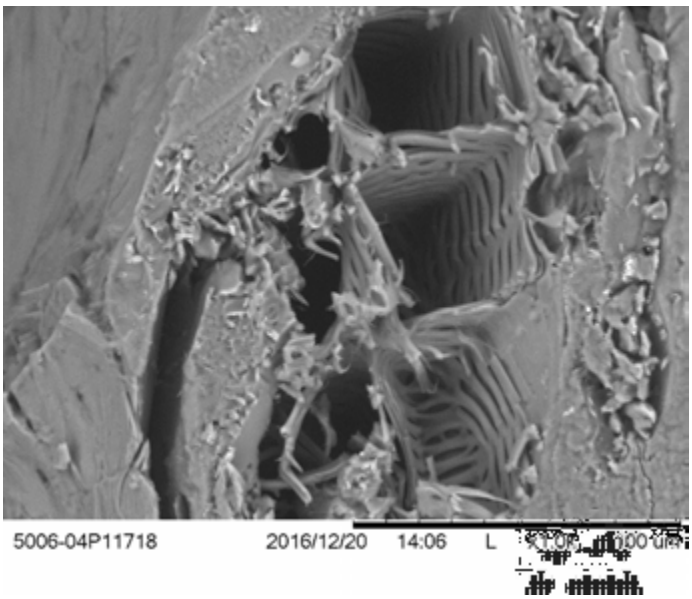








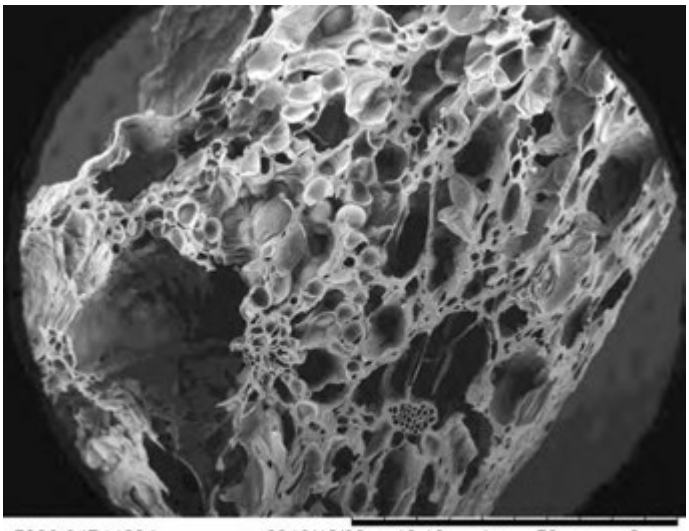


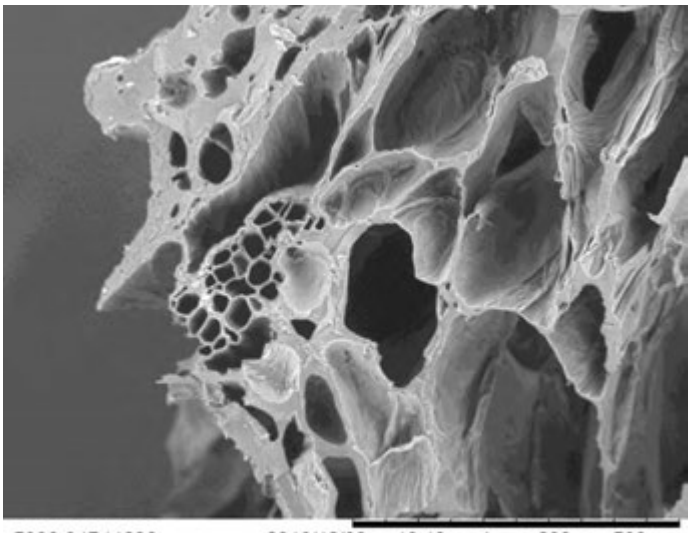


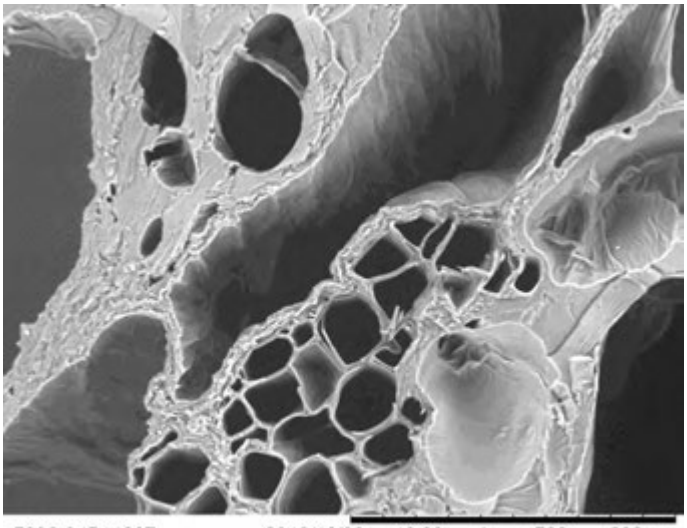
Oxalis tuberosa
OXALIDACEAE

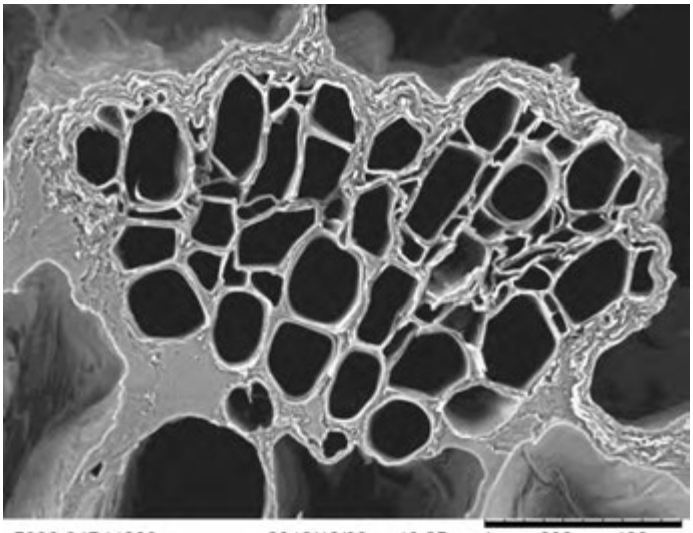
Common Name: Oca
Sample Type: Charred

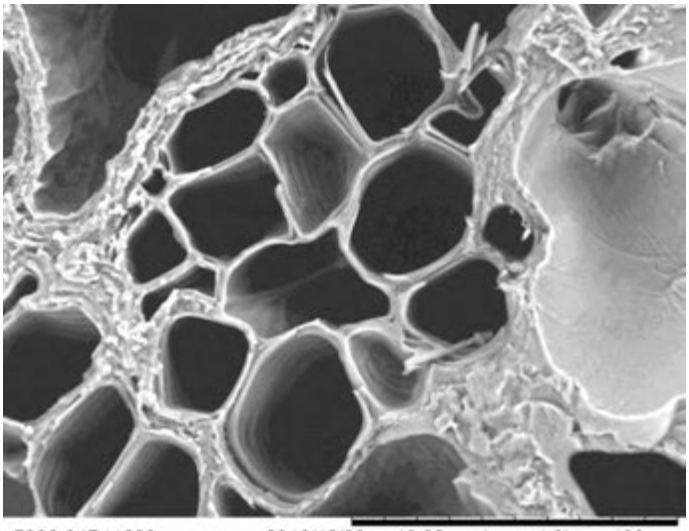
Transverse

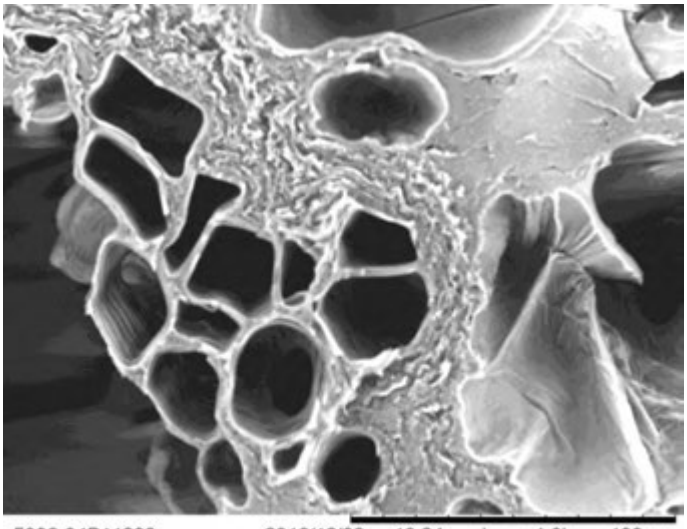




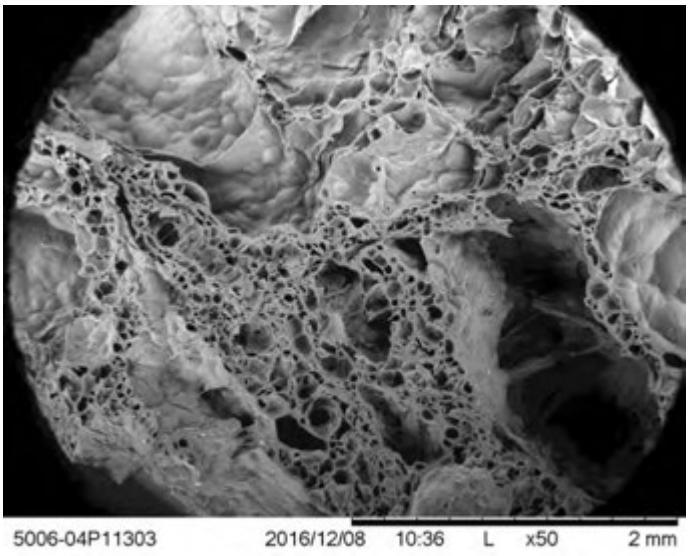


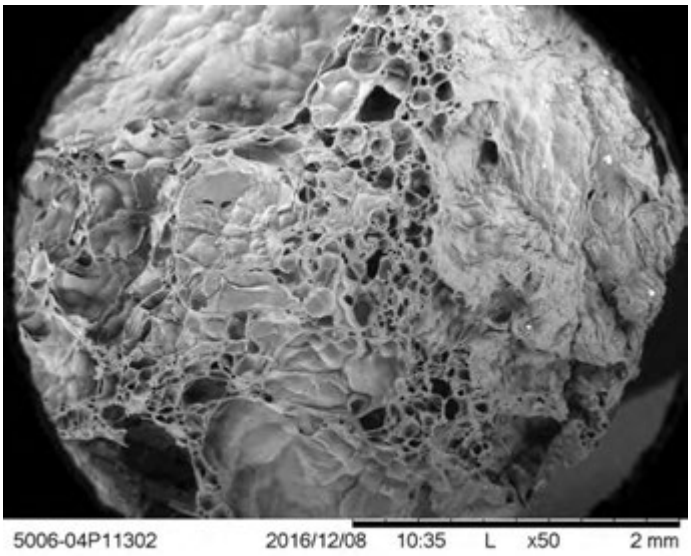


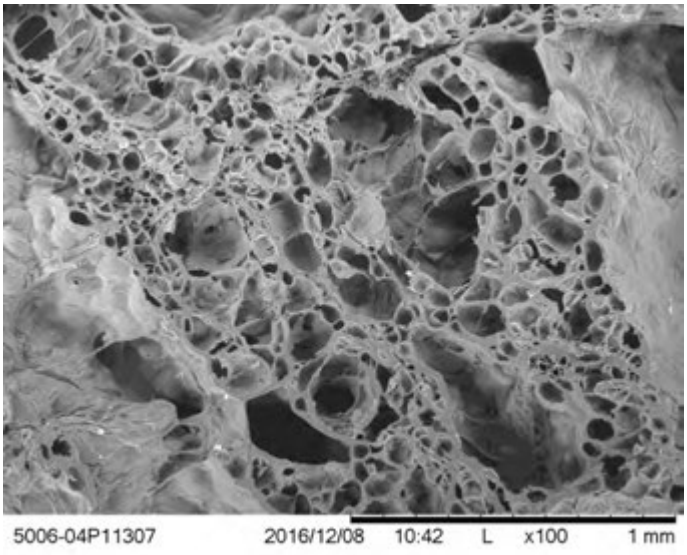


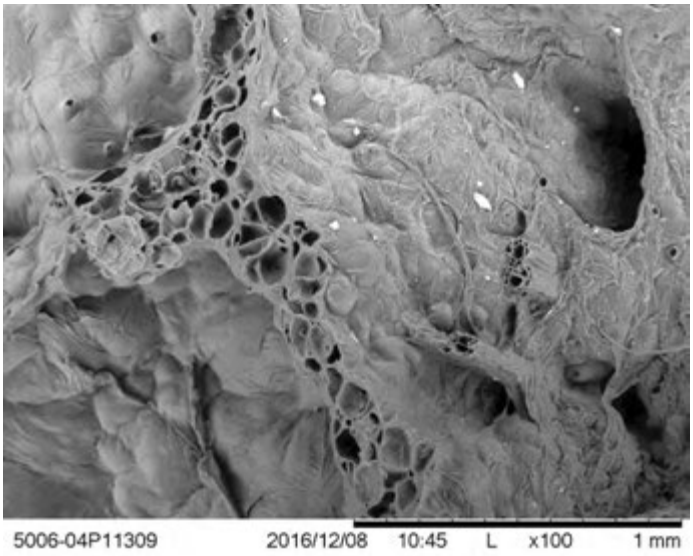


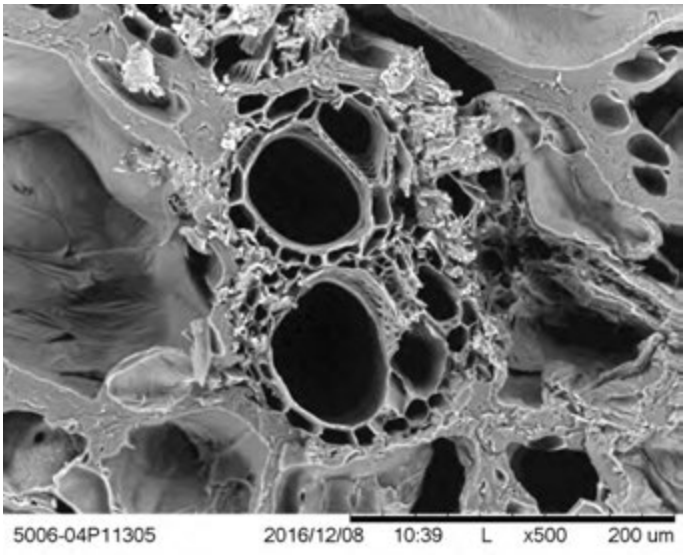
Pachyrhizus erosus Common Name: Jicama Transverse
FABACEAE Sample Type: Charred

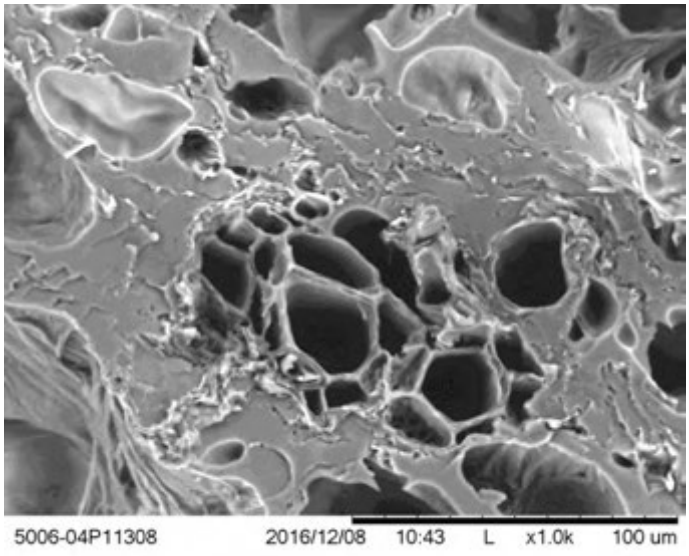








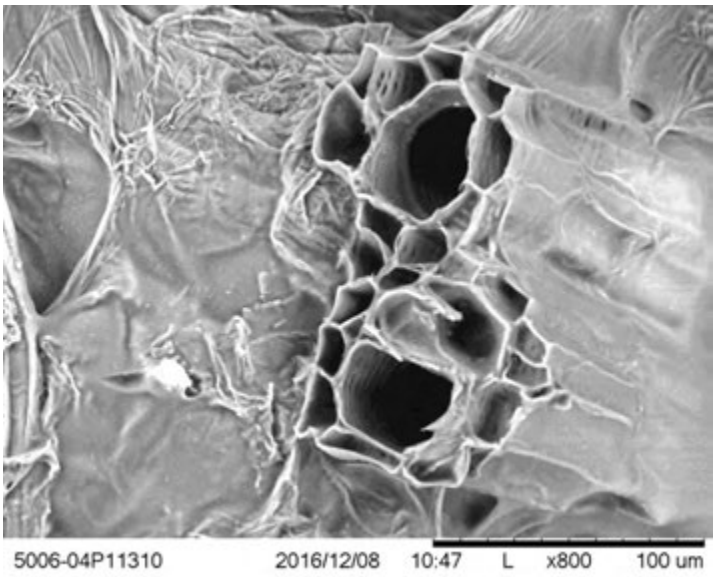


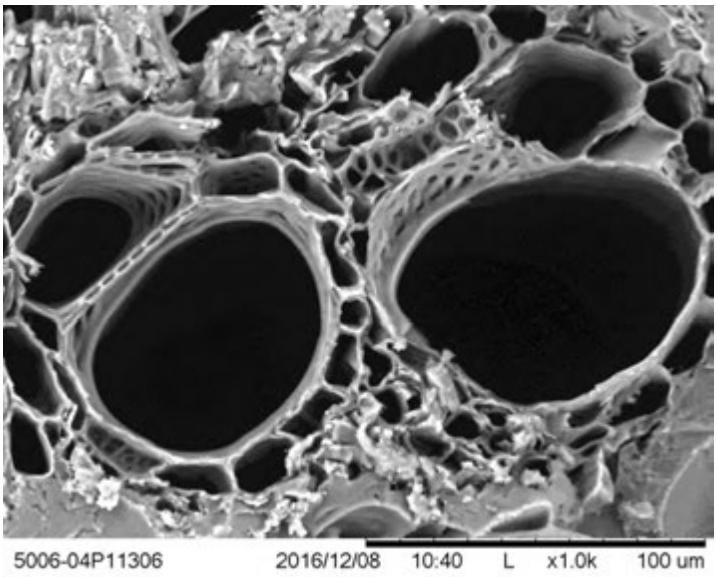


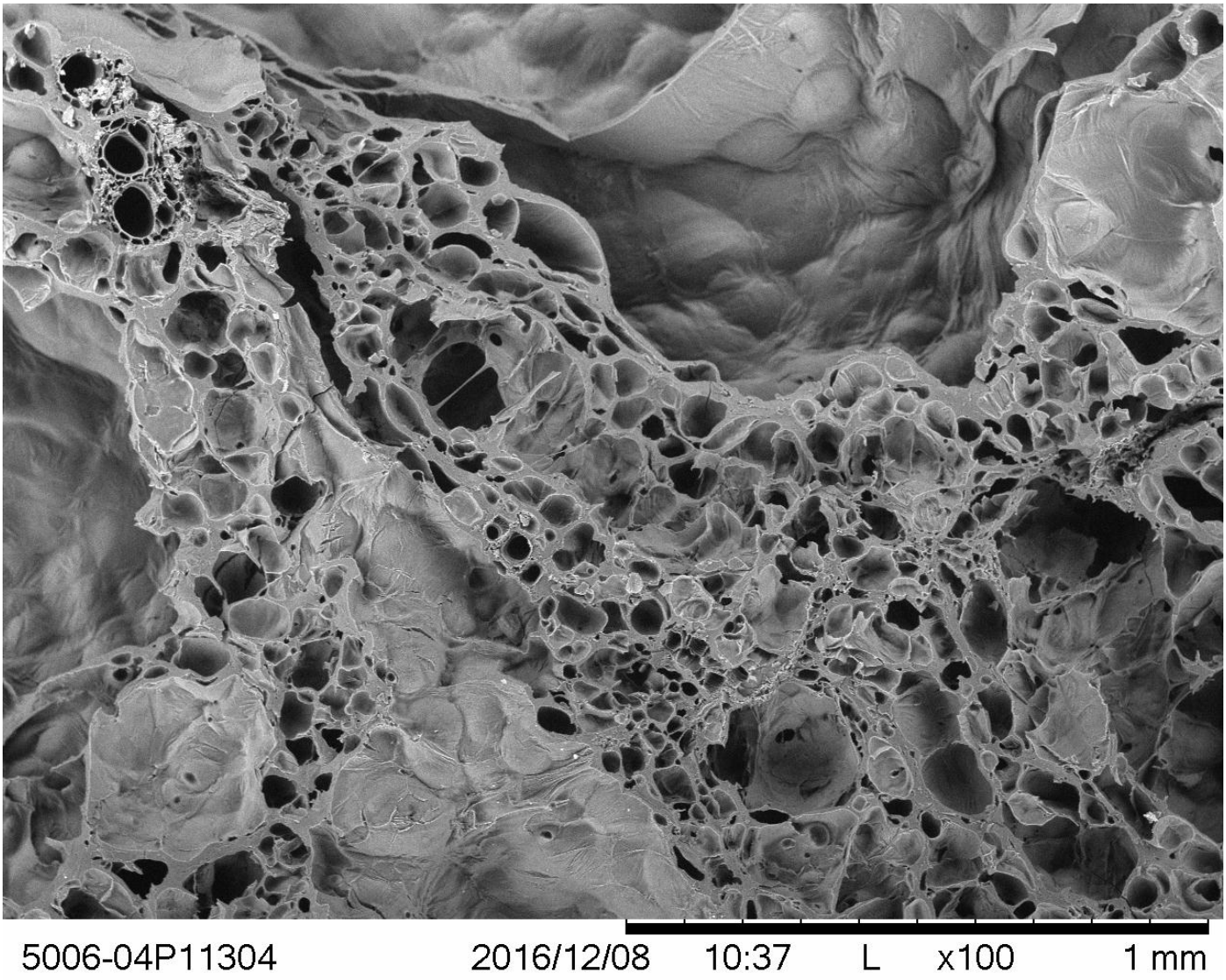
Pachyrhizus erosus
FABACEAE

Common Name: Jicama
Sample Type: Charred

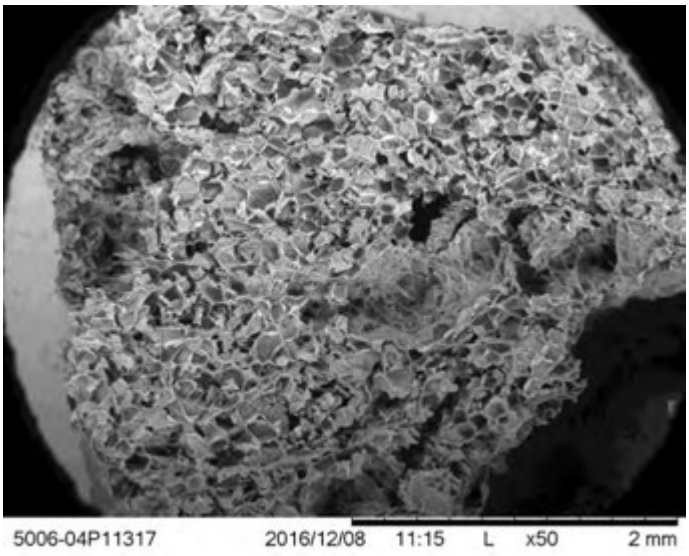
Transverse (continued)

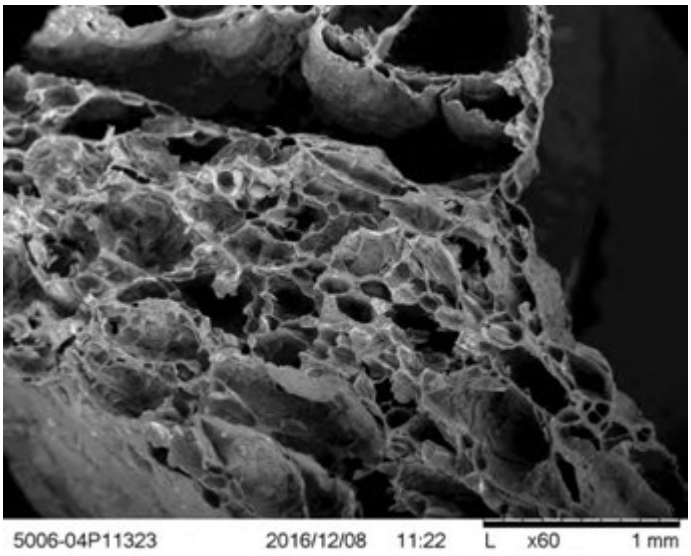


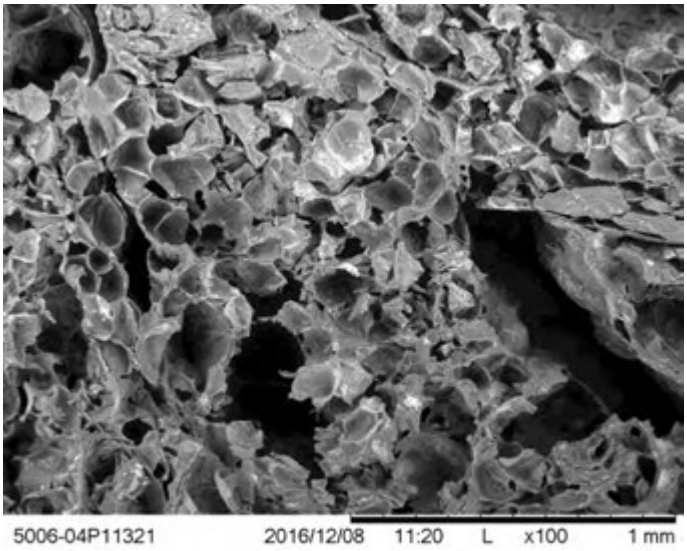


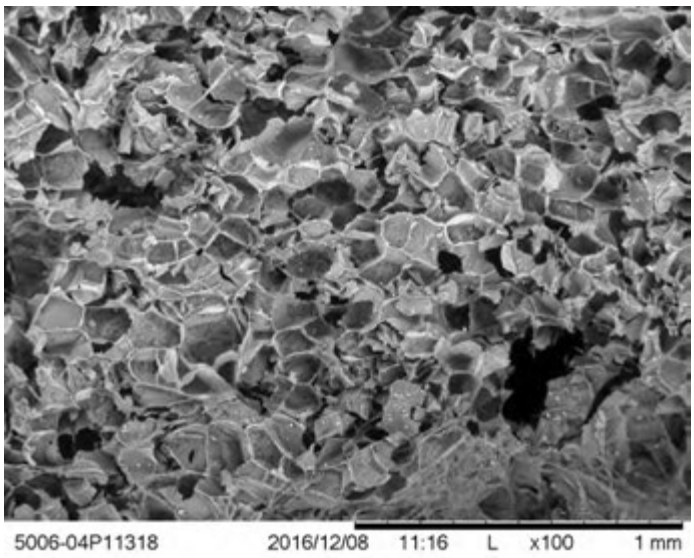


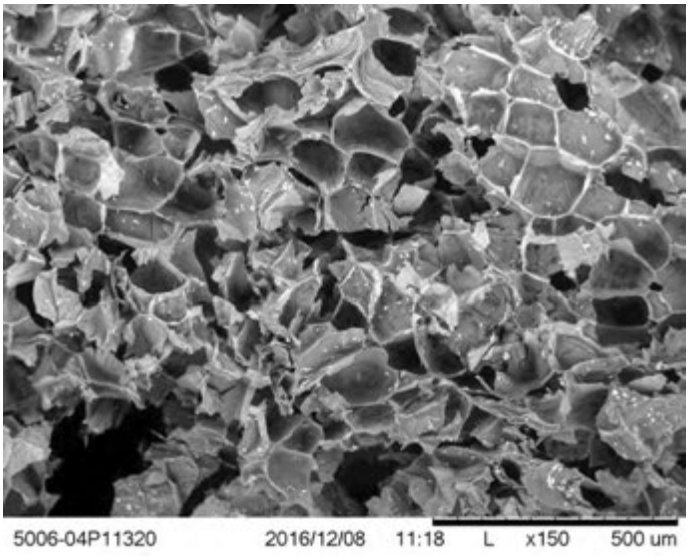
Smallanthus sonchifolius Common Name: Yacon Transverse
ASTERACEAE Sample Type: Charred

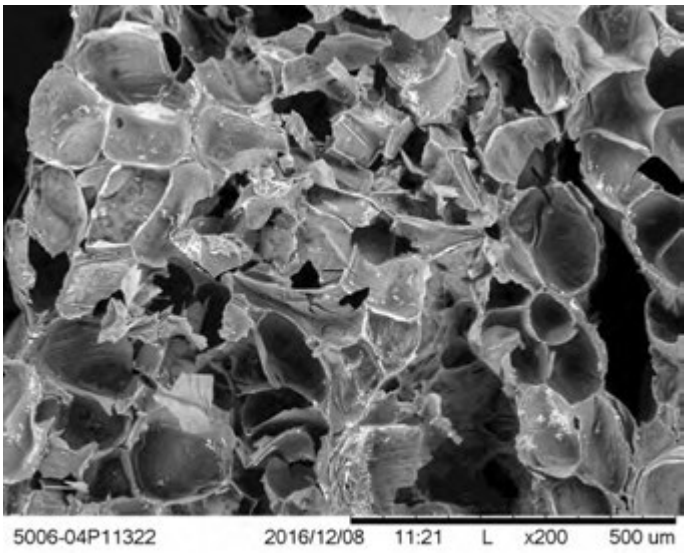








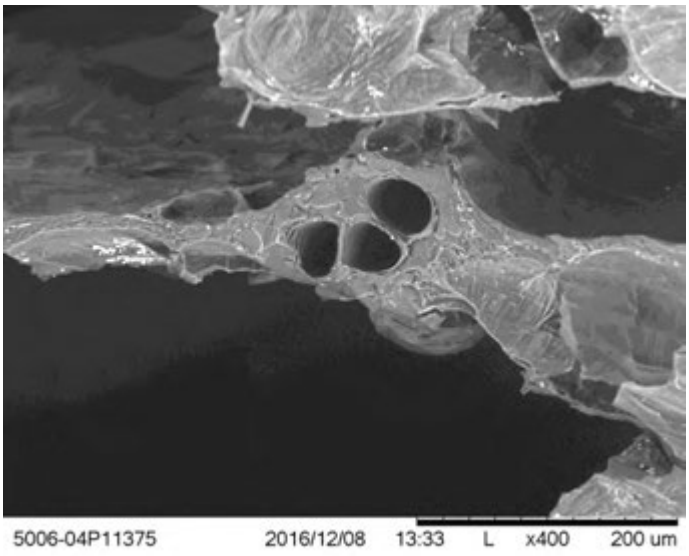


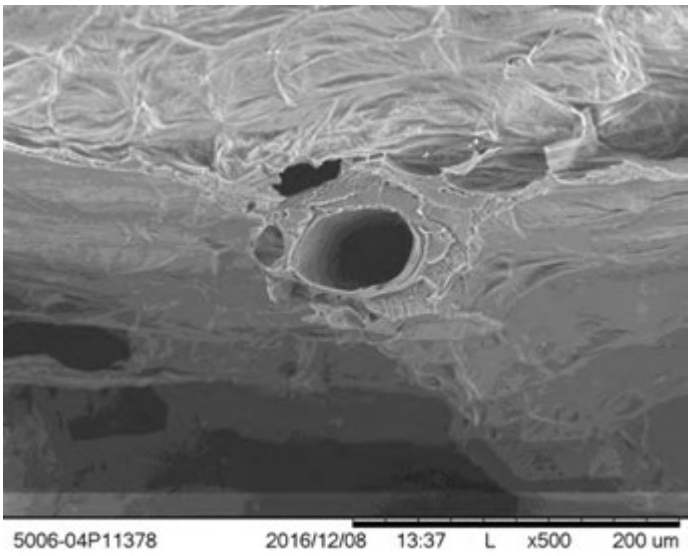


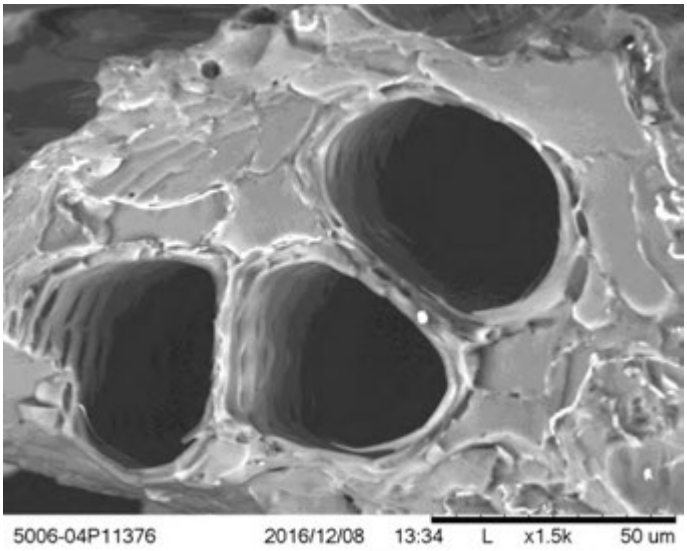
Smallanthus sonchifolius
ASTERACEAE

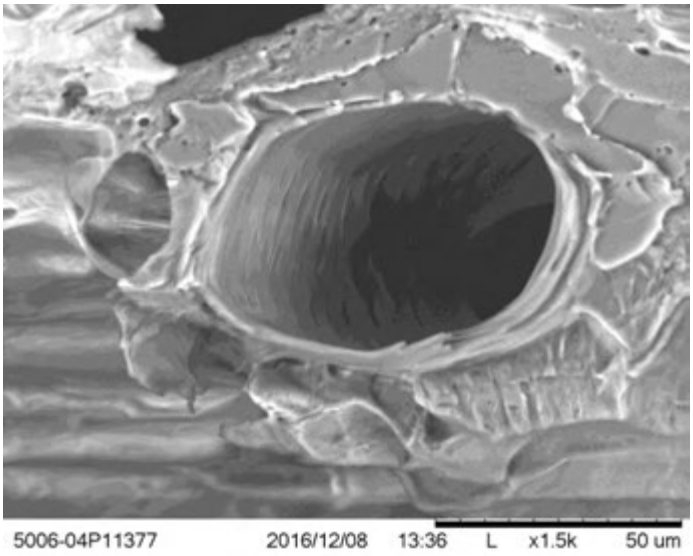
Common Name: Yacon
Sample Type: Charred

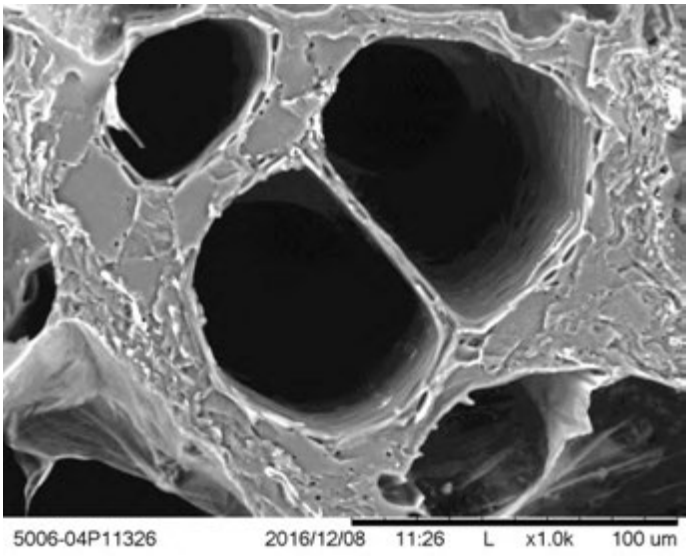
Transverse (Continued)

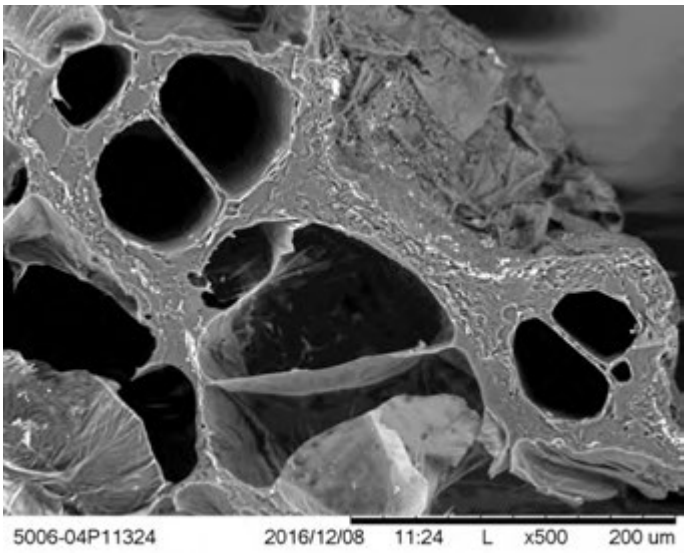








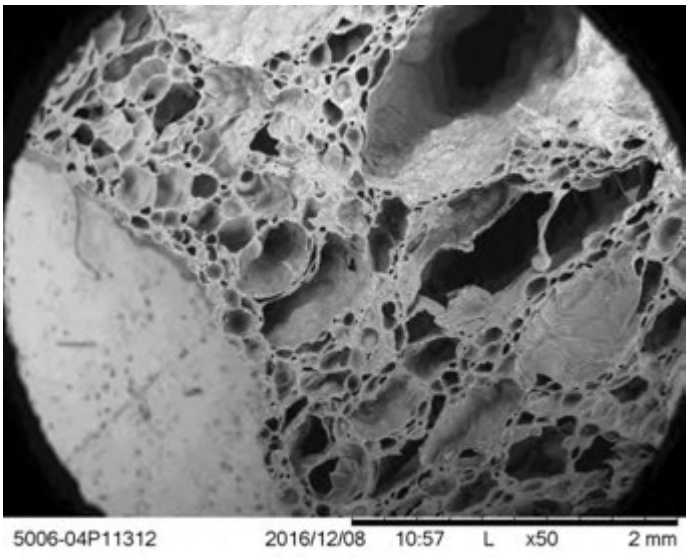


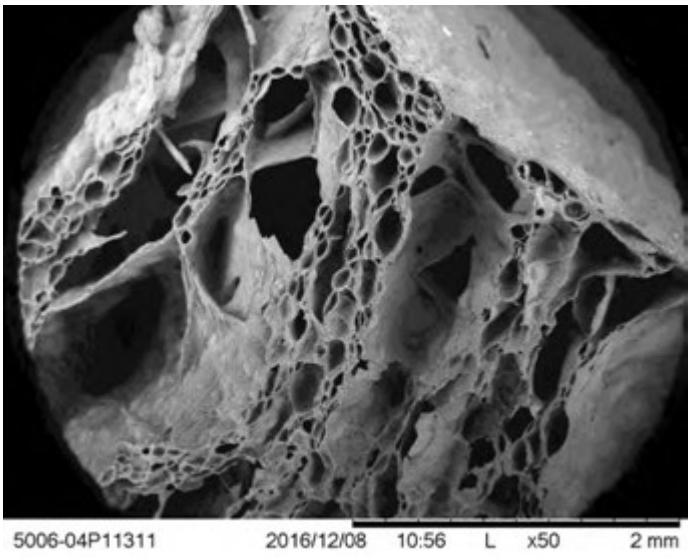


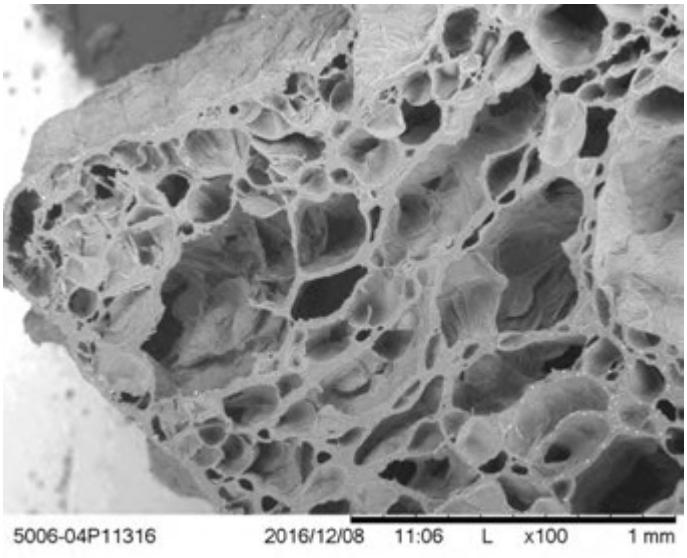
Solanum
SOLANACEAE

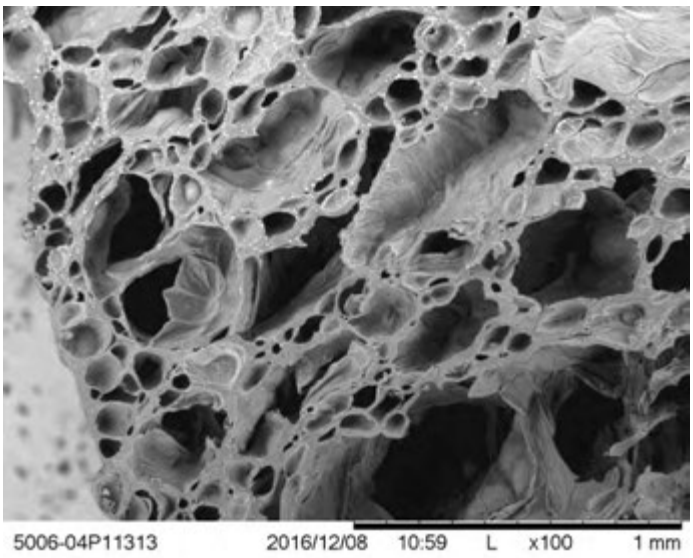
Common Name: Papa
Sample Type: Charred

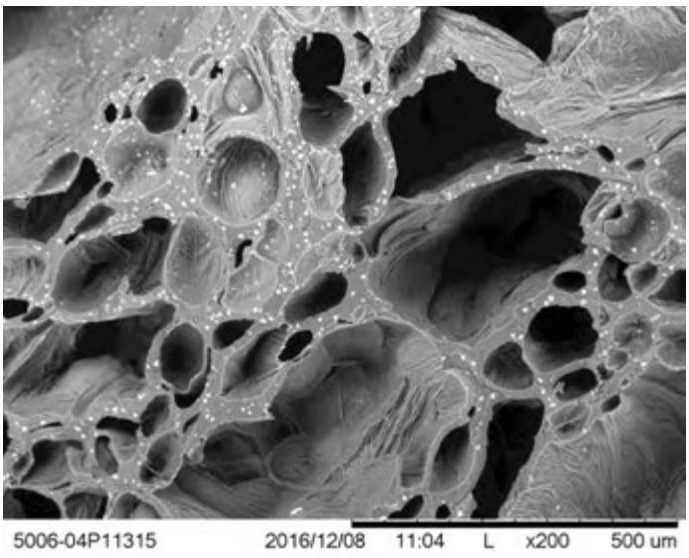
Tangential







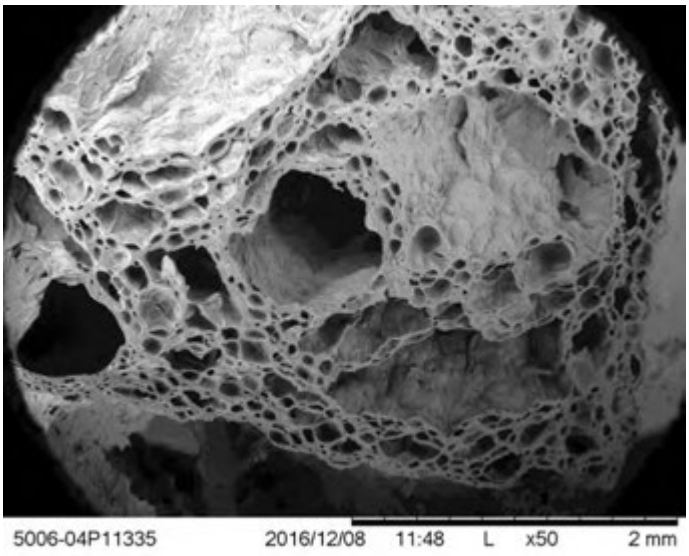


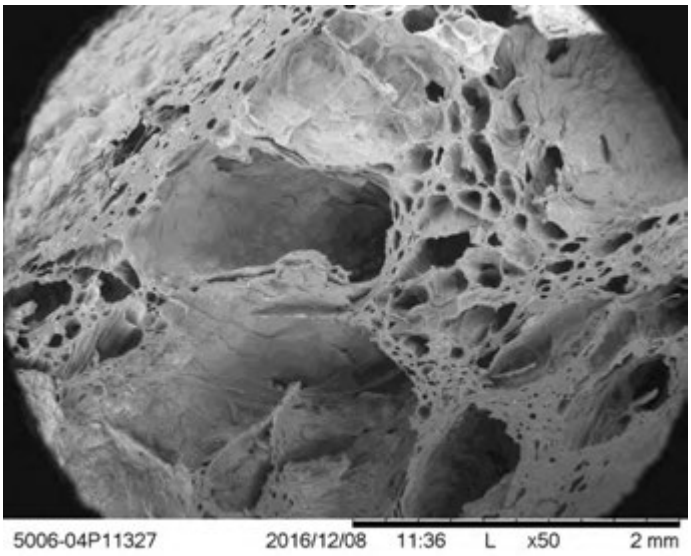


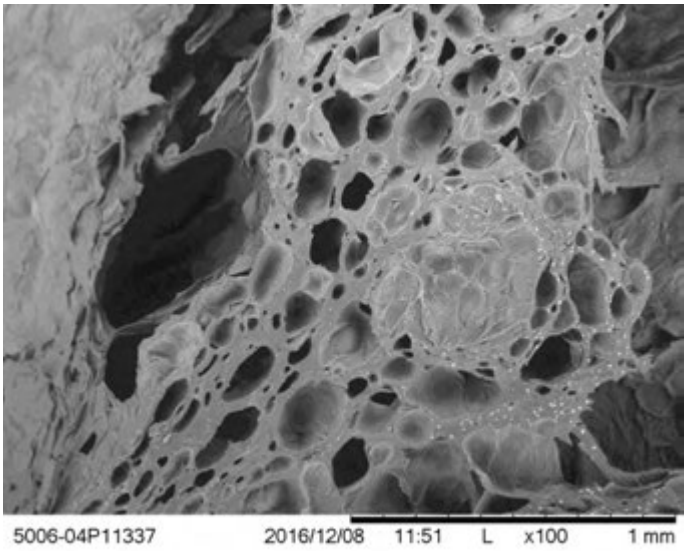
Solanum
SOLANACEAE

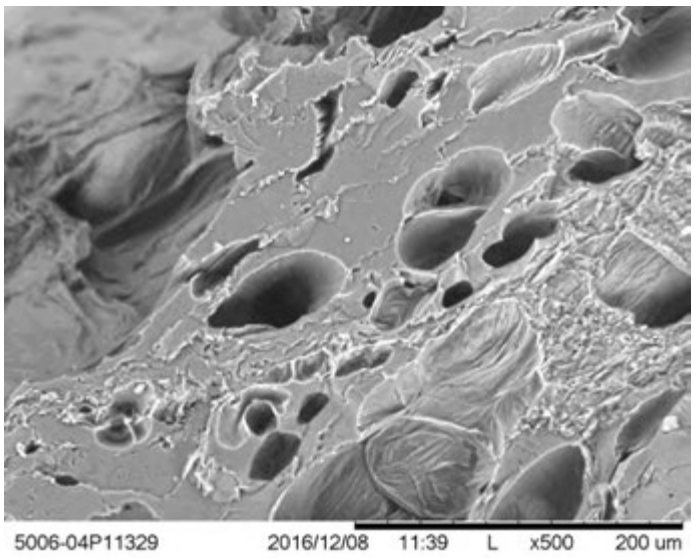
Common Name: Papa
Sample Type: Charred

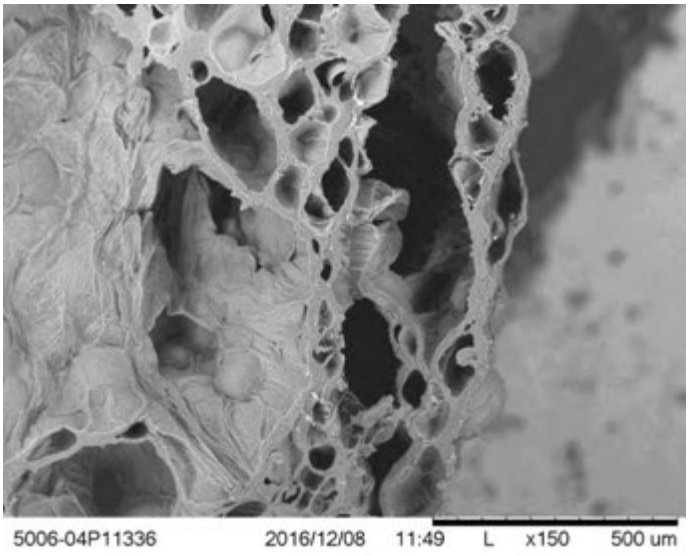
Transverse

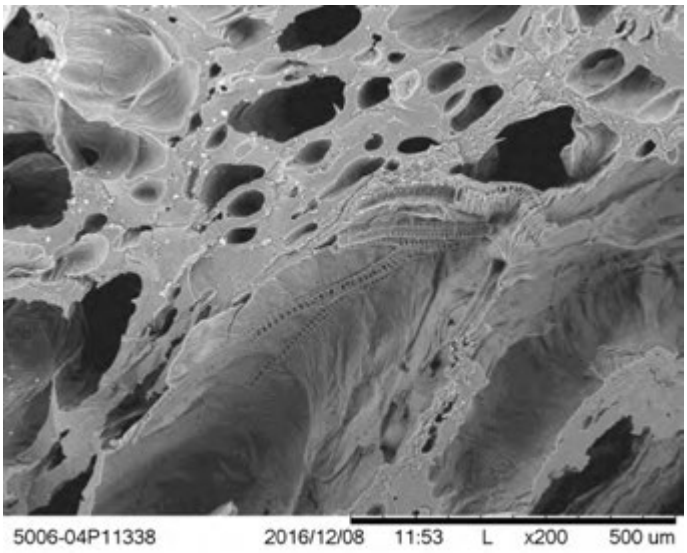








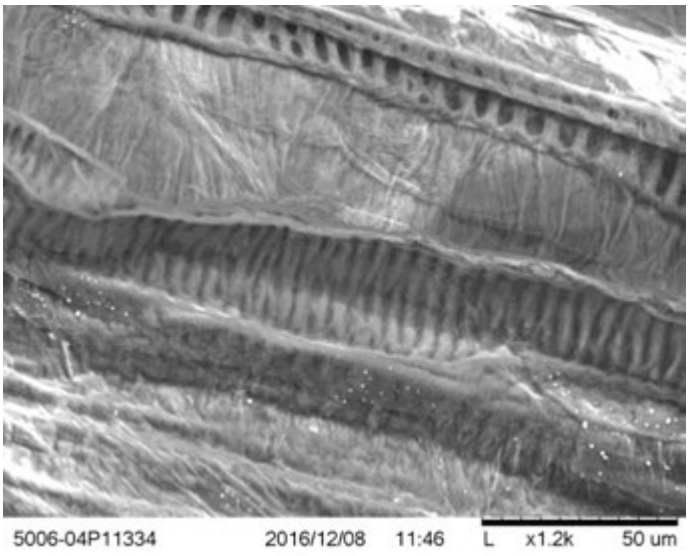


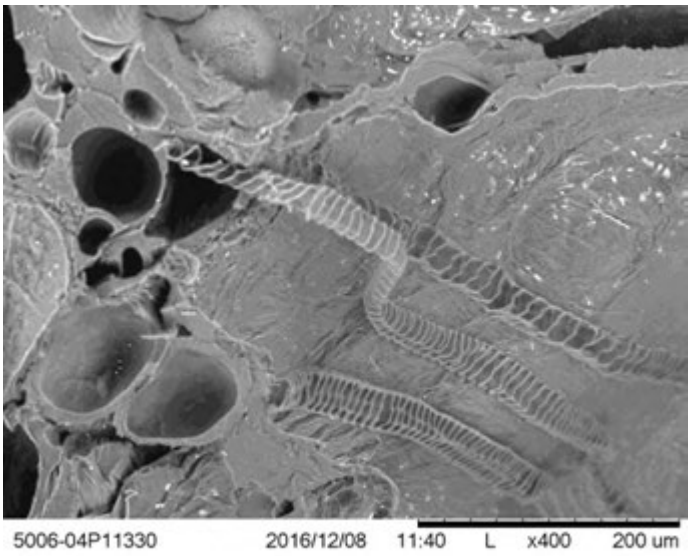


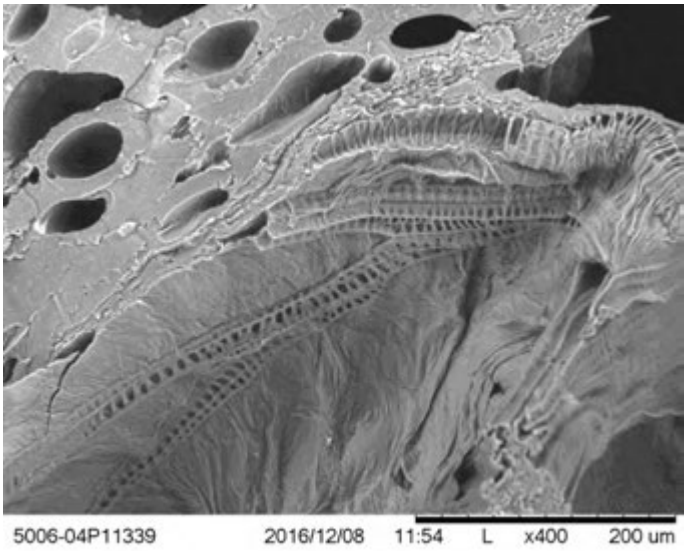
Solanum
SOLANACEAE

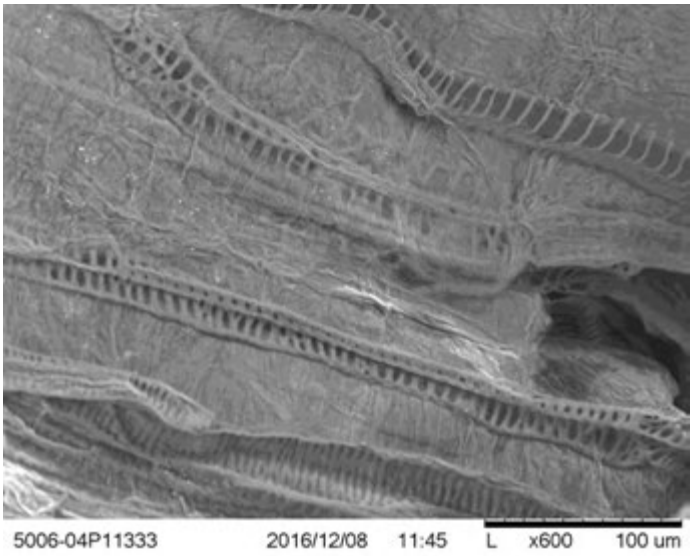
Common Name: Papa
Sample Type: Charred

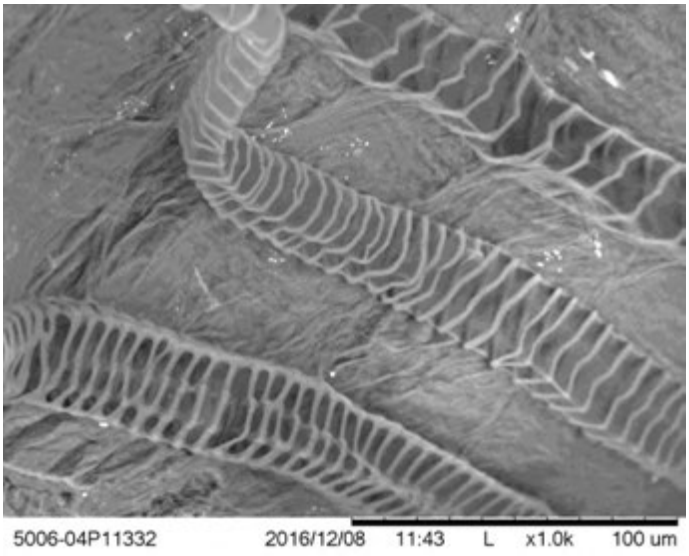
Transverse (Xylem)



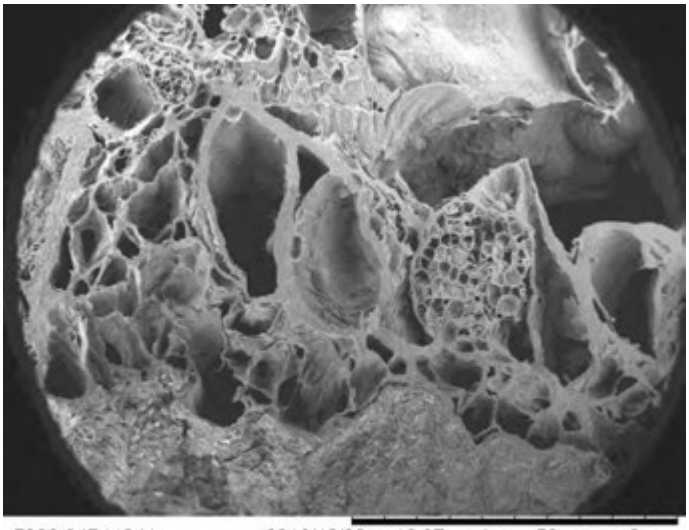


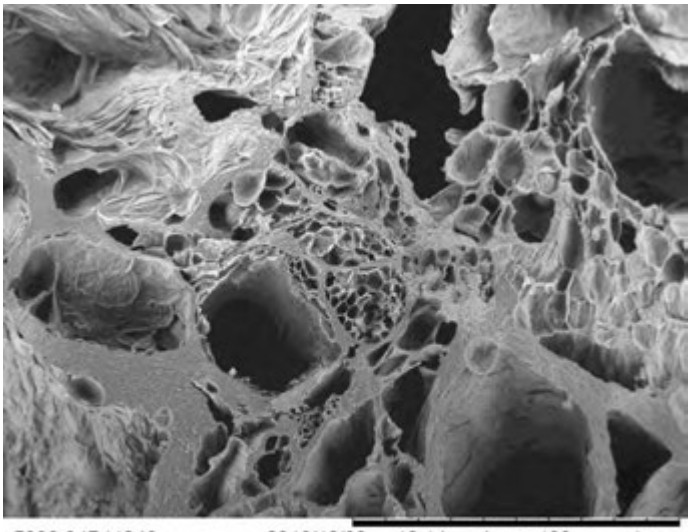


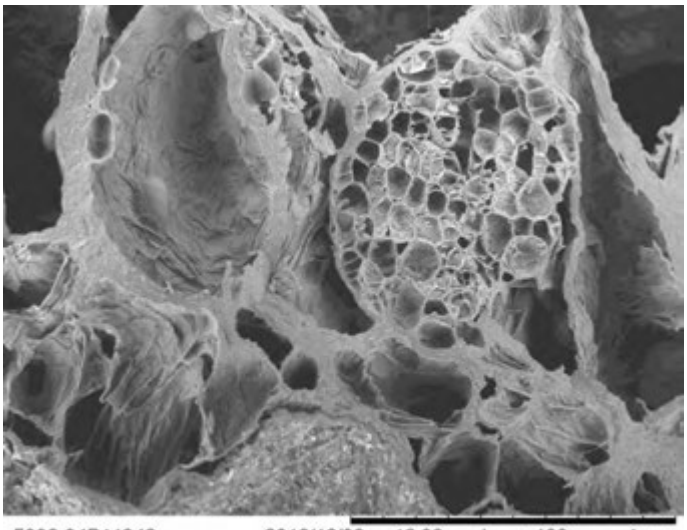


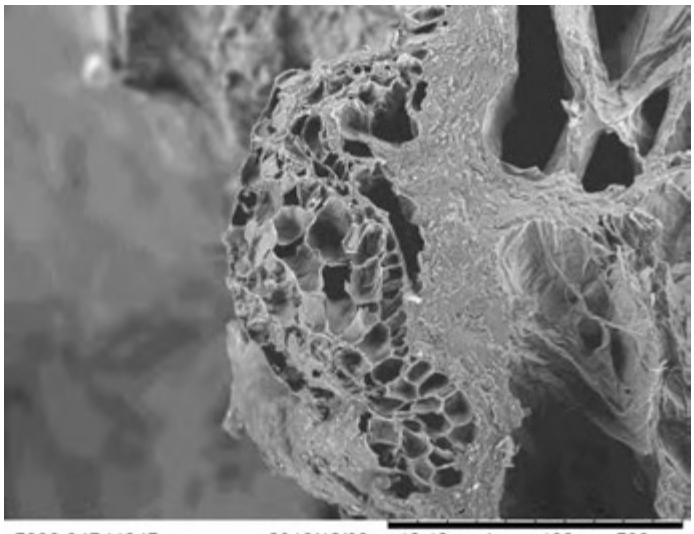


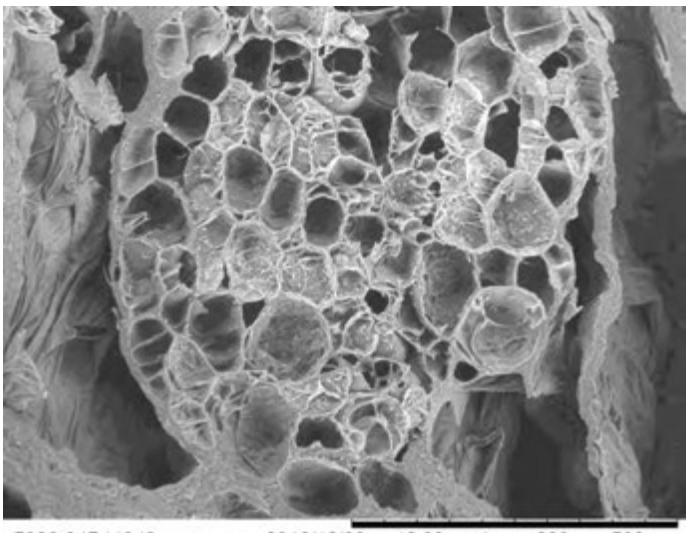
Tropaeolum tuberosum Common Name: Mashua Tangential
TROPAEOLACEAE Sample Type: Charred

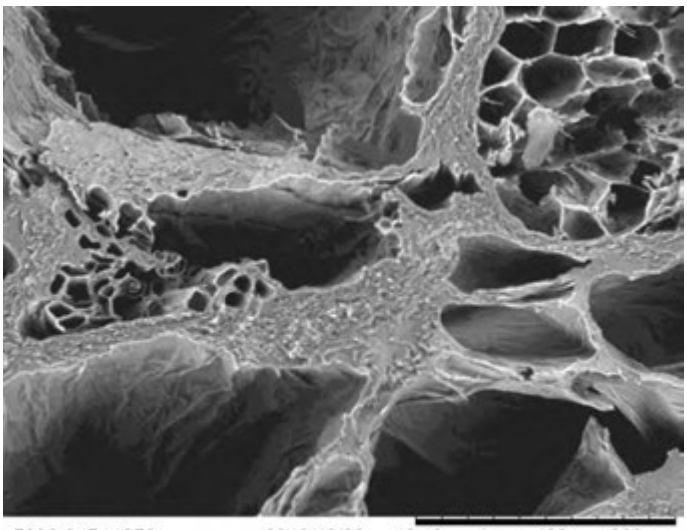




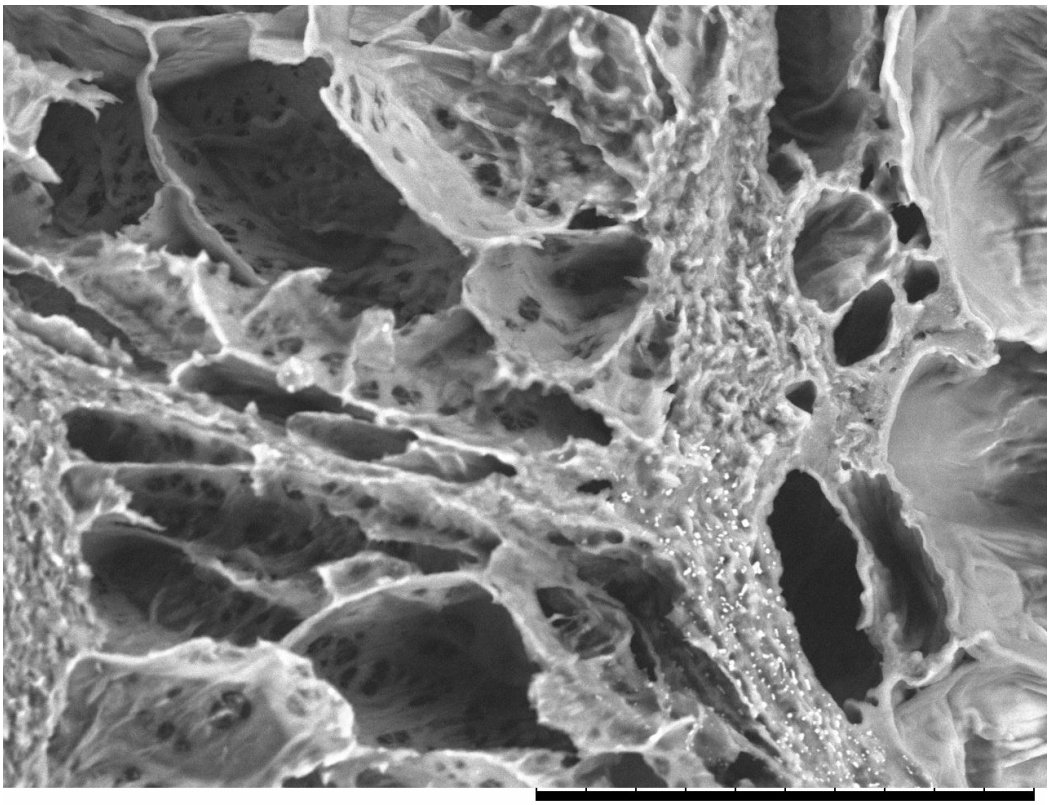


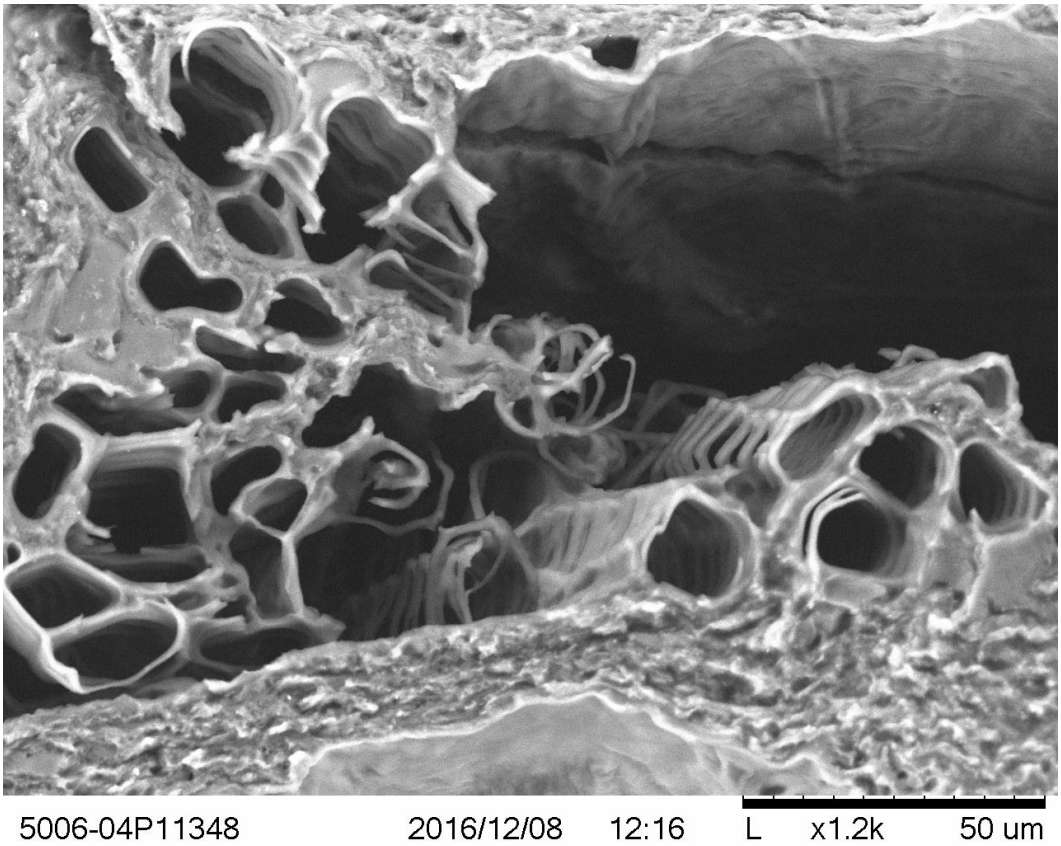




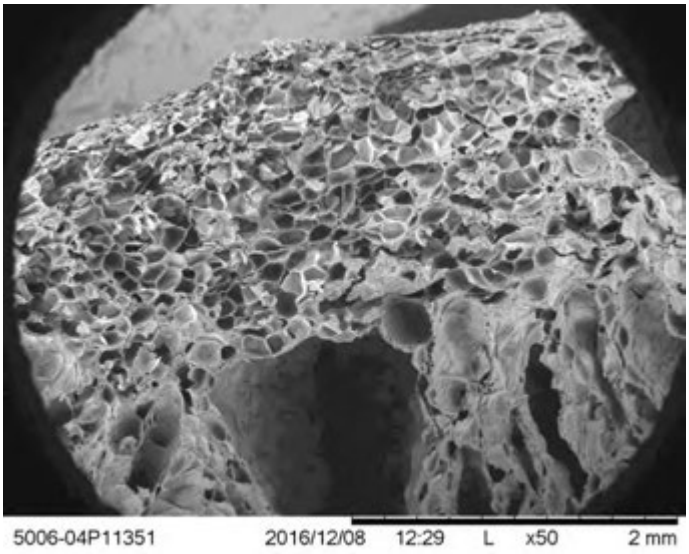


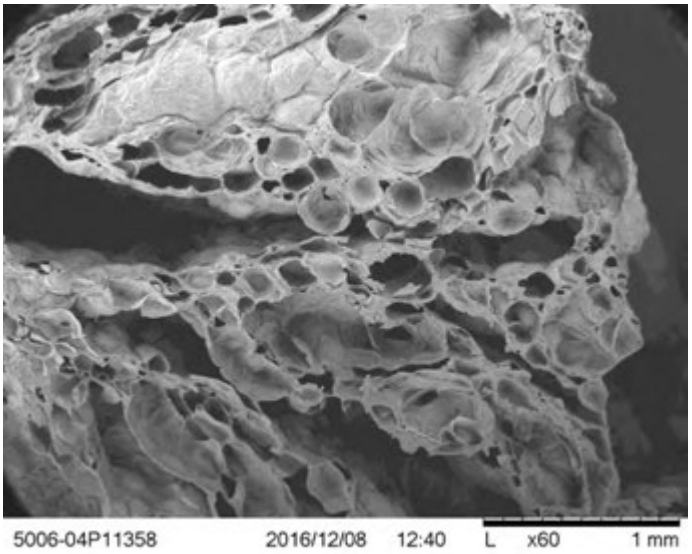
Tropaeolum tuberosum Common Name: Mashua Tangential (Continued)
TROPAEOLACEAE Sample Type: Charred

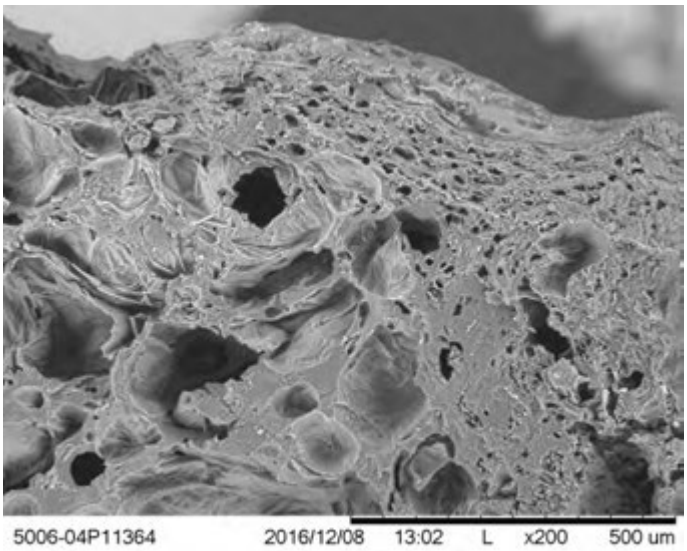


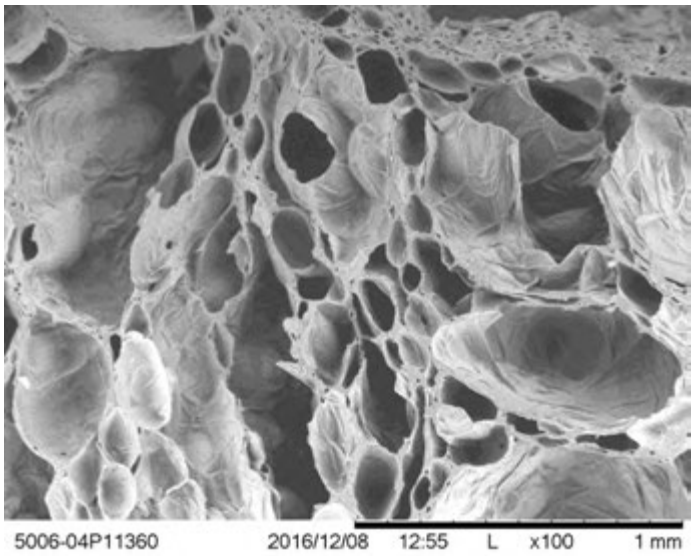


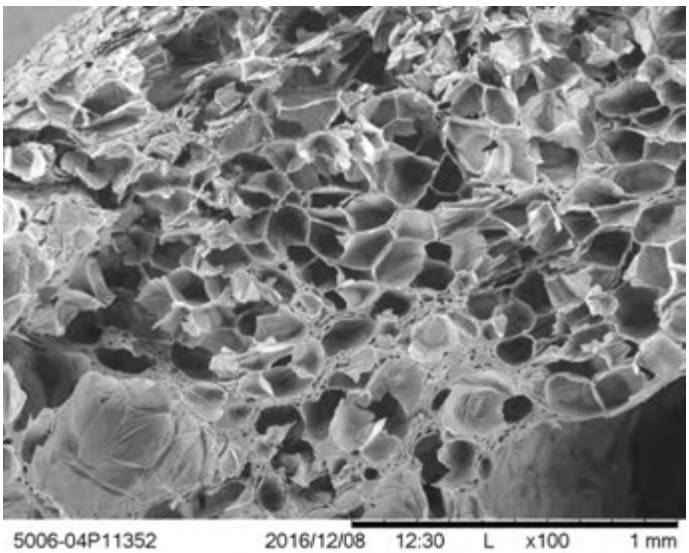
Tropaeolum tuberosum Common Name: Mashua Transverse
TROPAEOLACEAE Sample Type: Charred

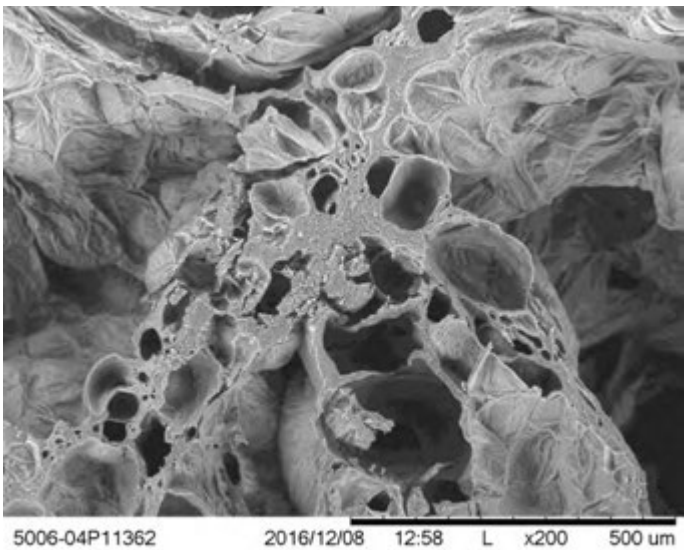




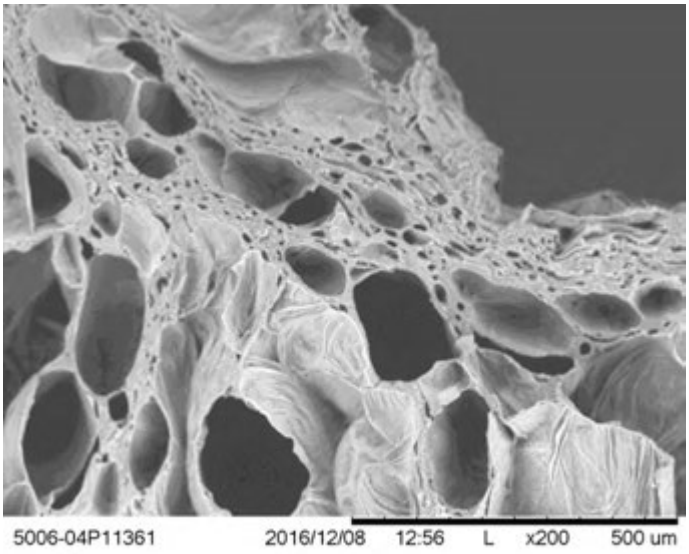


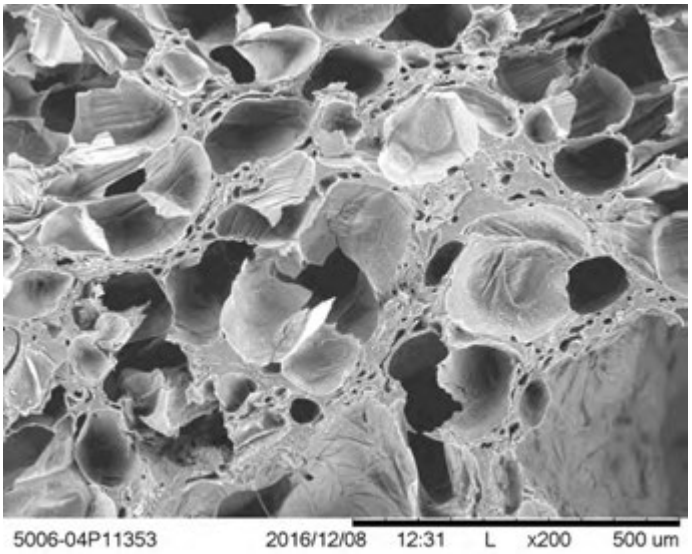


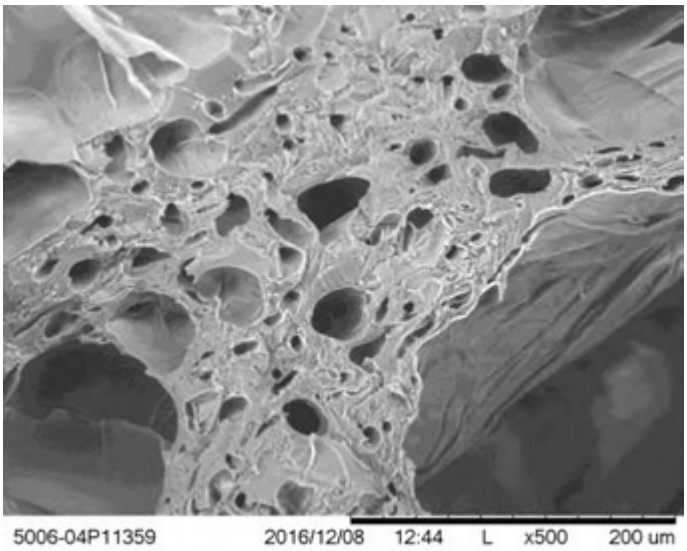


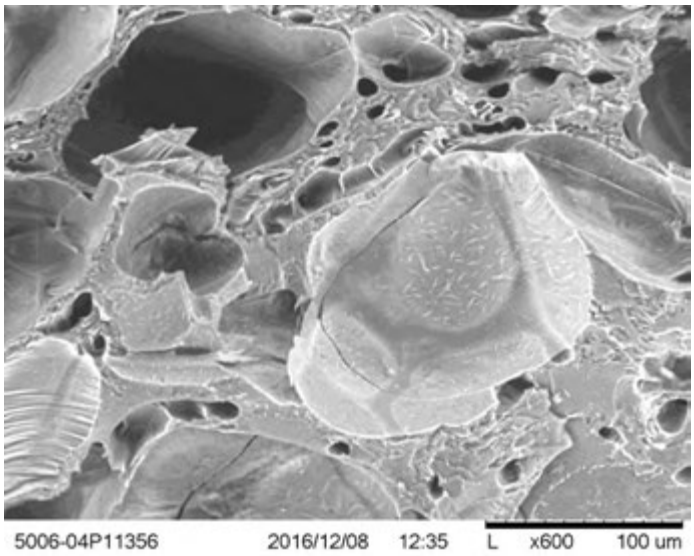


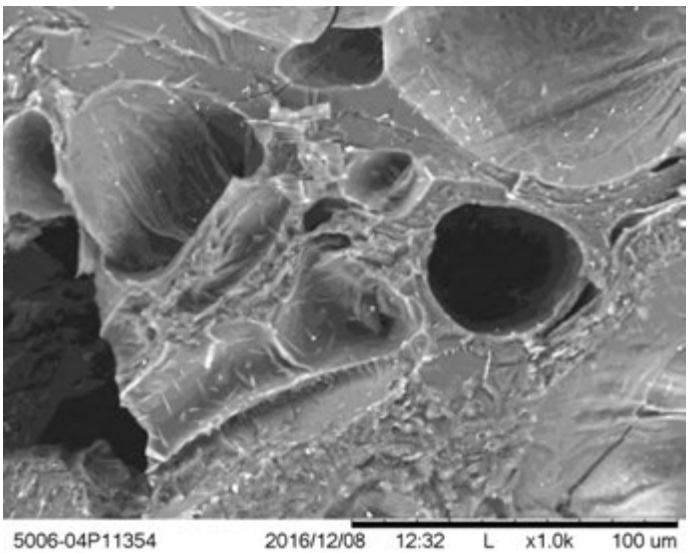
Tropaeolum tuberosum Common Name: Mashua Transverse (Continued)
TROPAEOLACEAE Sample Type: Charred

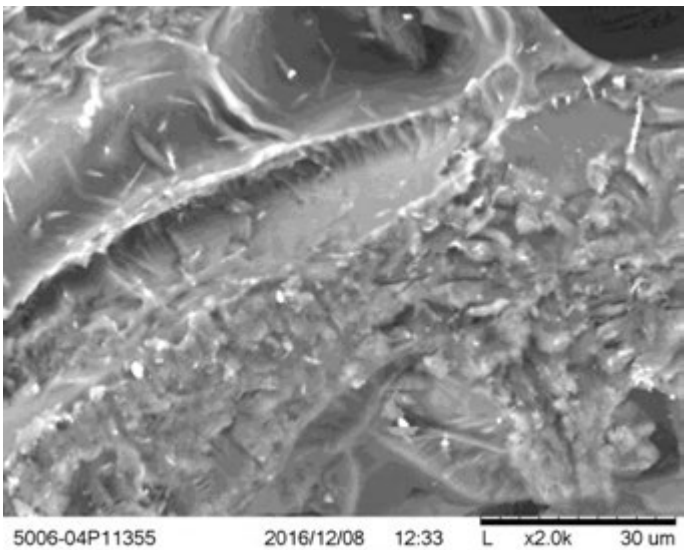




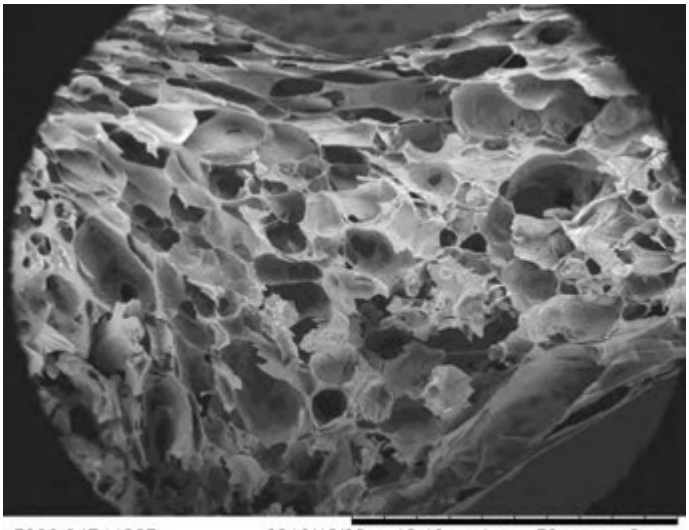


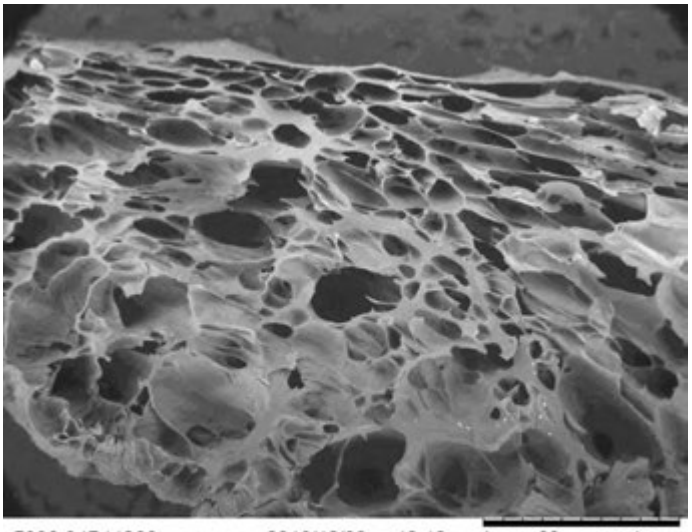


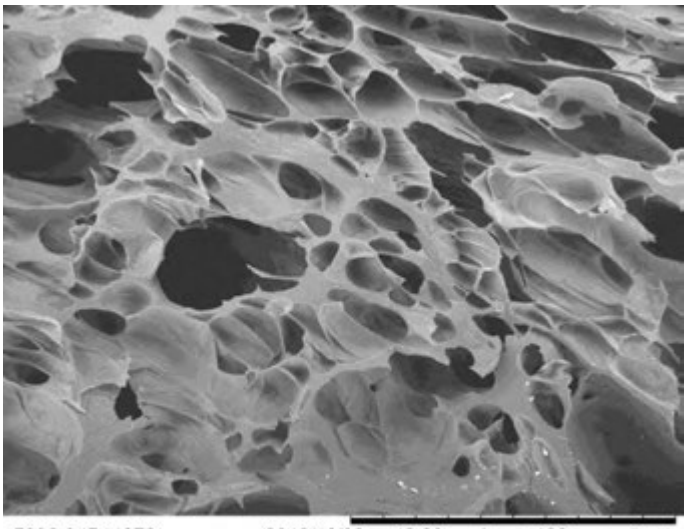


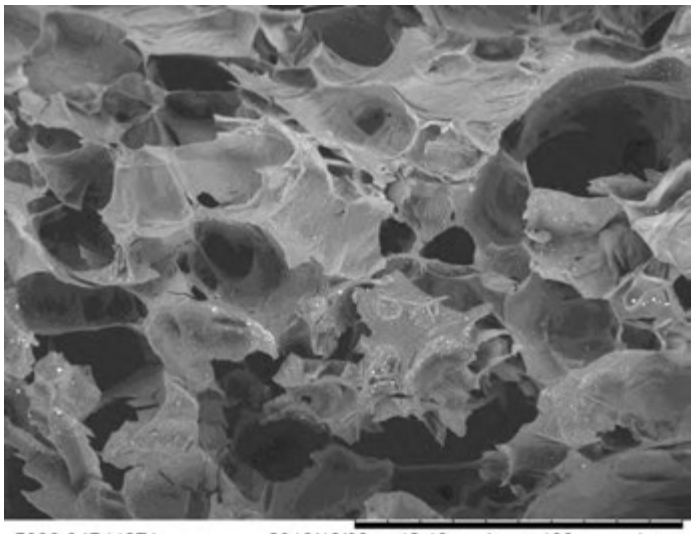


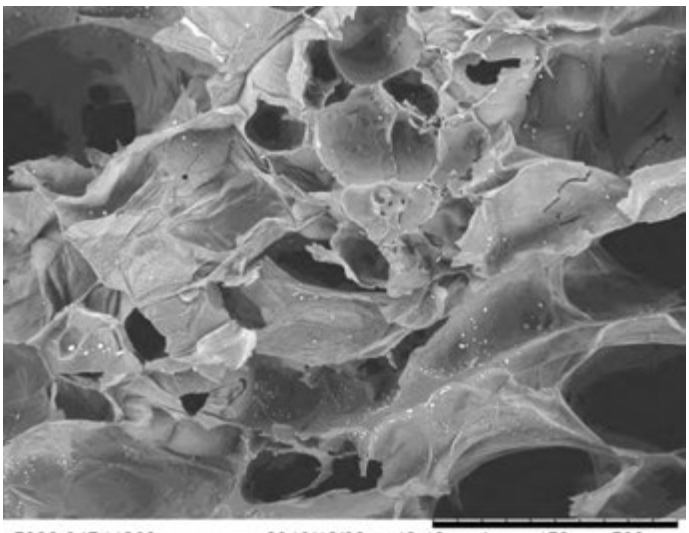
Ullucus tuberosus Common Name: Papalisa/Ollucu Tangential
BASELLACEAE Sample Type: Charred

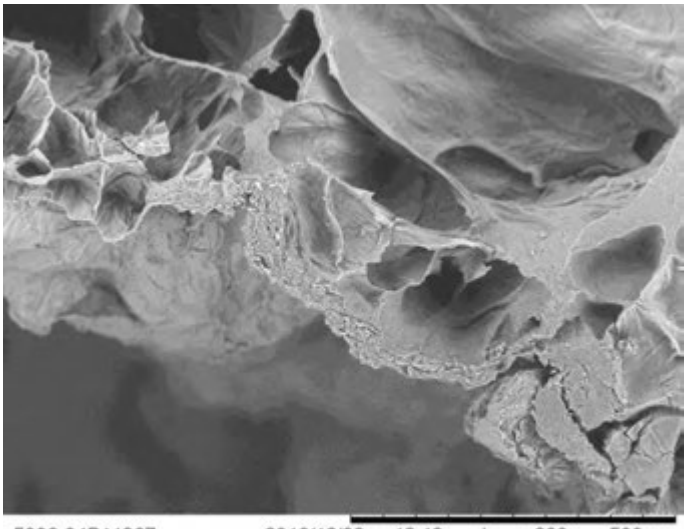








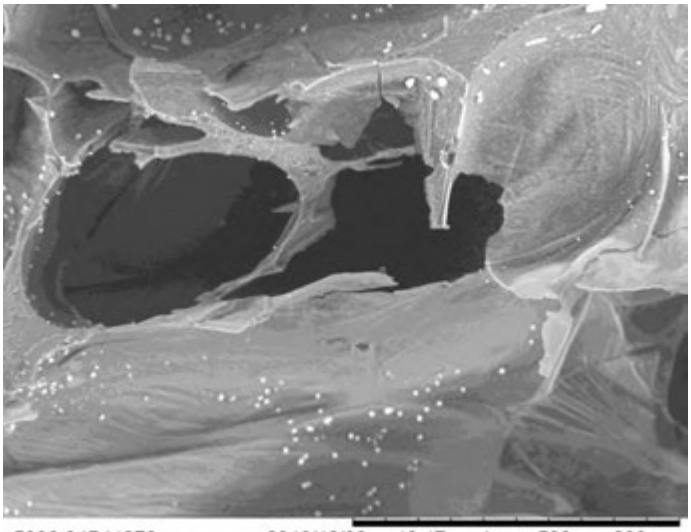


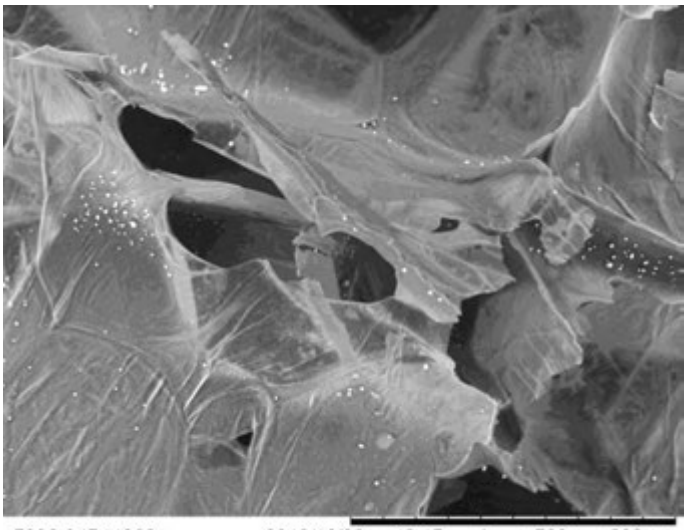


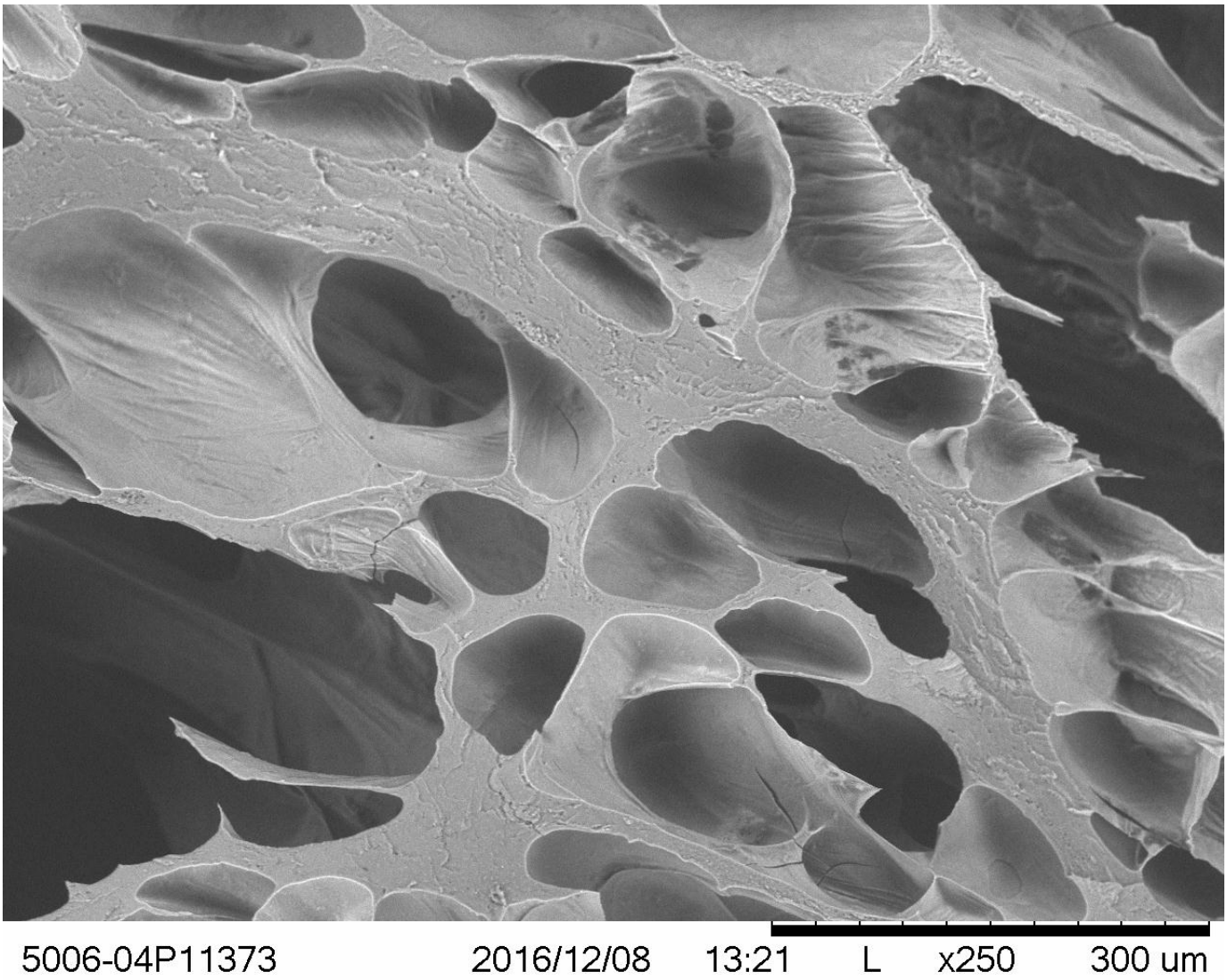
Ullucus tuberosus
BASELLACEAE

Common Name: Papalisa/Ollucu
Sample Type: Charred

Tangential (Continued)





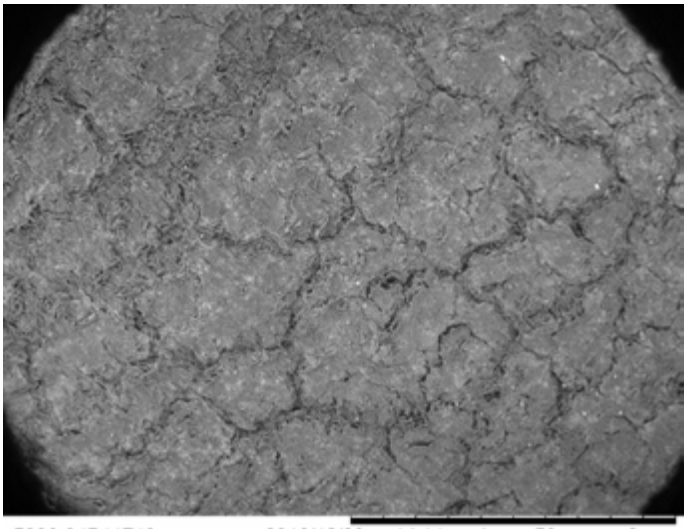


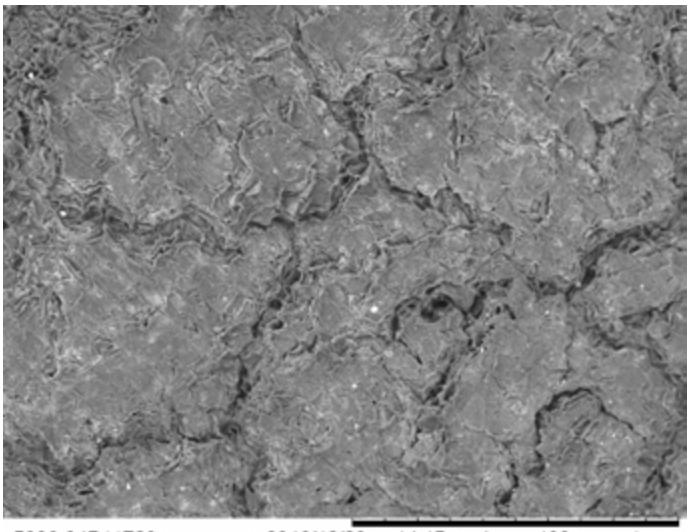
Specimen Surfaces

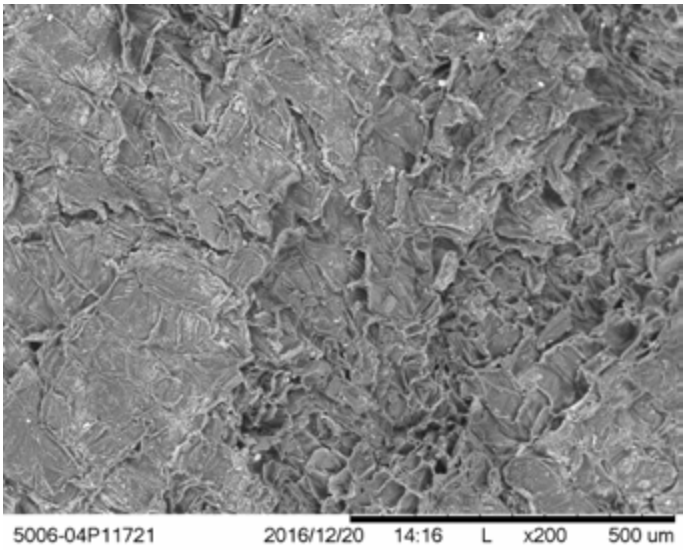
Ipomoea batatas
CONVULVULACEAE

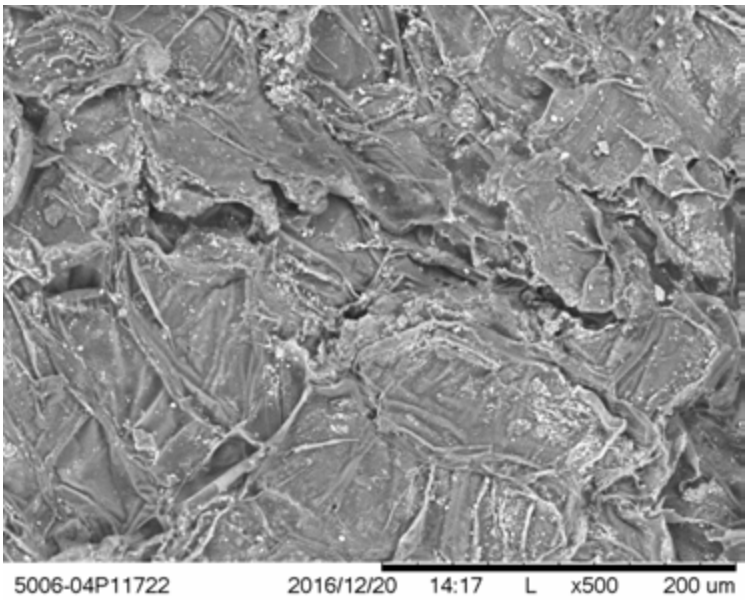
Common Name: Sweet Potato
Sample Type: Charred

Exterior Surface





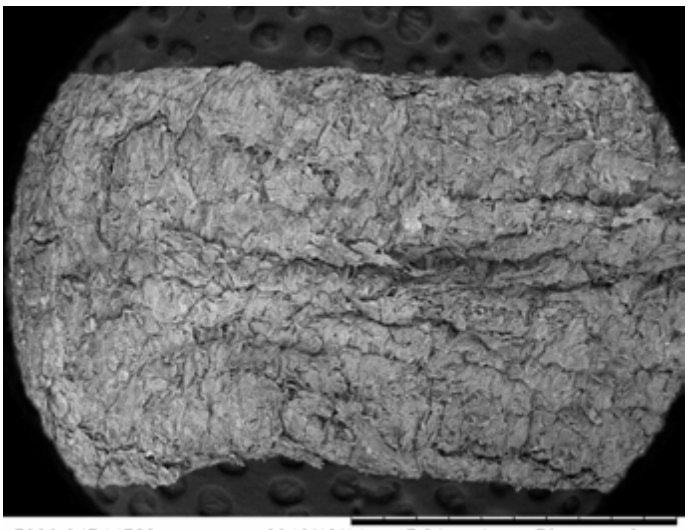




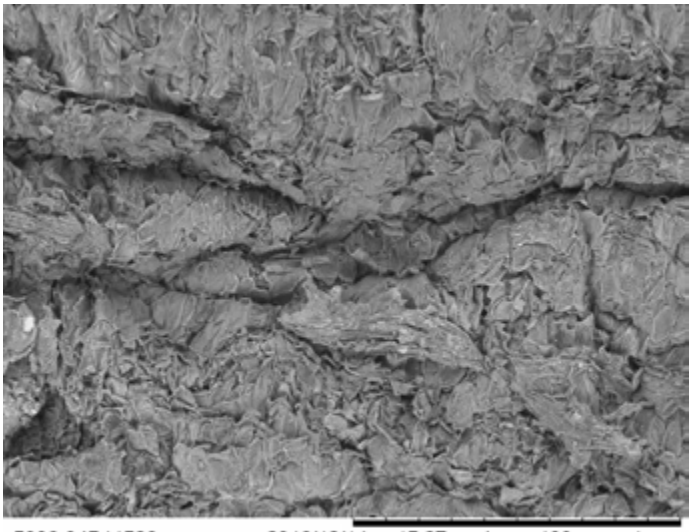
Ipomoea batatas
CONVULVULACEAE

Common Name: Sweet Potato
Sample Type: Wet/Fresh

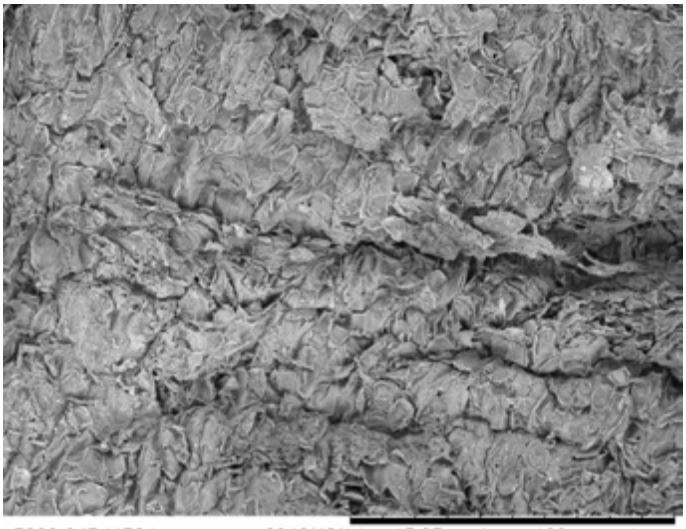
Exterior



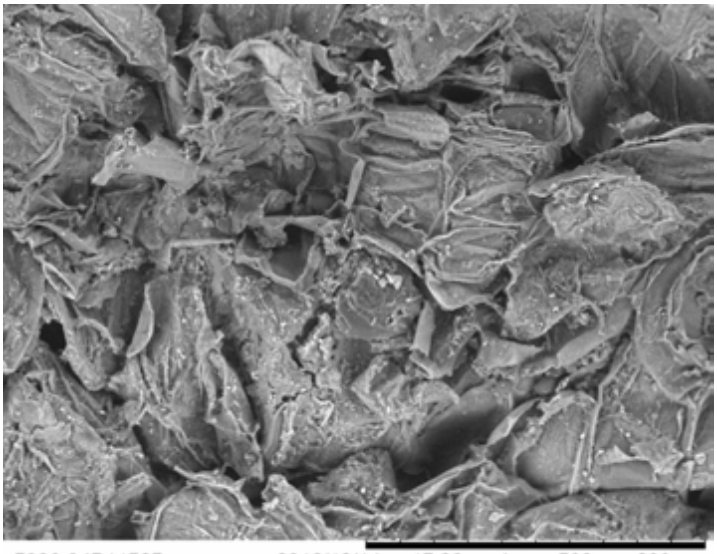
5006-04P11523 2016/12/14 15:24 L x50 2 mm



5006-04P11526 2016/12/14 15:27 L x100 1 mm

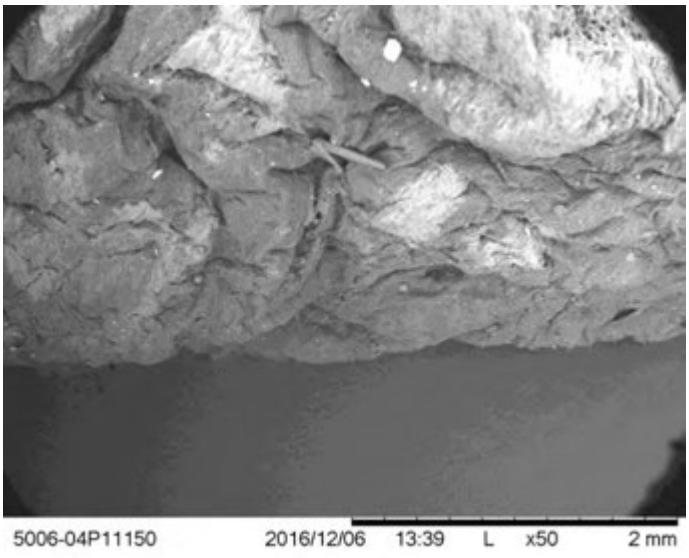


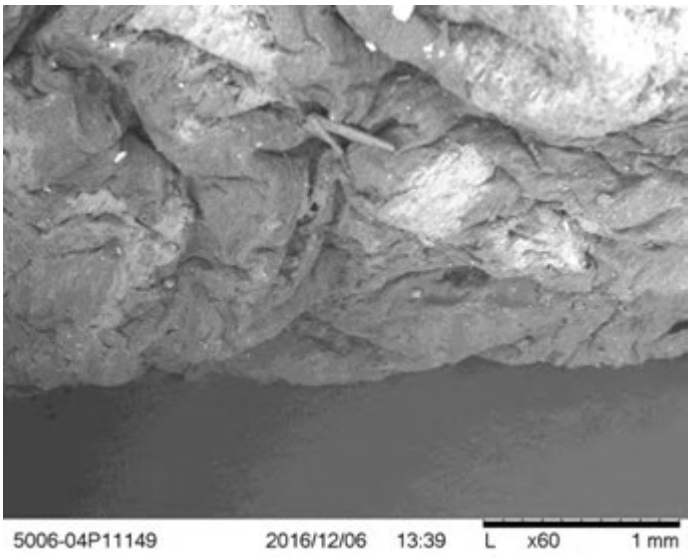
5006-04P11524 2016/12/14 15:25 L x100 1 mm

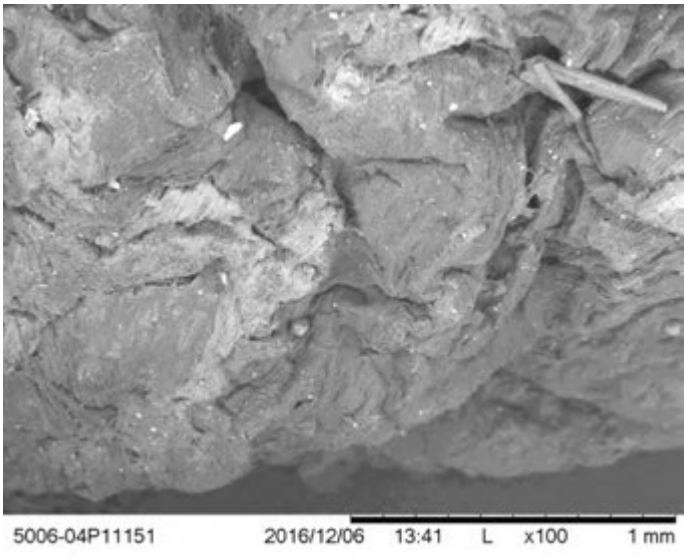


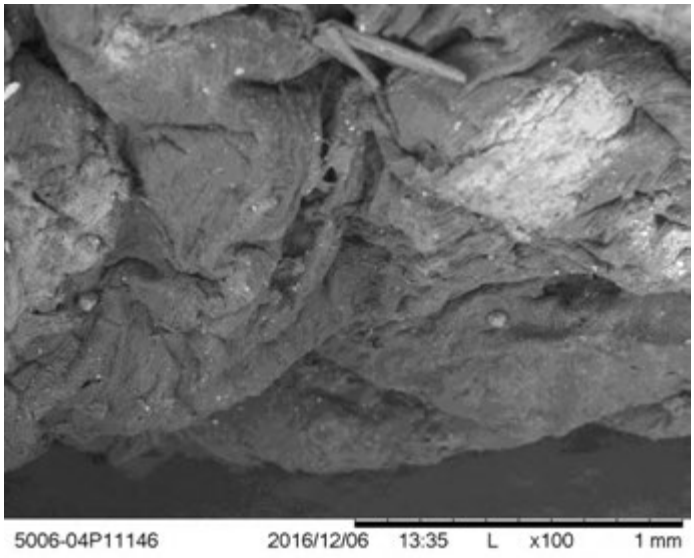
5006-04P11525 2016/12/14 15:26 L x500 200 um

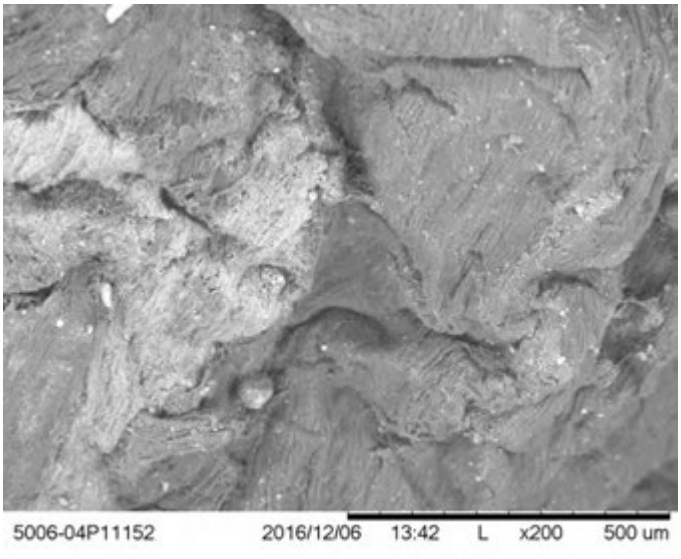
Lepidium meyenii Common Name: Maca Exterior
BRASSICACEAE Sample Type: Charred

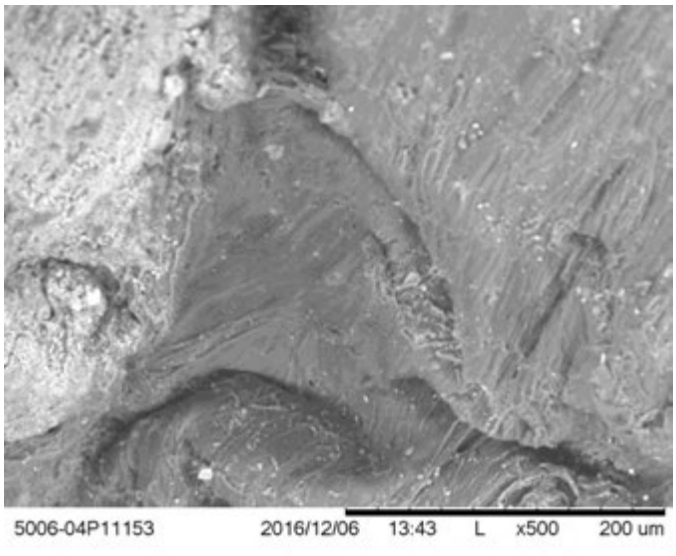




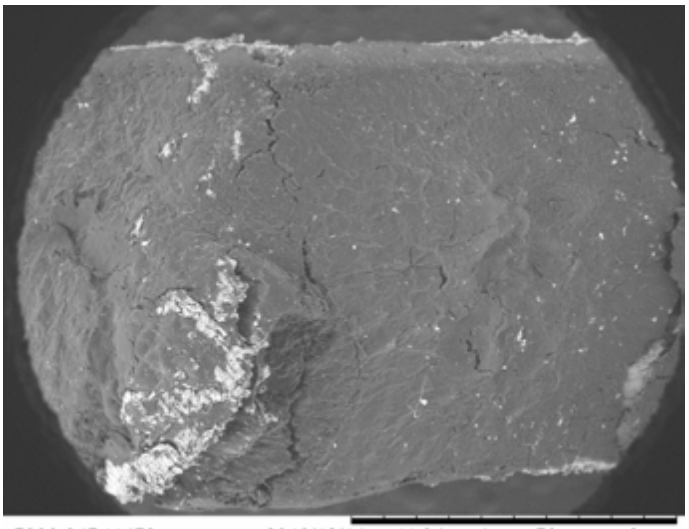


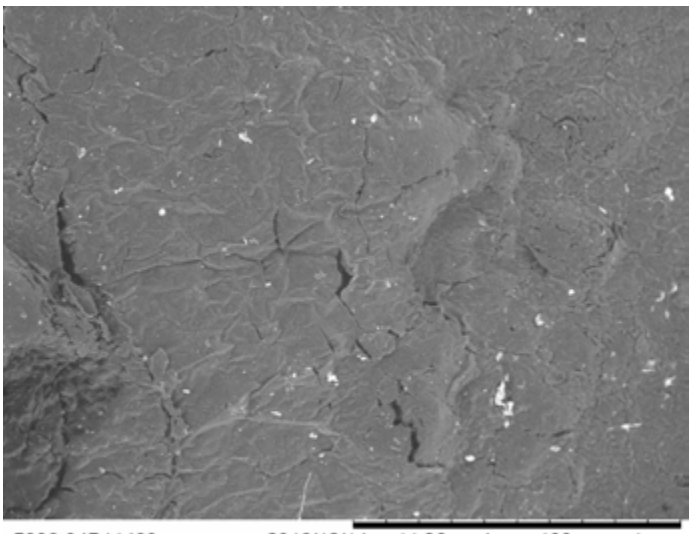


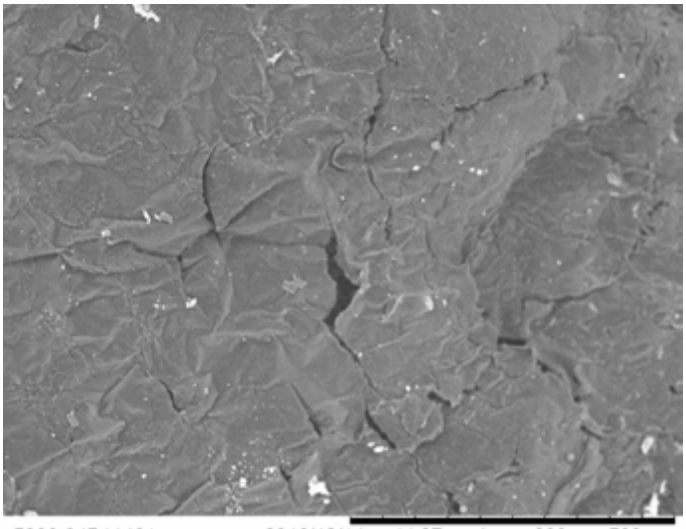


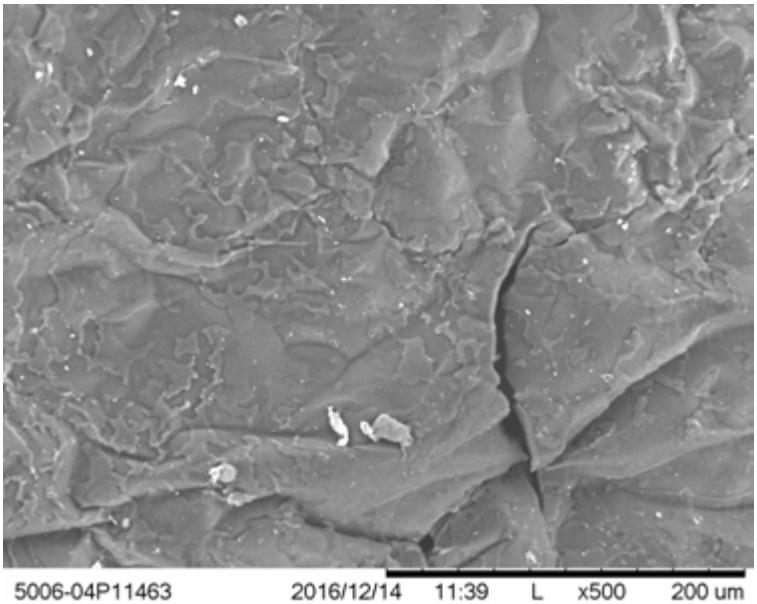


Manihot esculenta Common Name: Manioc Exterior
EUPHORBIACEAE Sample Type: Wet/Fresh





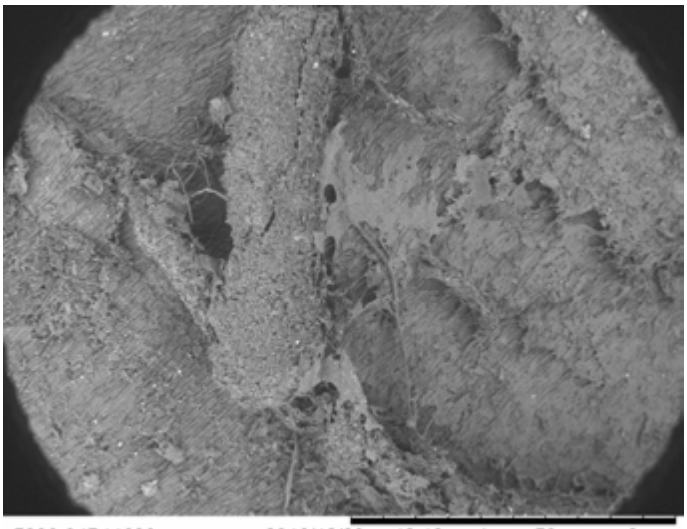


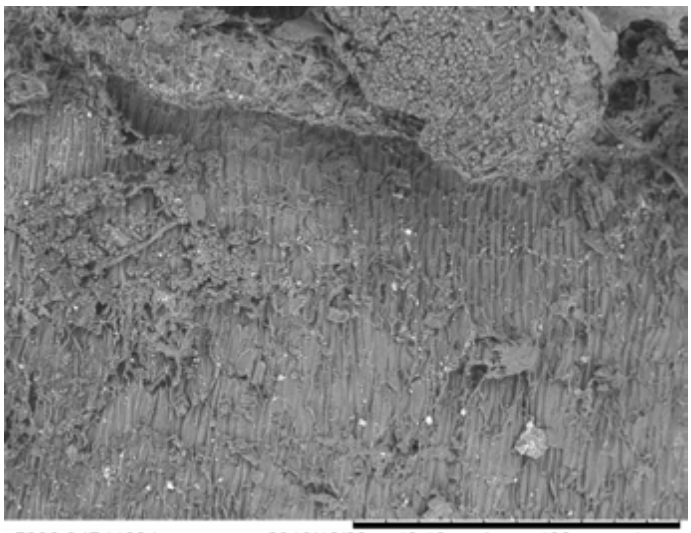


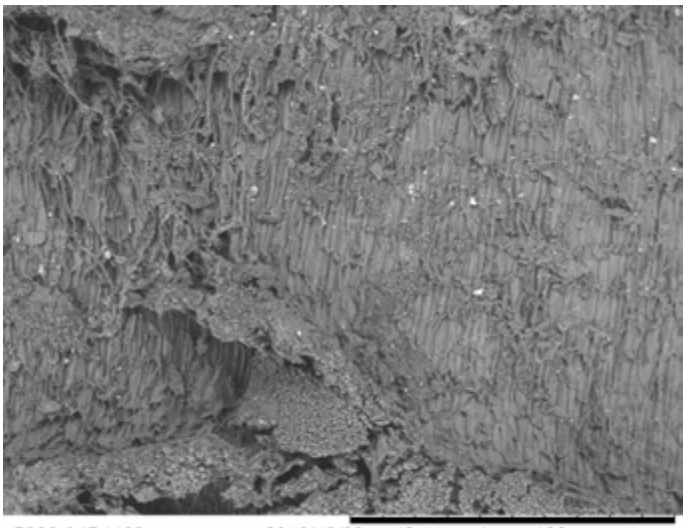
Manihot esculenta
EUPHORBIACEAE

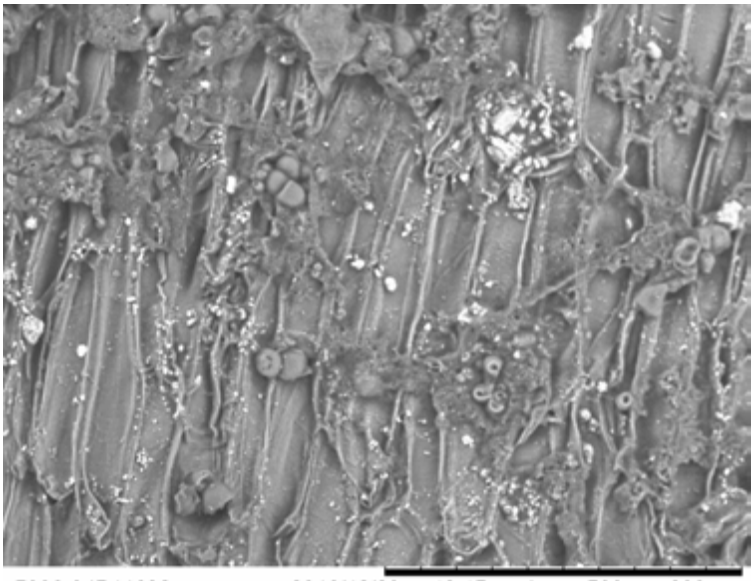
Common Name: Manioc
Sample Type: Charred

Exterior Surface

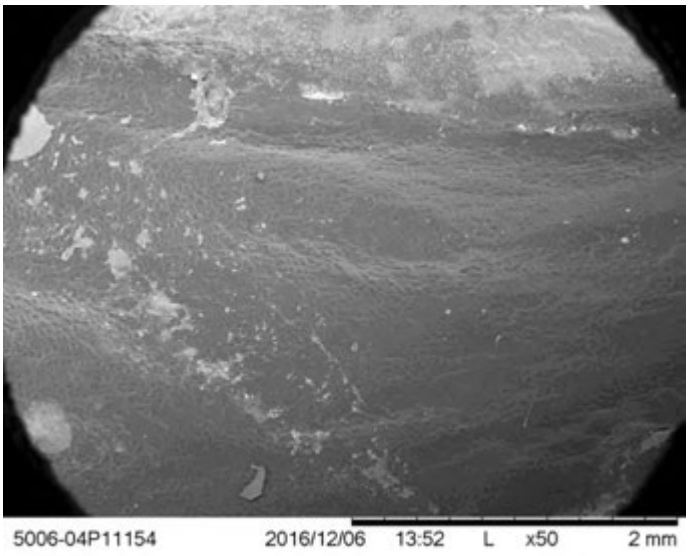


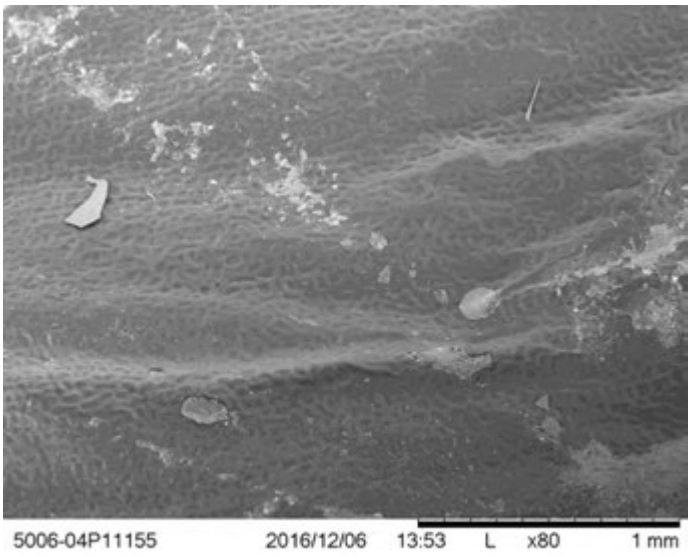


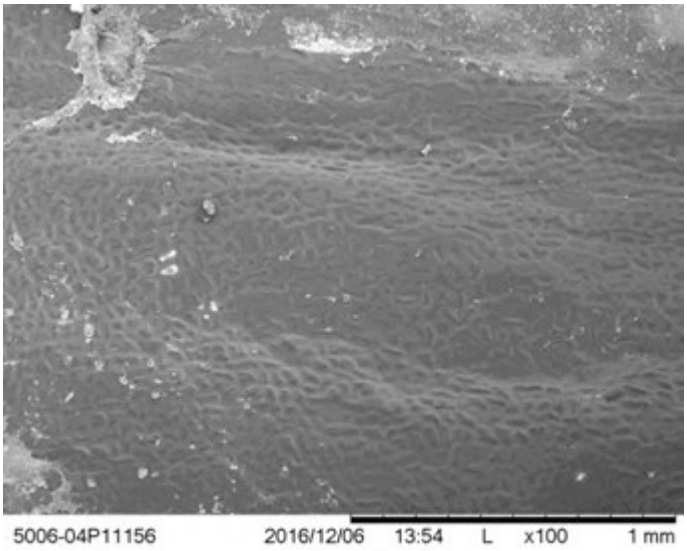


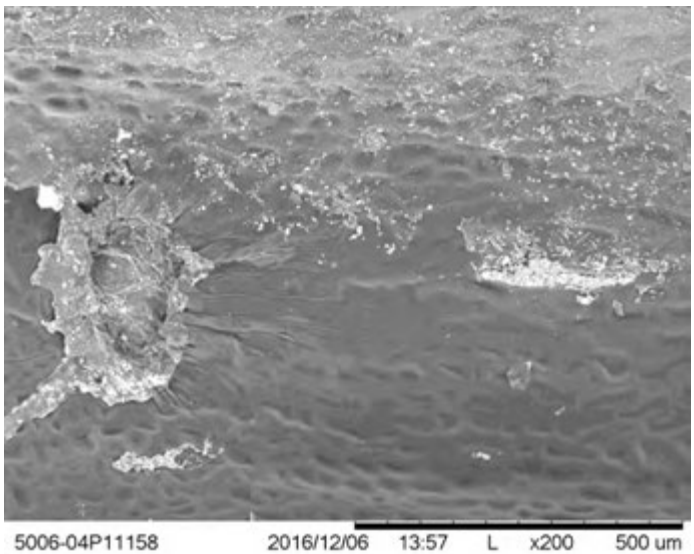


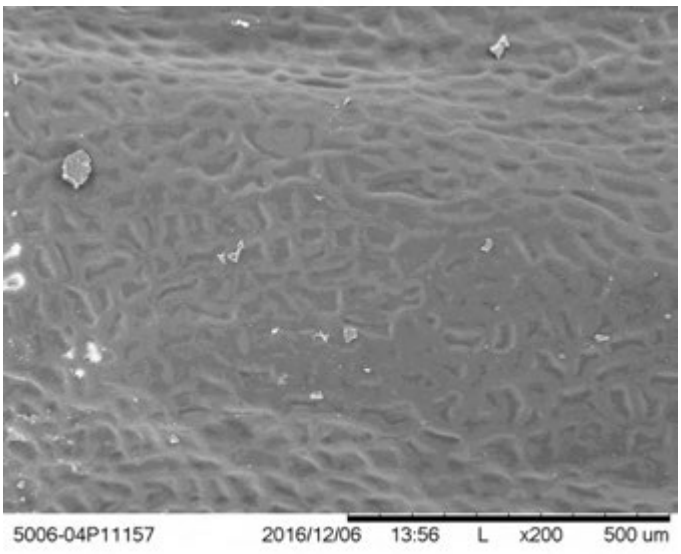
Oxalis tuberosa Common Name: Oca Exterior
OXALIDACEAE Sample Type: Charred

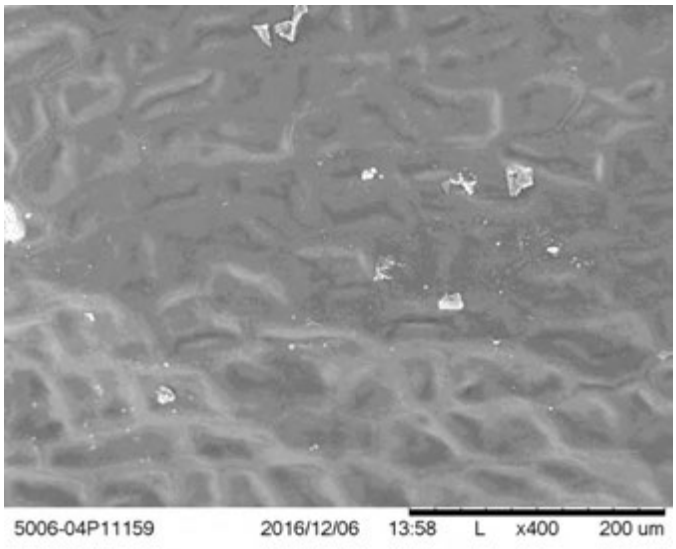




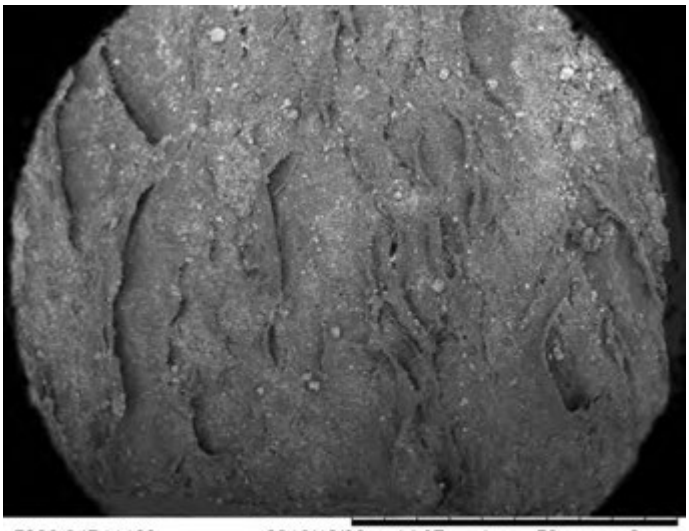


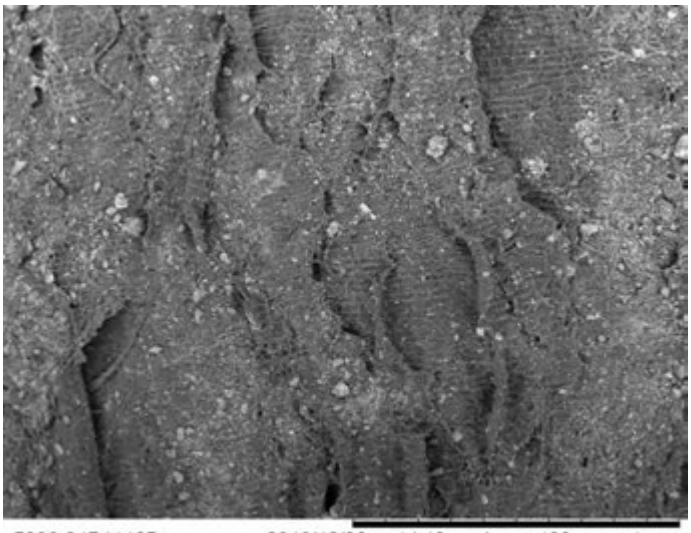


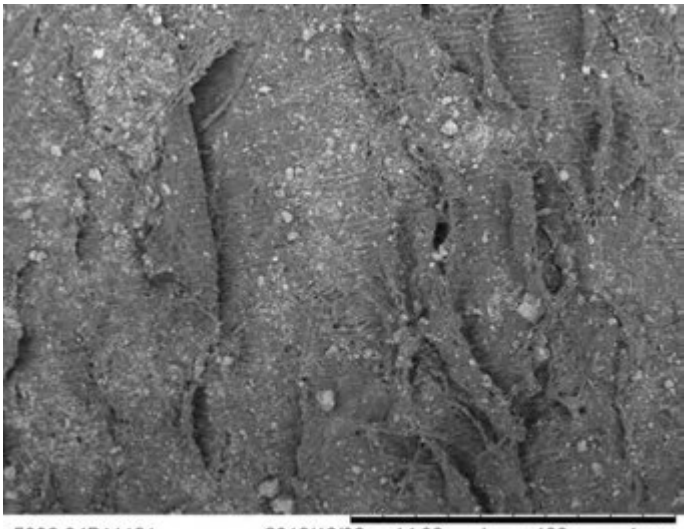


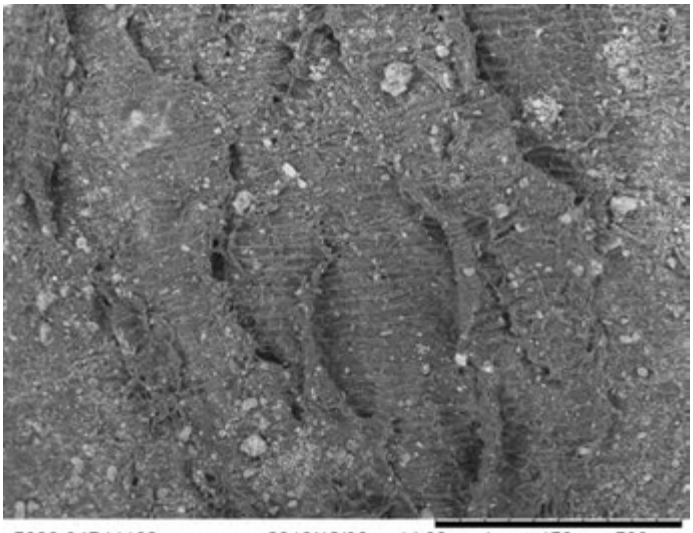


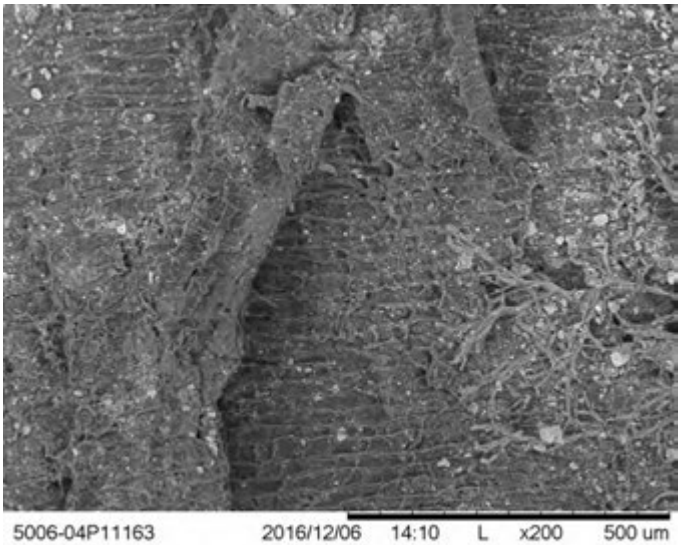
Pachyrhizus erosus Common Name: Jicama Exterior
FABACEAE Sample Type: Charred

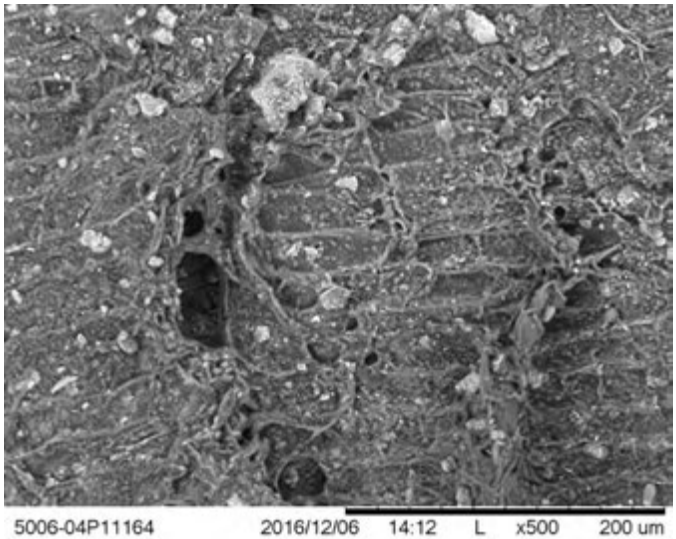




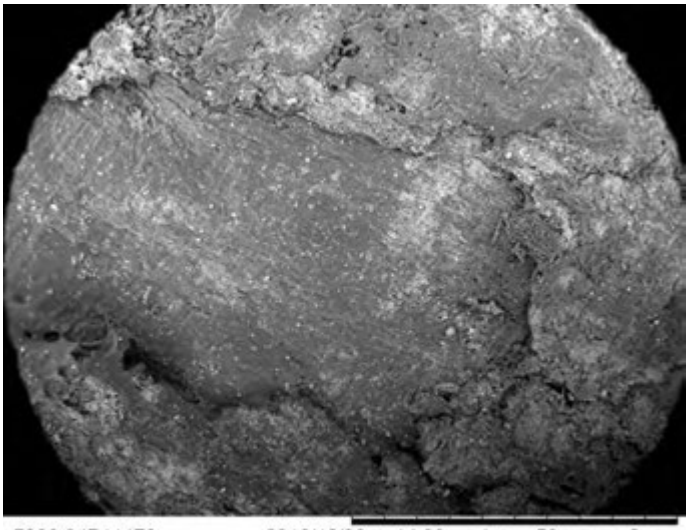


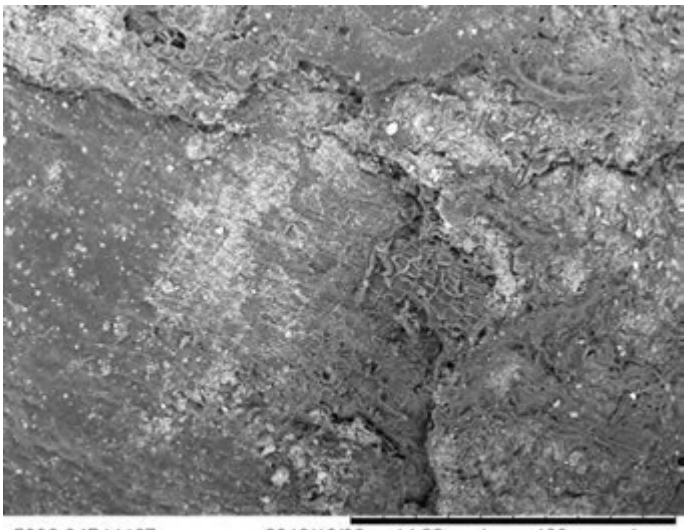


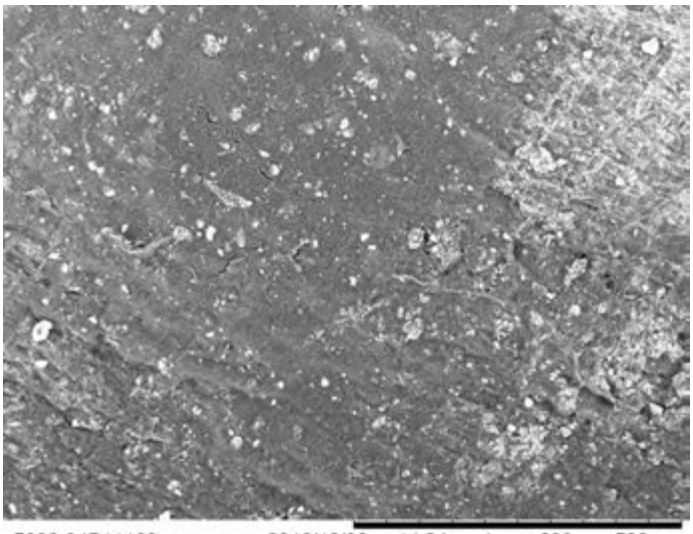


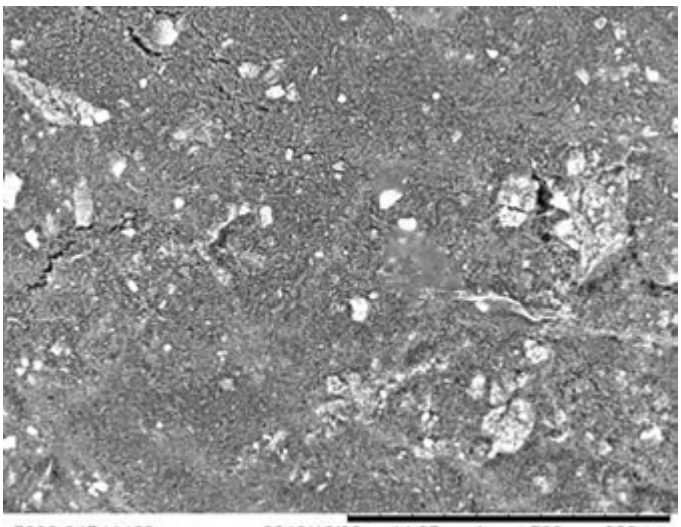


Smallanthus sonchifolius Common Name: Yacon Exterior
ASTERACEAE Sample Type: Charred





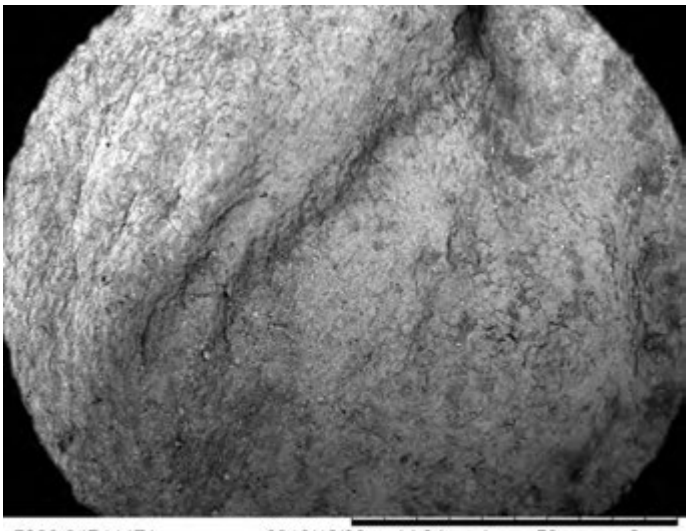


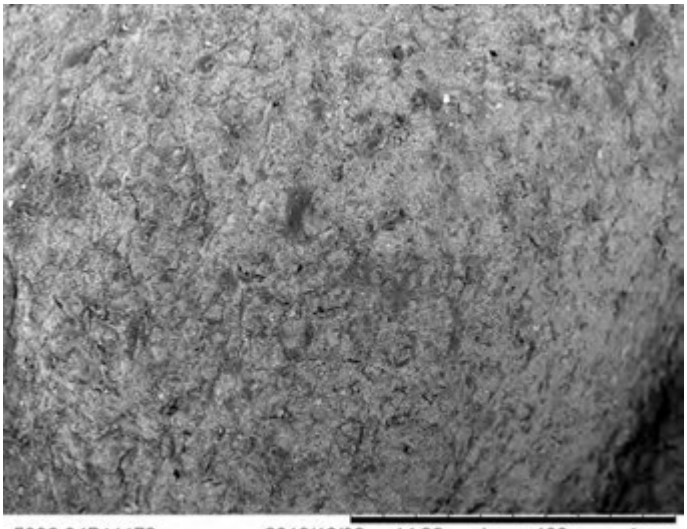


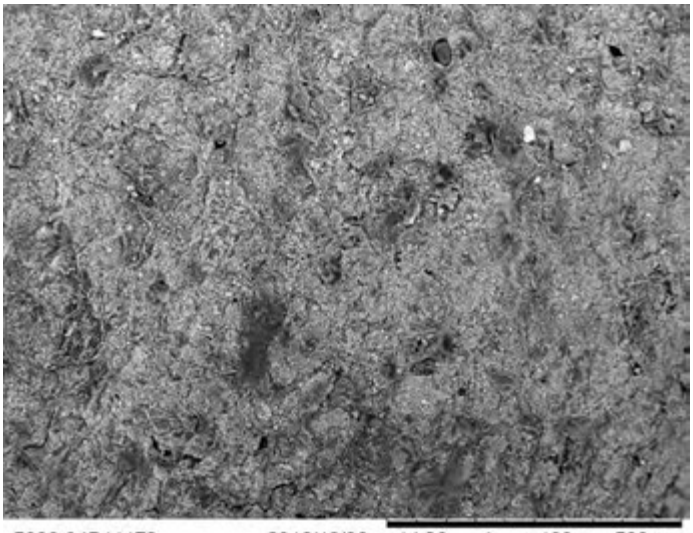
Solanum
SOLANACEAE

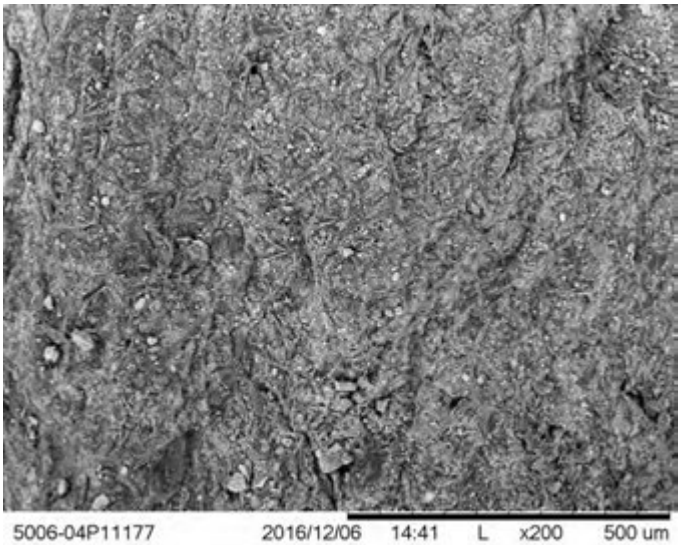
Common Name: Papa
Sample Type: Charred

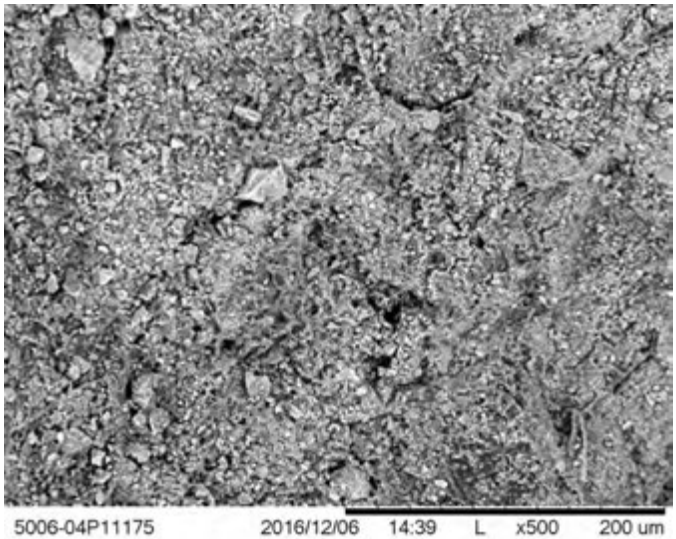
Exterior



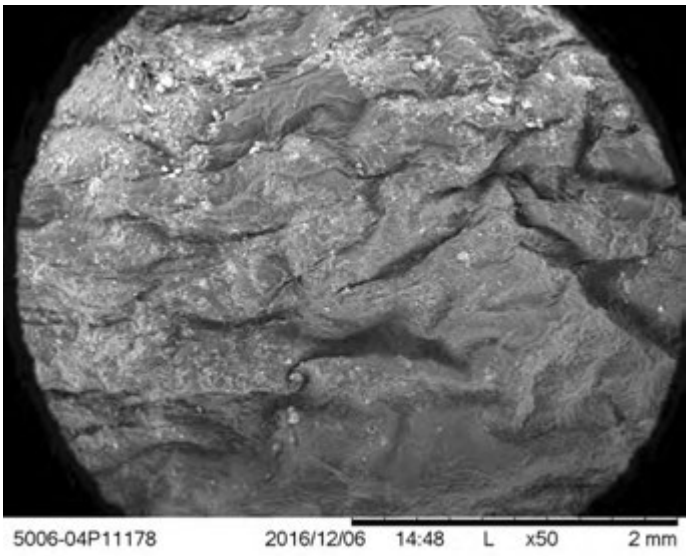


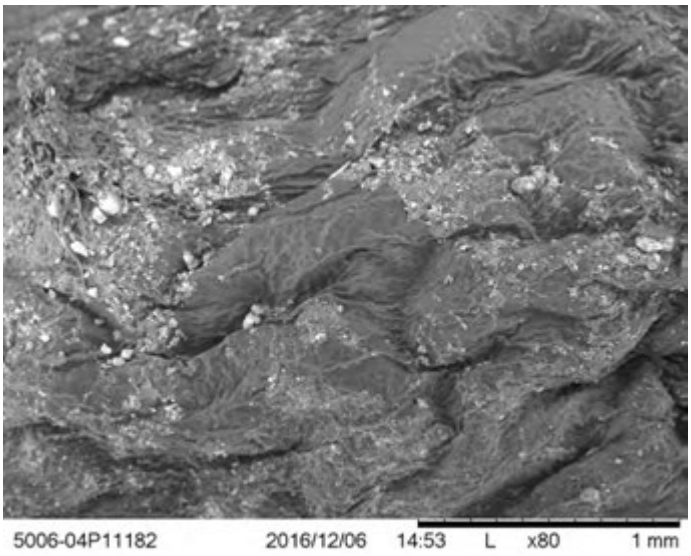


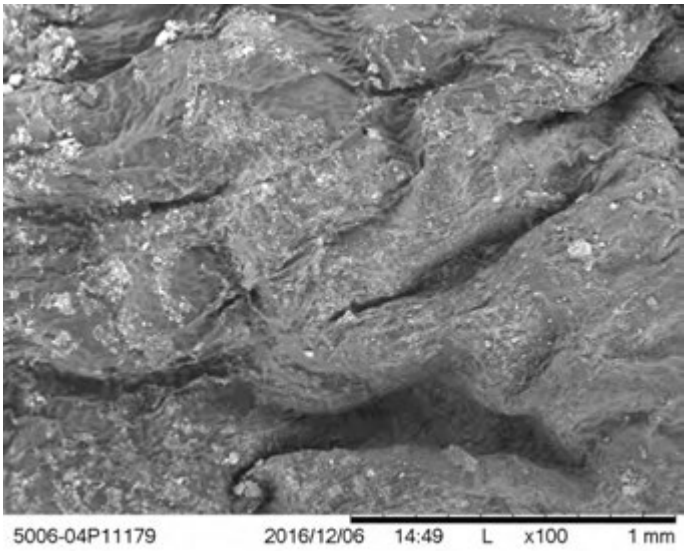


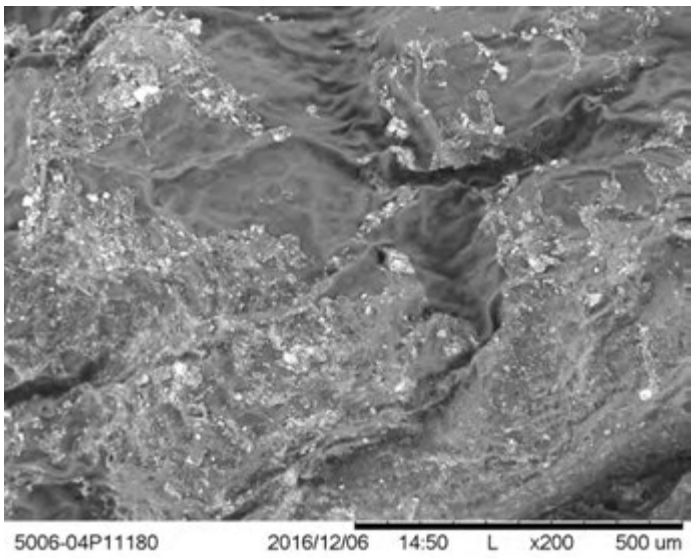


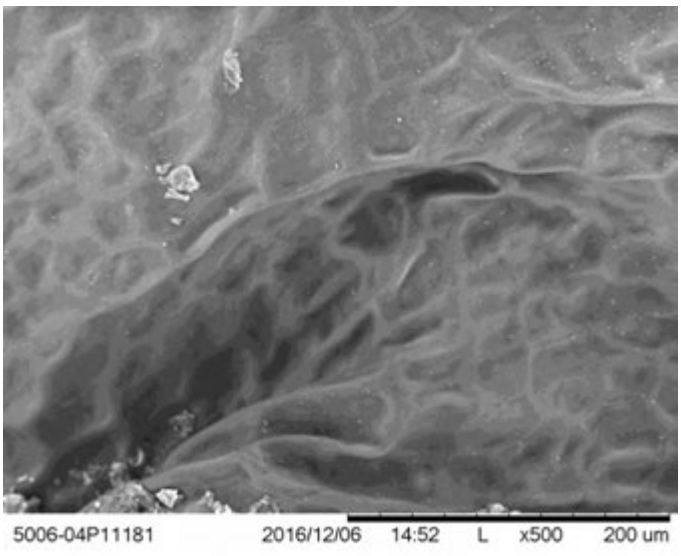
Tropaeolum tuberosum Common Name: Mashua Exterior
TROPAEOLACEAE Sample Type: Charred



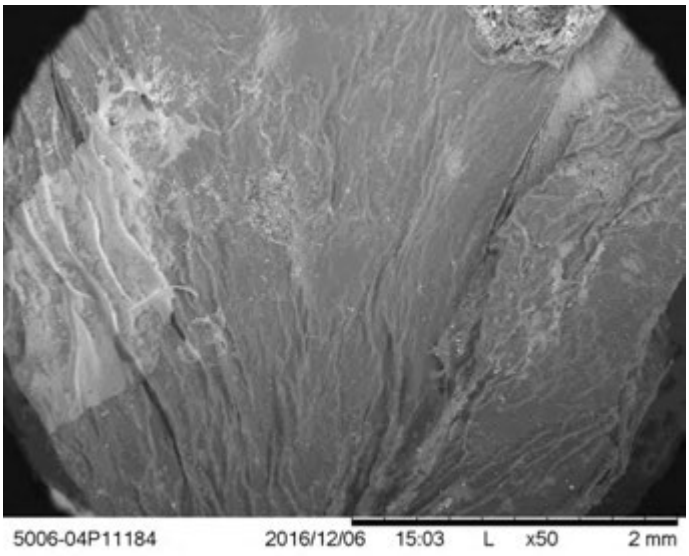


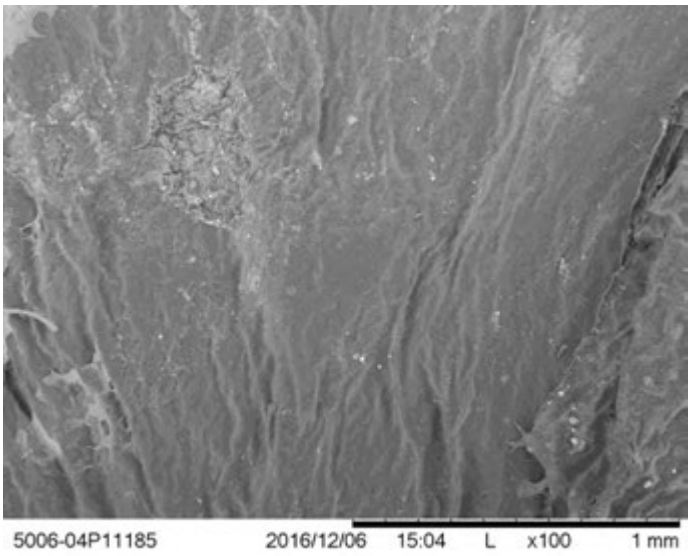


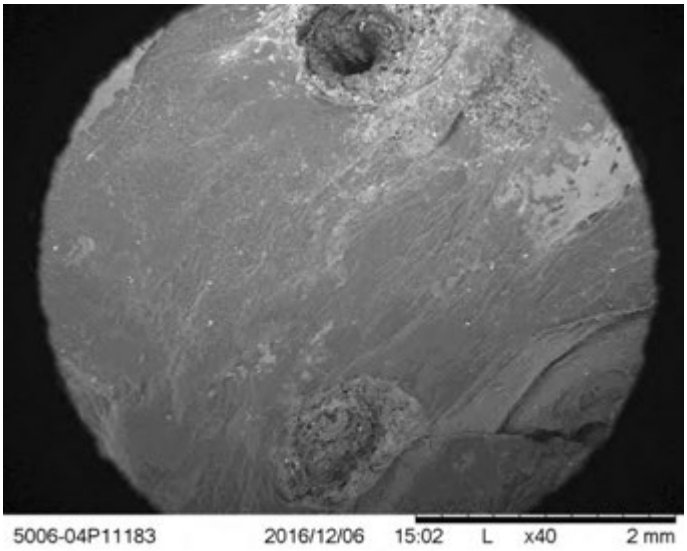


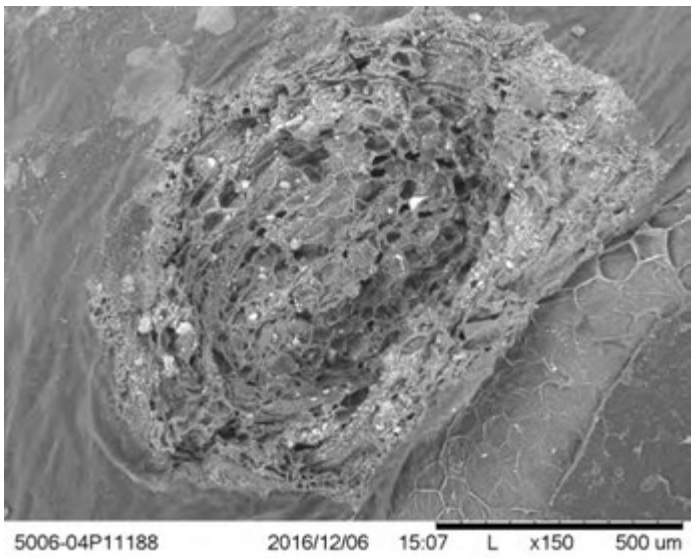


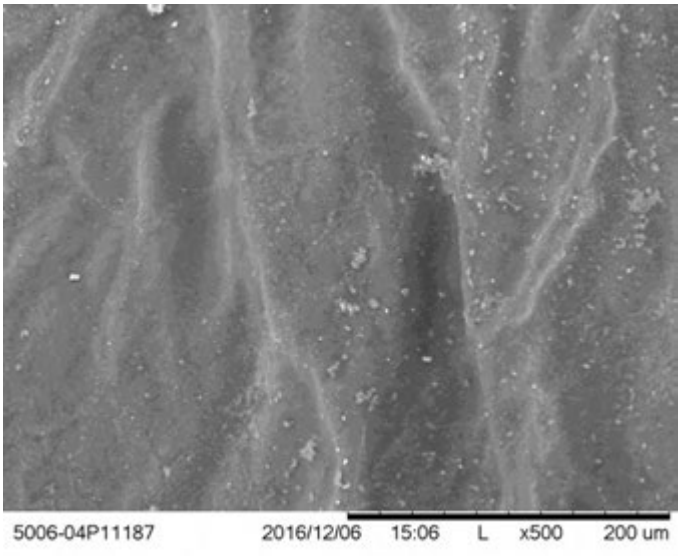
Ullucus tuberosus Common Name: Papalisa/Ollucu Exterior
BASELLACEAE Sample Type: Charred

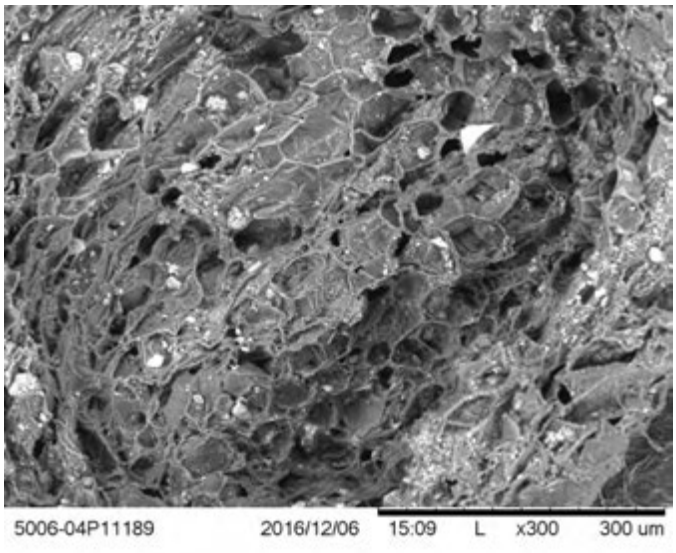






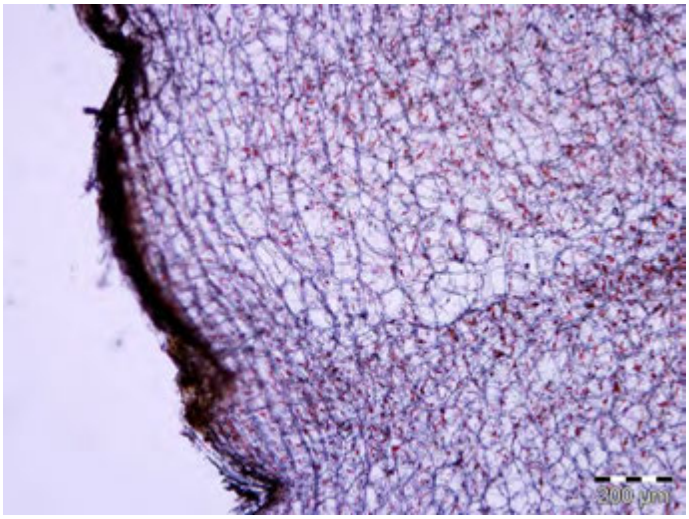


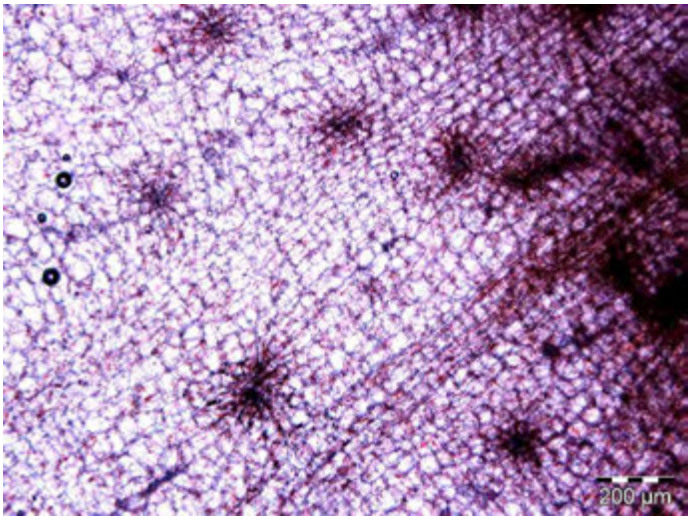


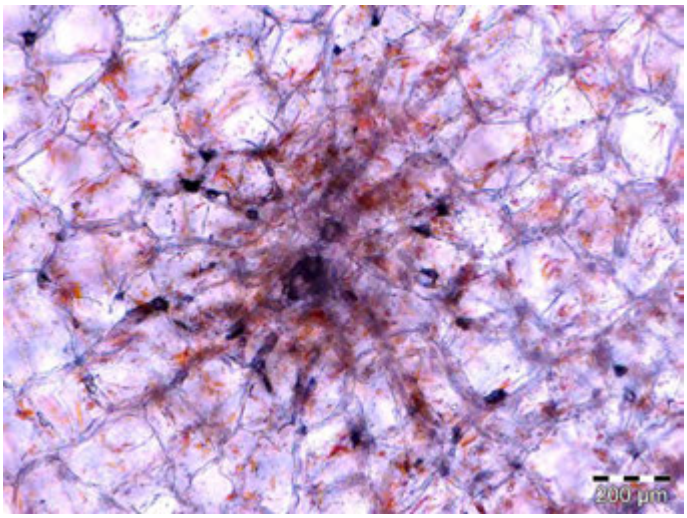


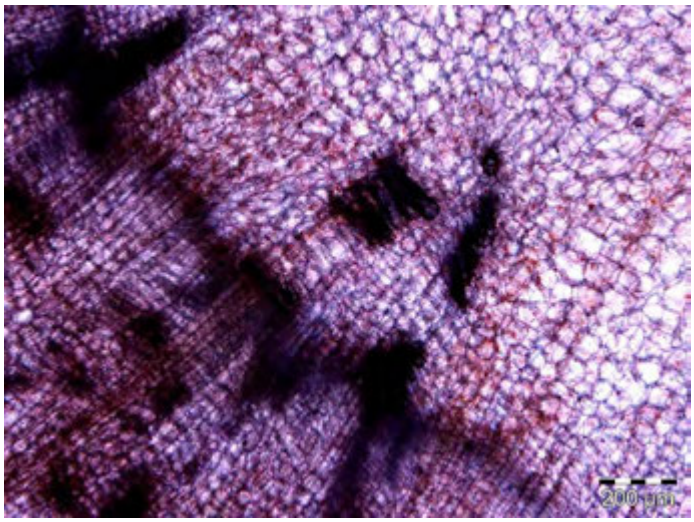
Stained Specimen

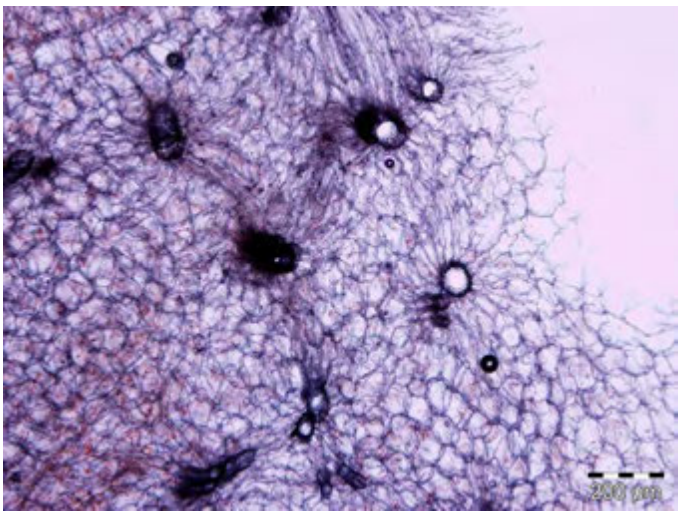
Daucus carota Common Name: Carrot
APIACEAE Sample Type: Stained

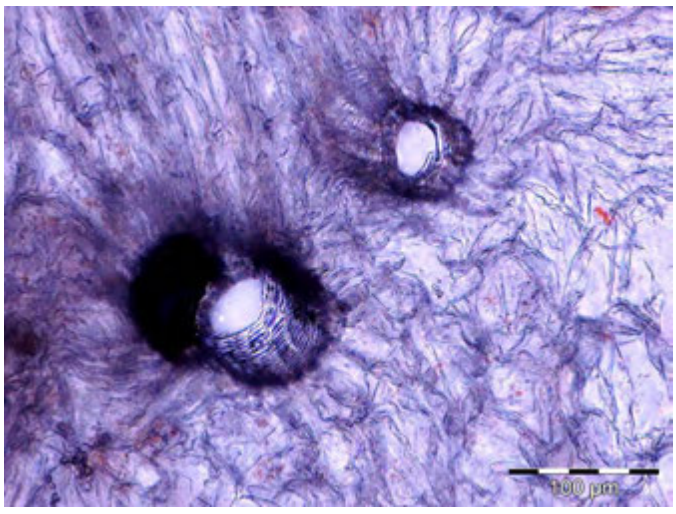




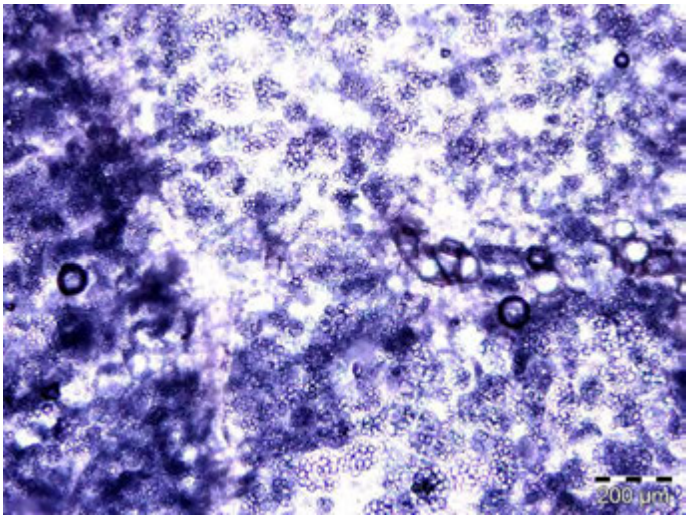


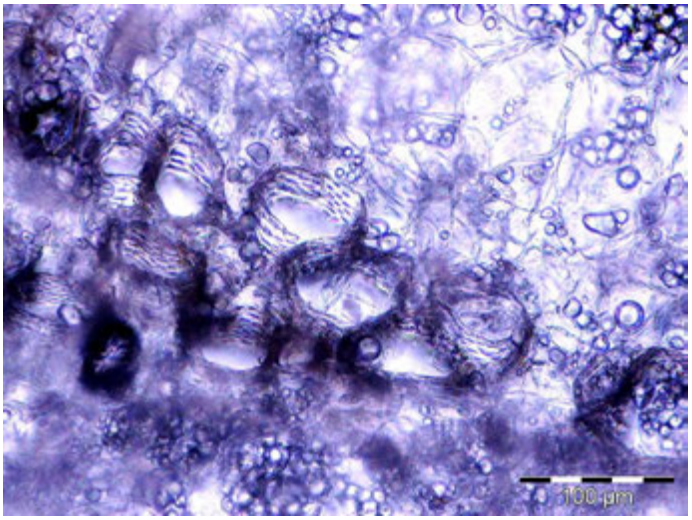


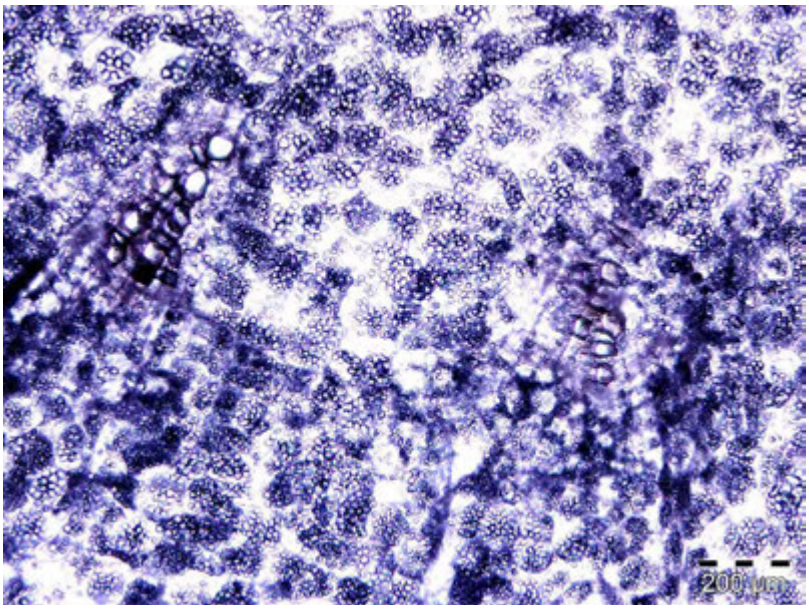


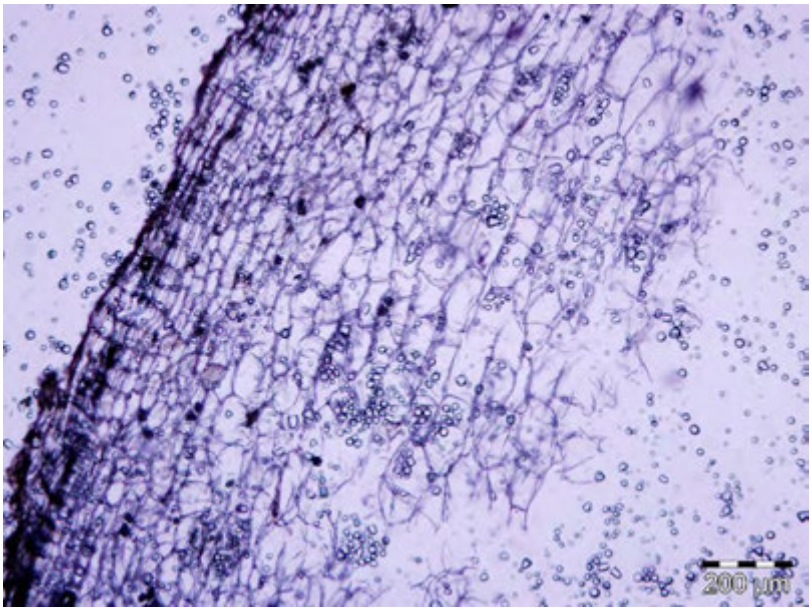


Ipomoea batatas Common Name: Sweet Potato
CONVULVULACEAE Sample Type: Stained

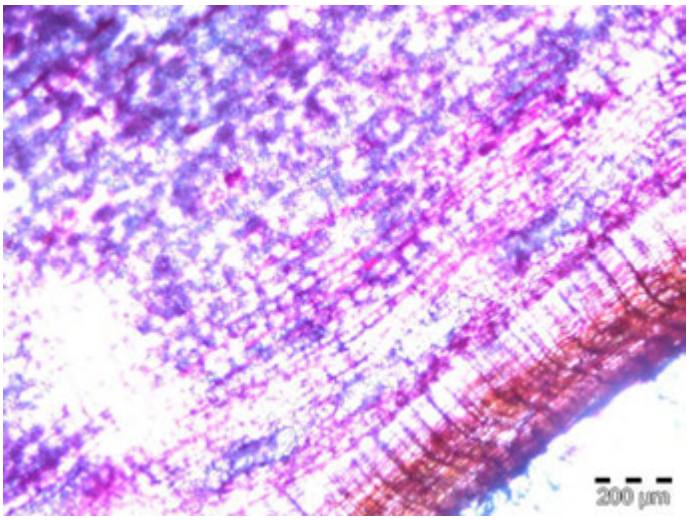


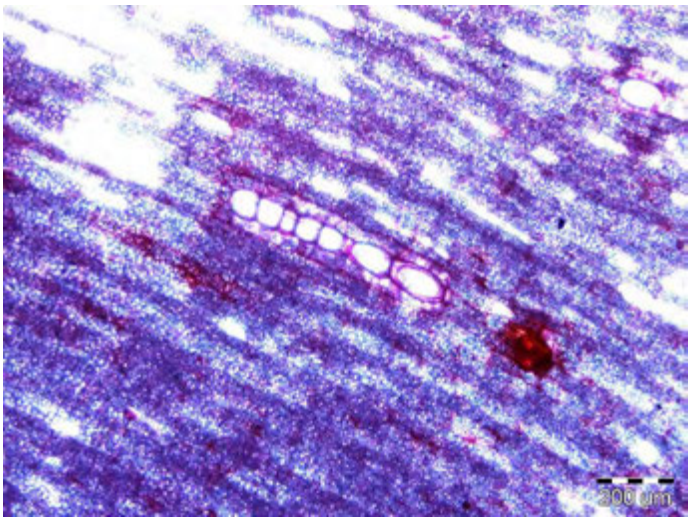


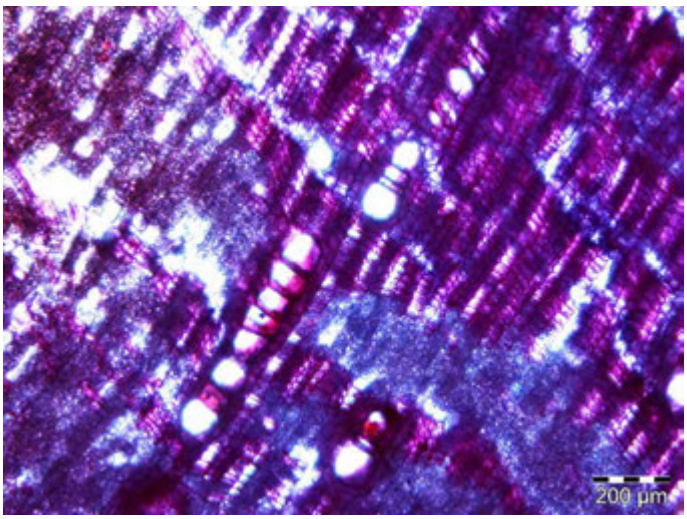


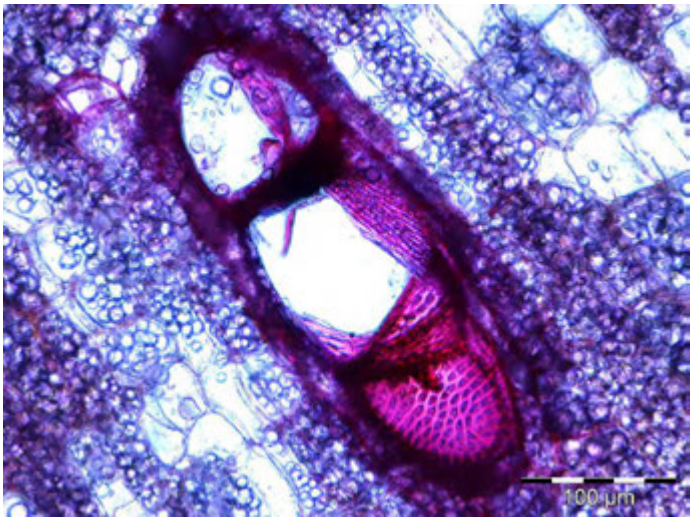


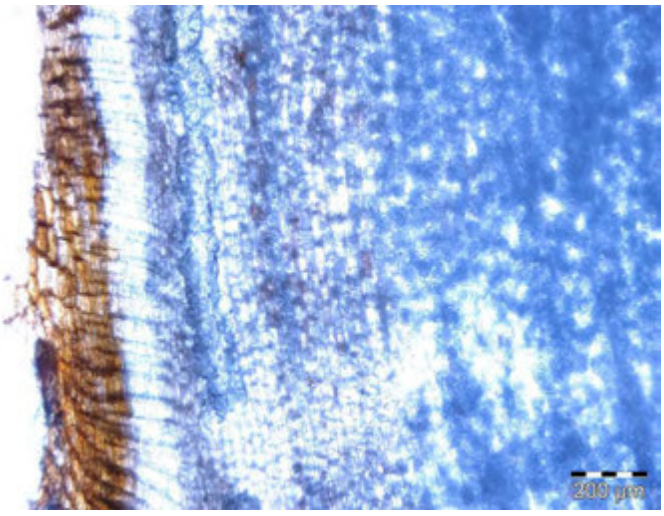
Manihot esculenta Common Name: Manioc
EUPHORBIACEAE Sample Type: Stained

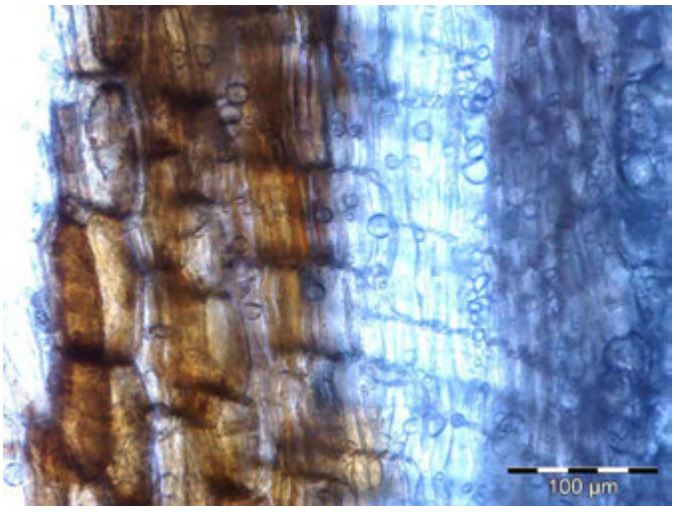




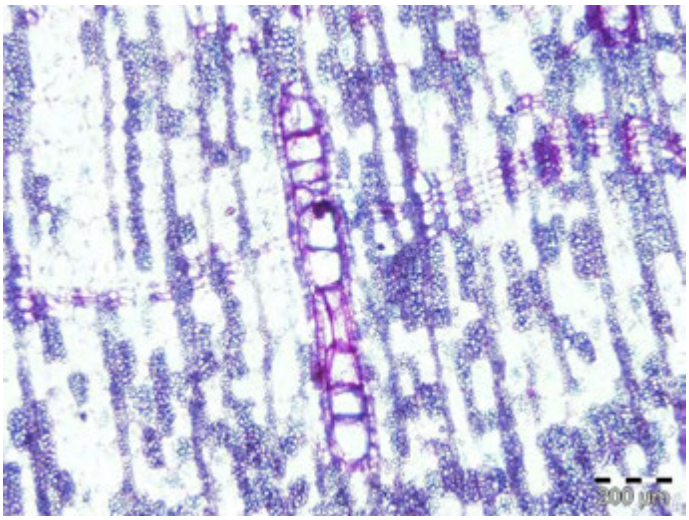


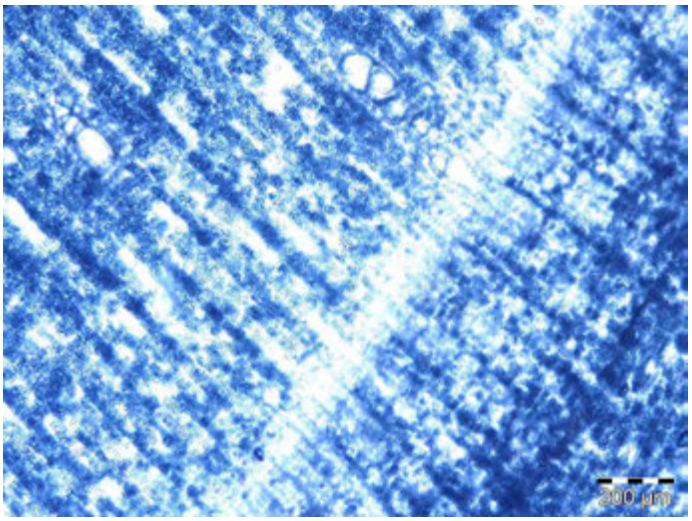


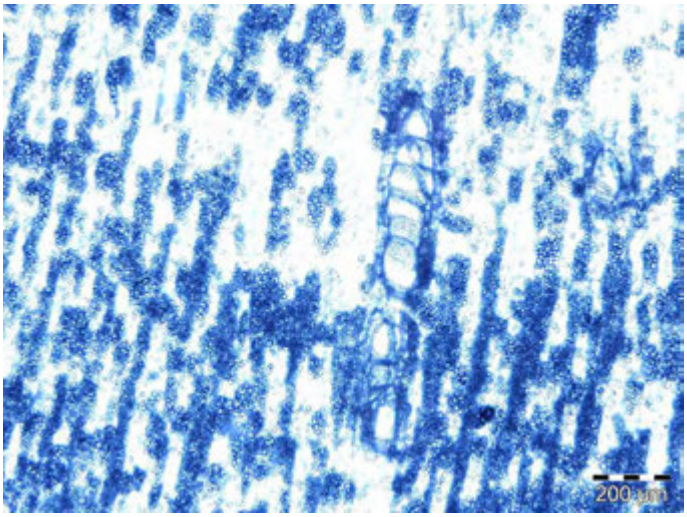


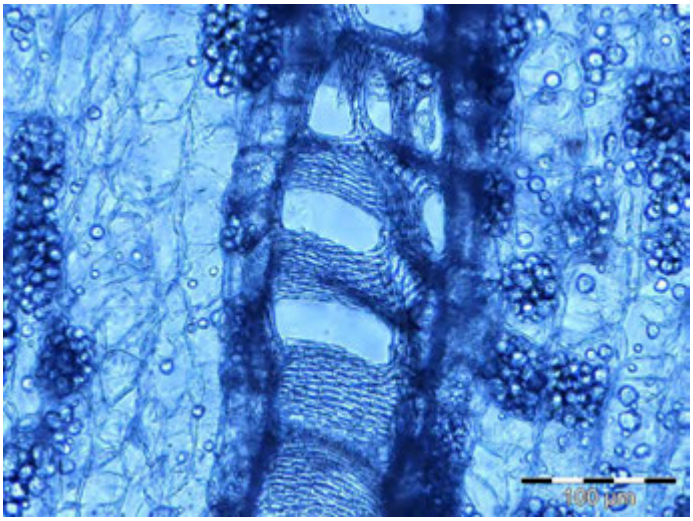


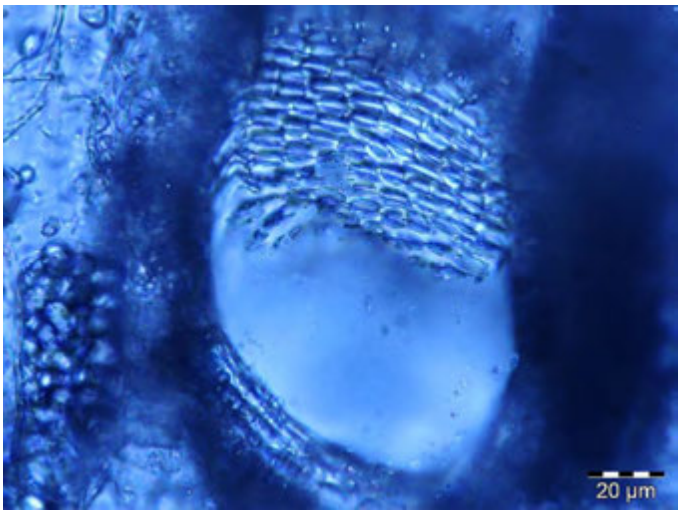
Manihot esculenta Common Name: Manioc (Continued)
EUPHORBIACEAE Sample Type: Stained

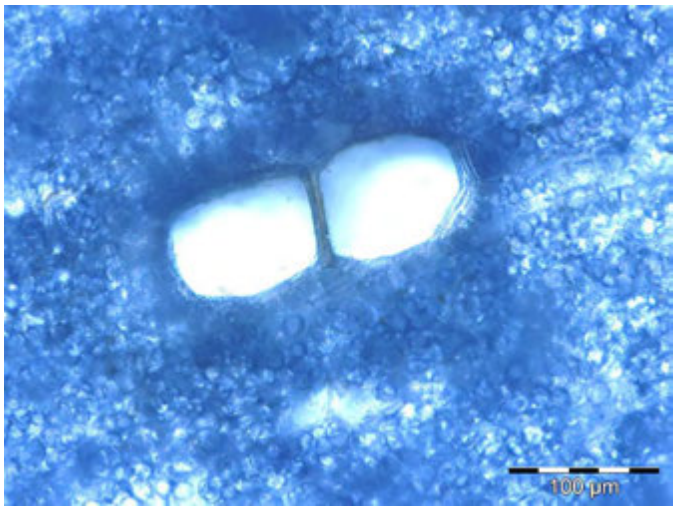




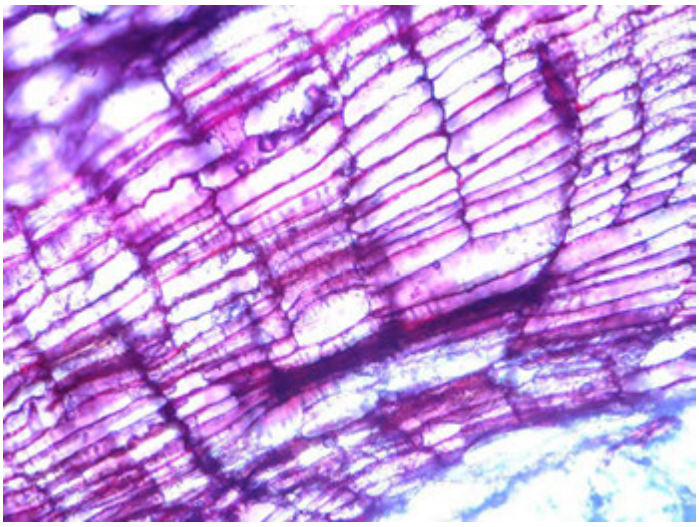


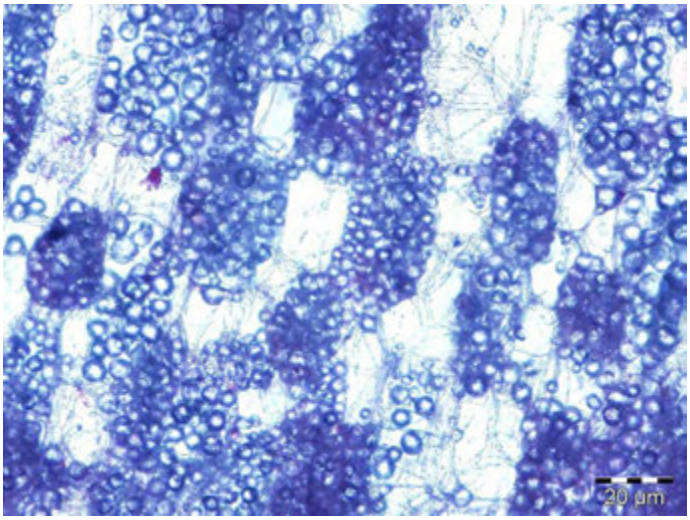


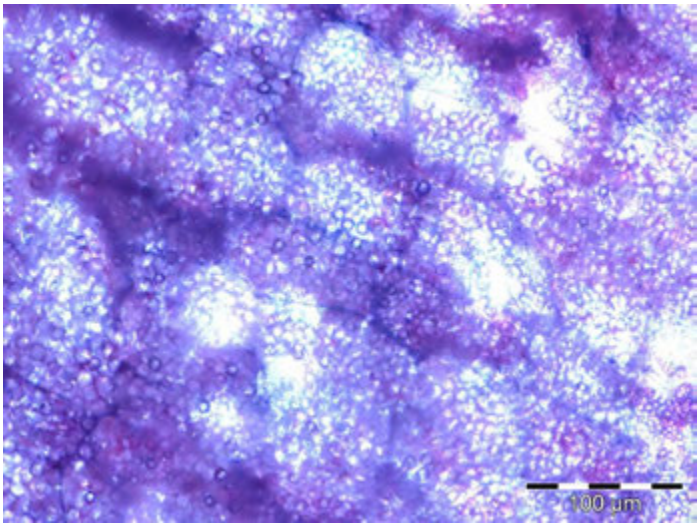


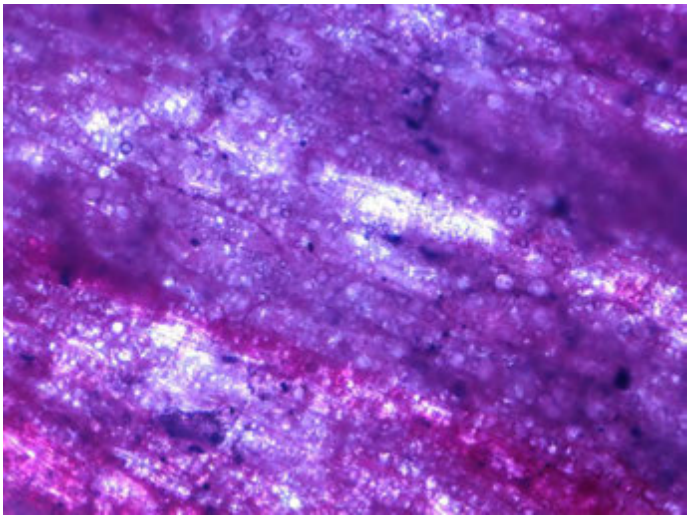


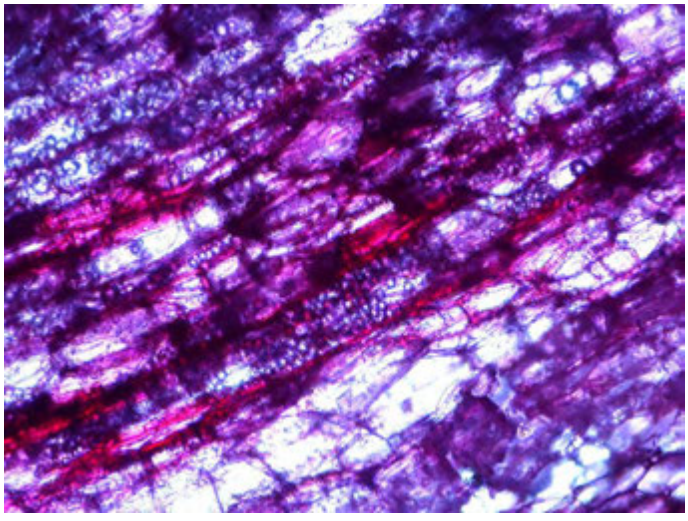
Manihot esculenta Common Name: Manioc (Continued)
EUPHORBIACEAE Sample Type: Stained

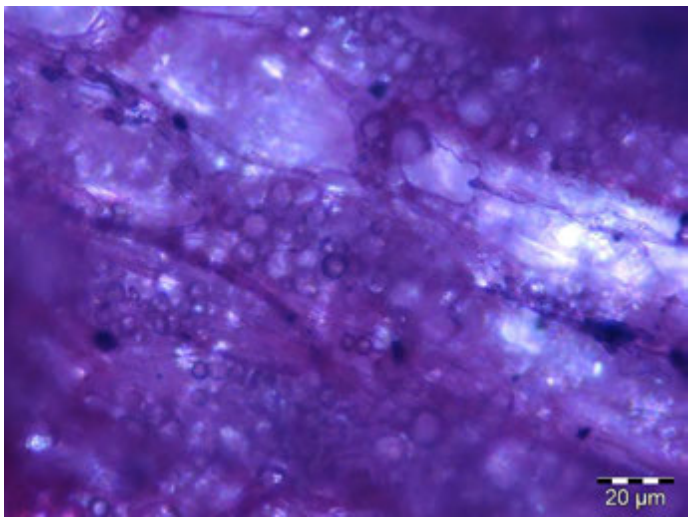






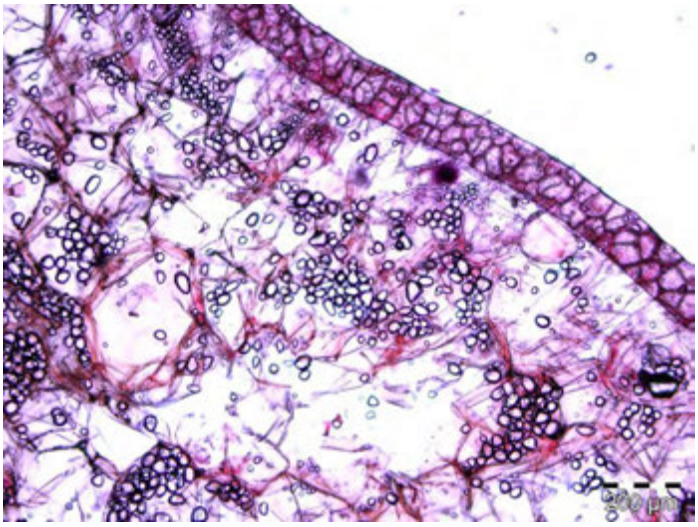


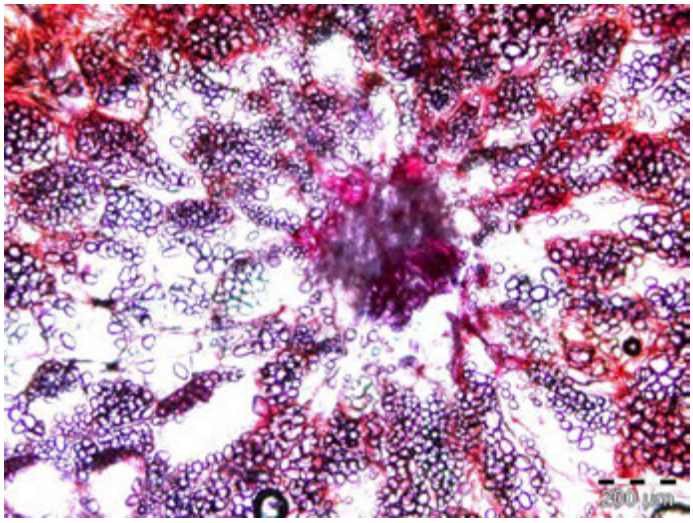


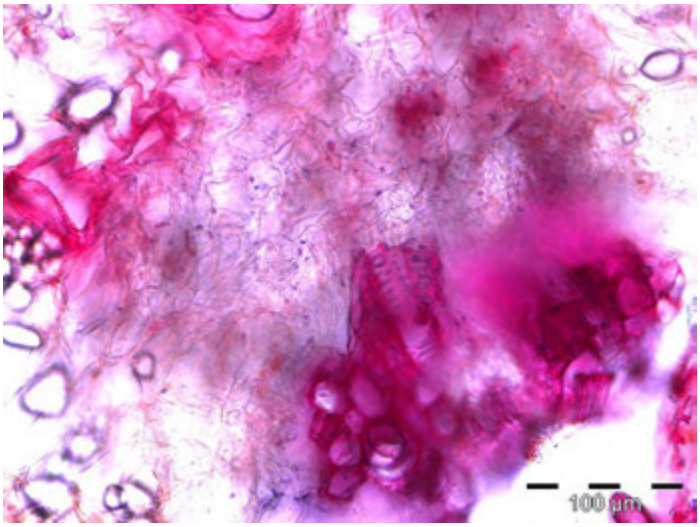


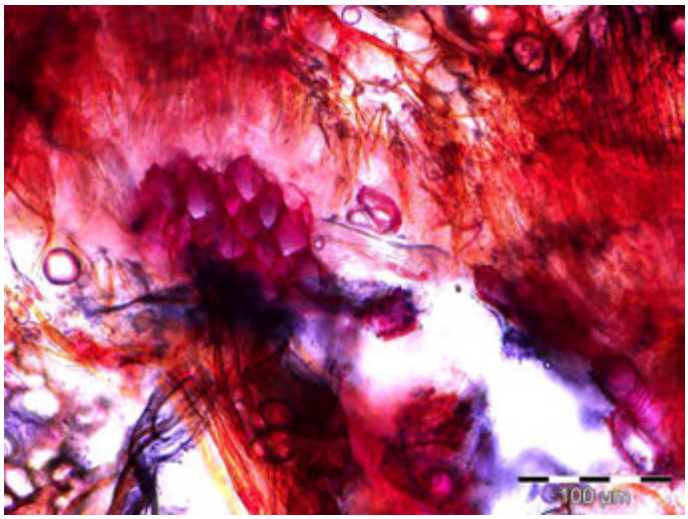
Oxalis tuberosa
OXALIDACEAE

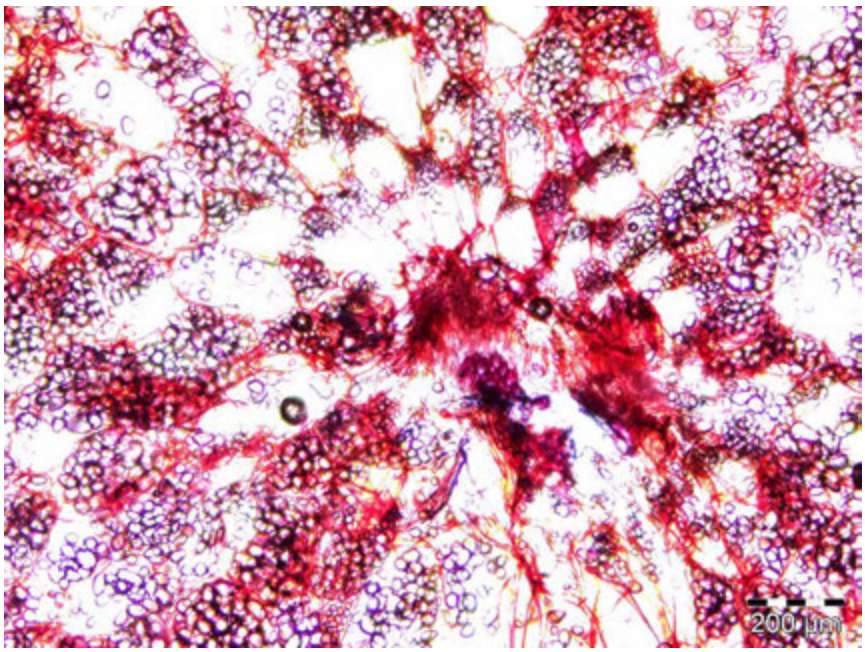
Common Name: Oca
Sample Type: Stained





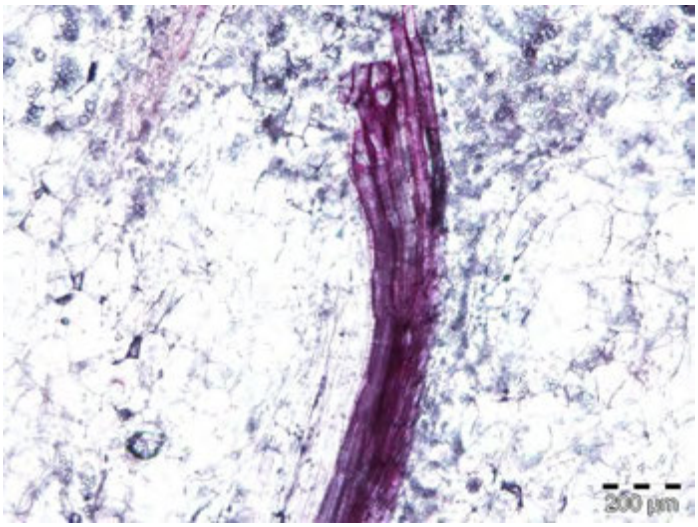


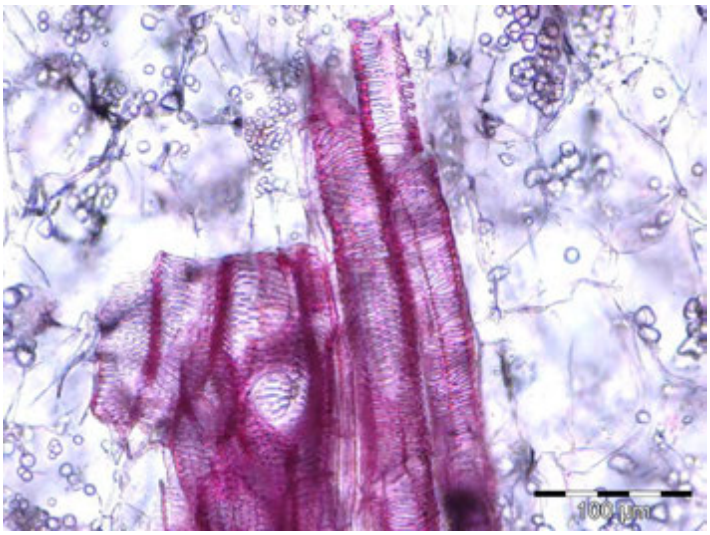


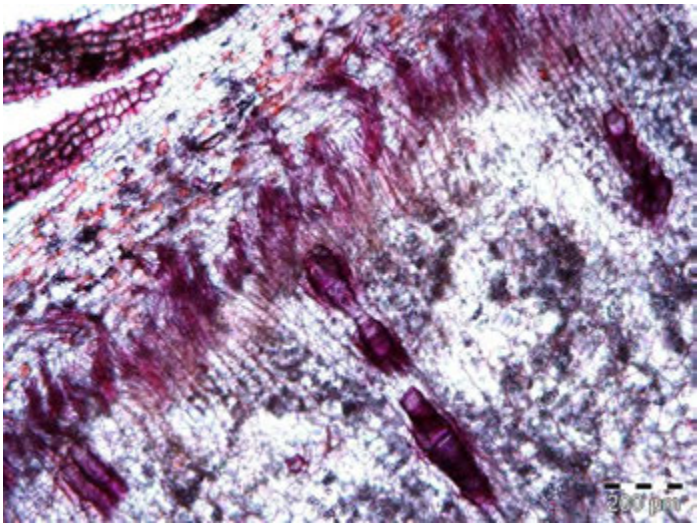


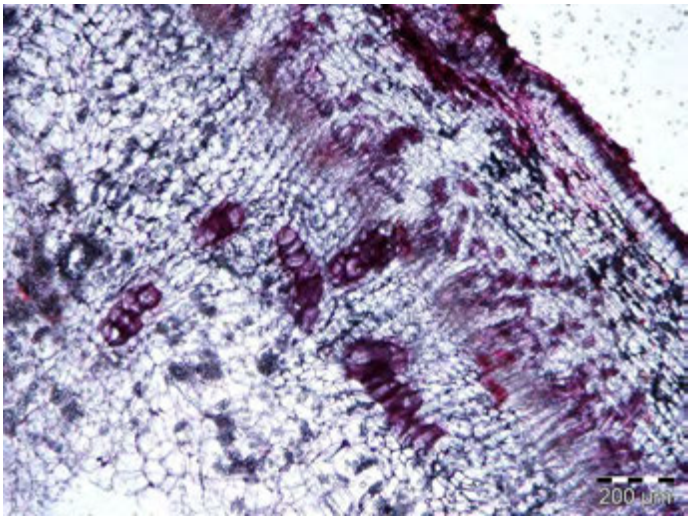
Pachyrhizus erosus
FABACEAE

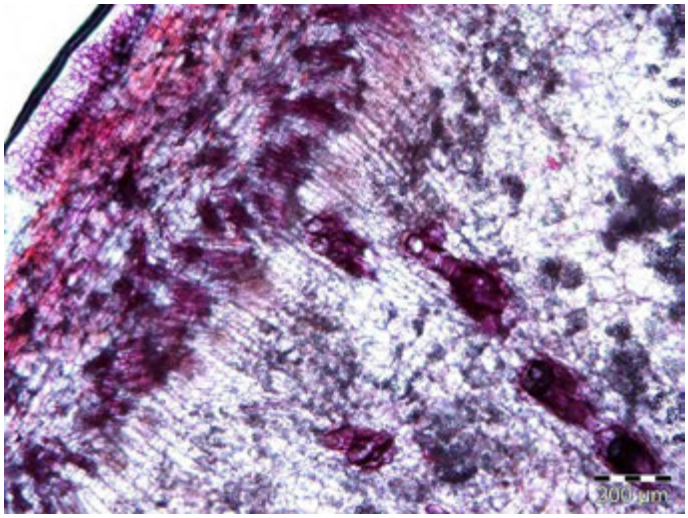
Common Name: Jicama
Sample Type: Stained

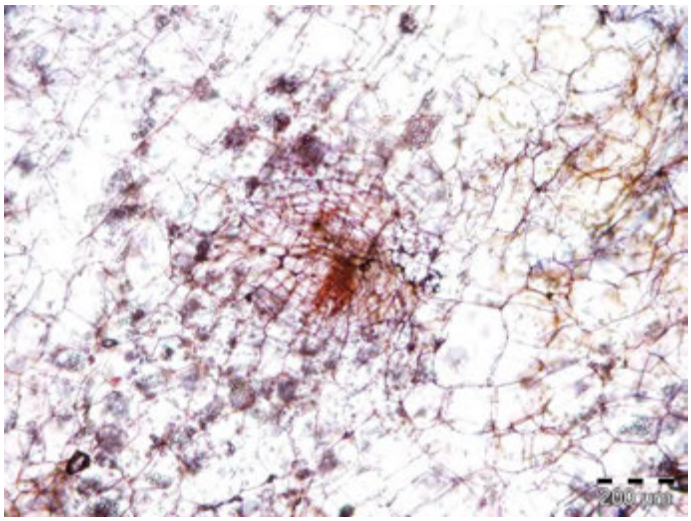




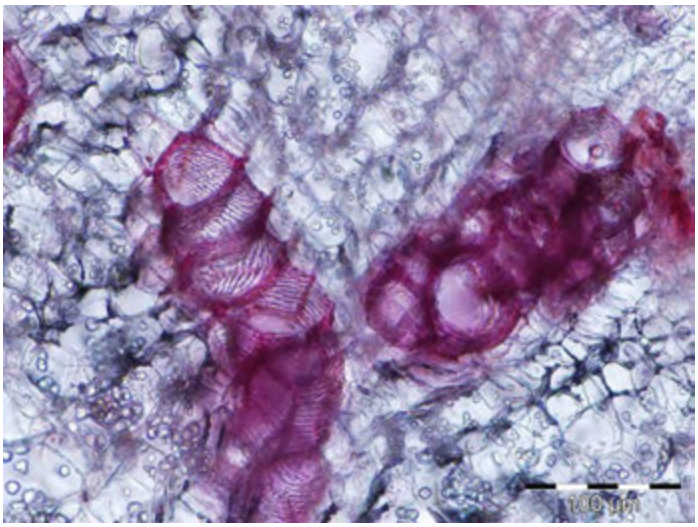


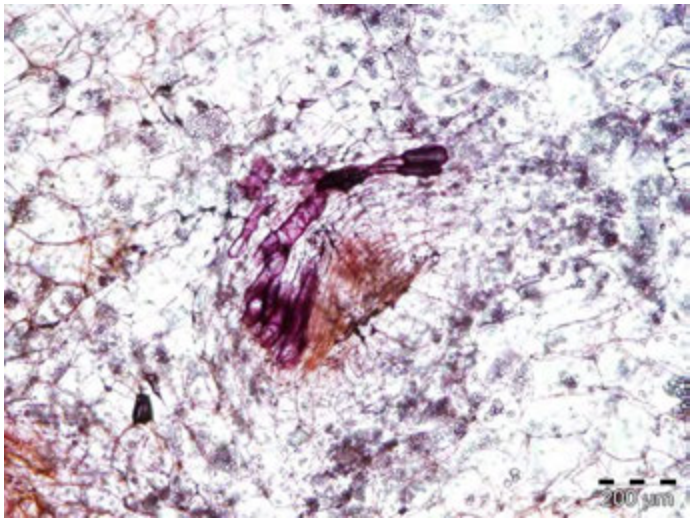


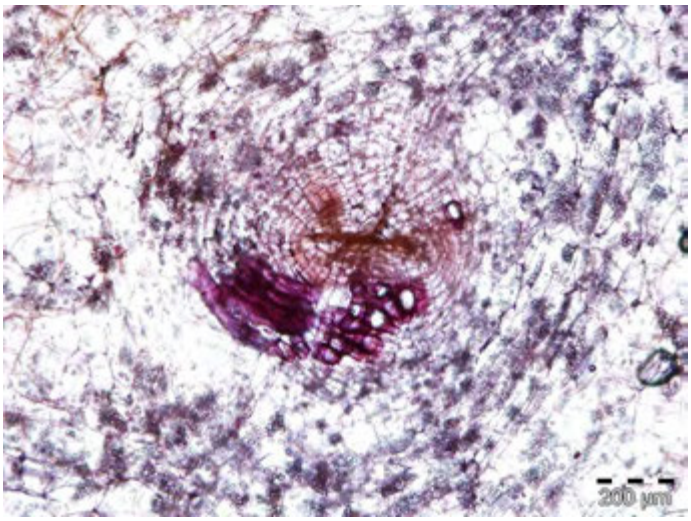


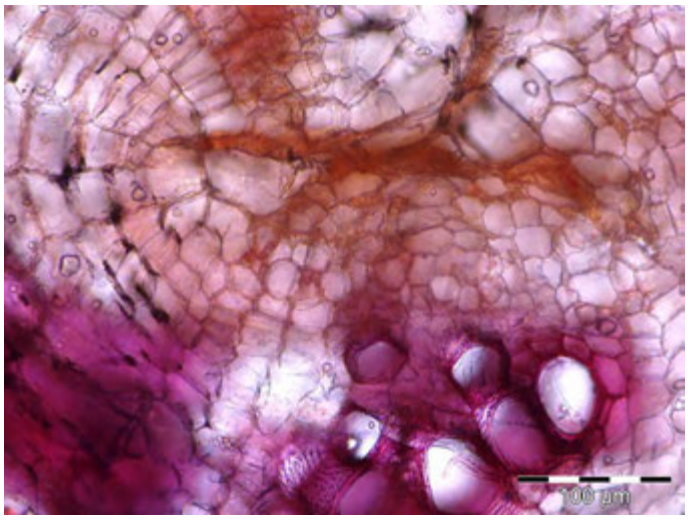


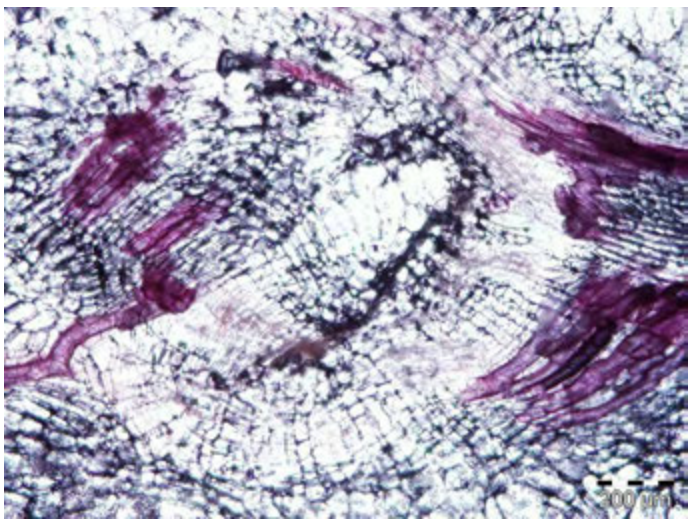
Pachyrhizus erosus Common Name: Jicama (Continued)
FABACEAE Sample Type: Stained



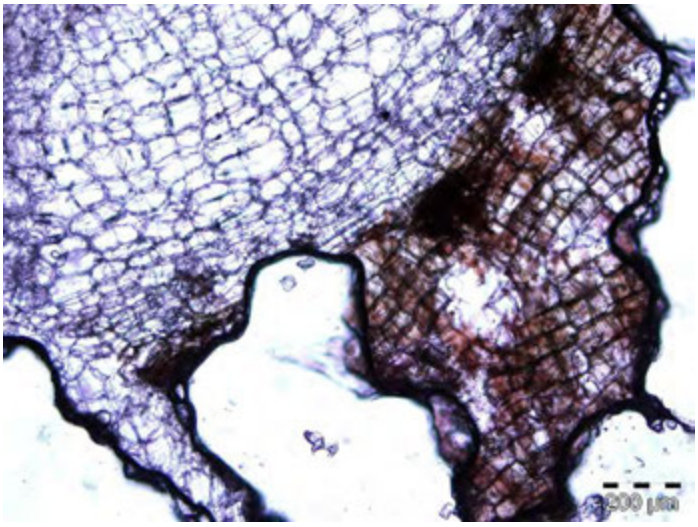


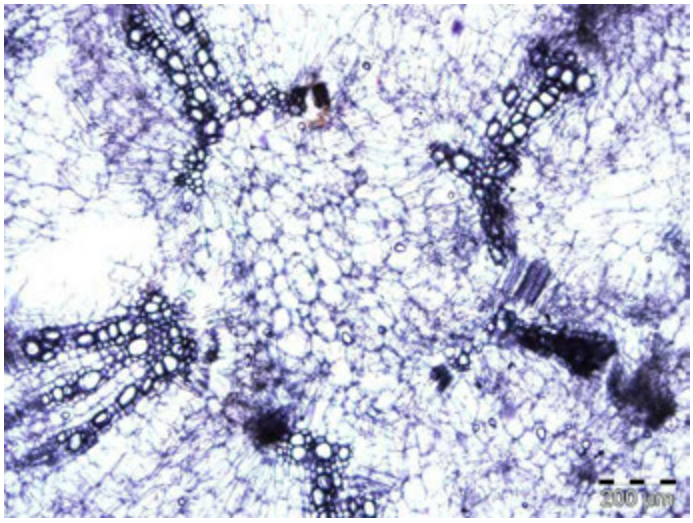


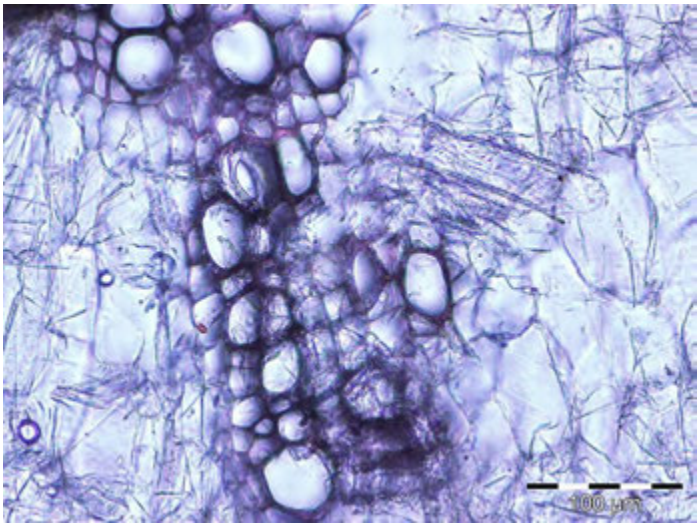


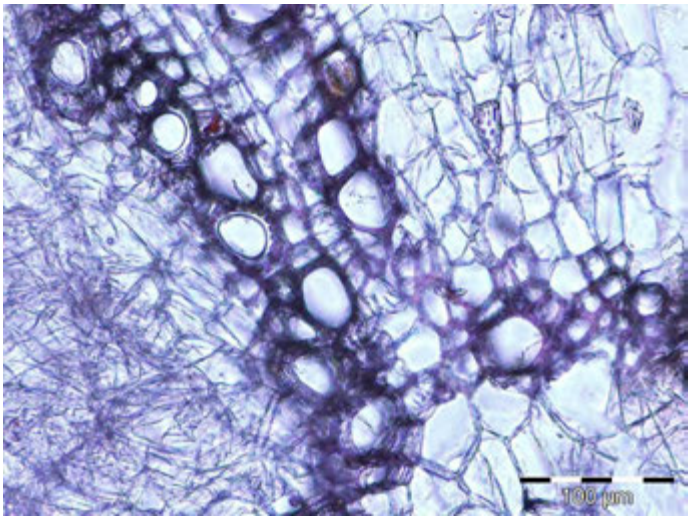


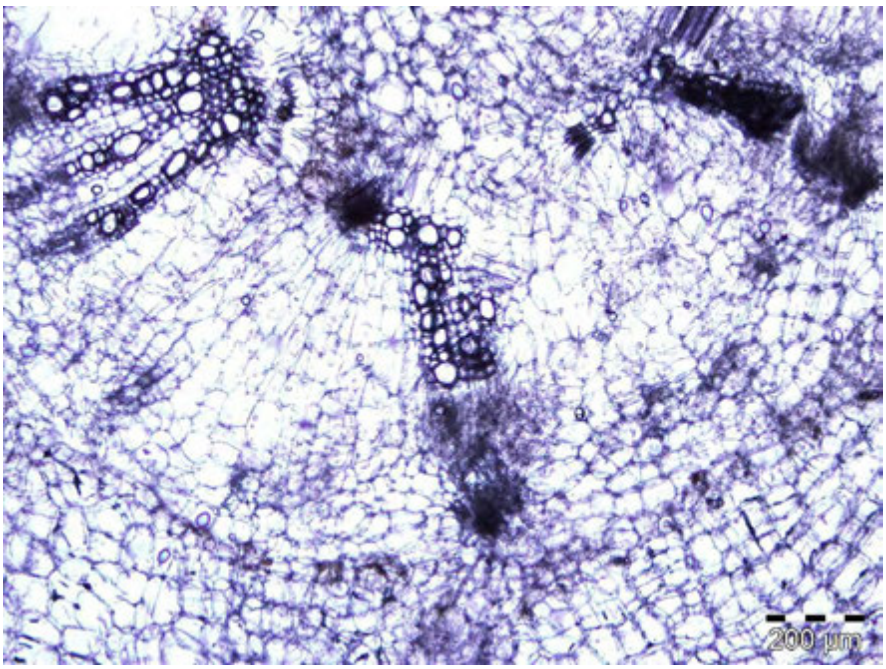
Smallanthus sonchifolius Common Name: Yacon
ASTERACEAE Sample Type: Stained





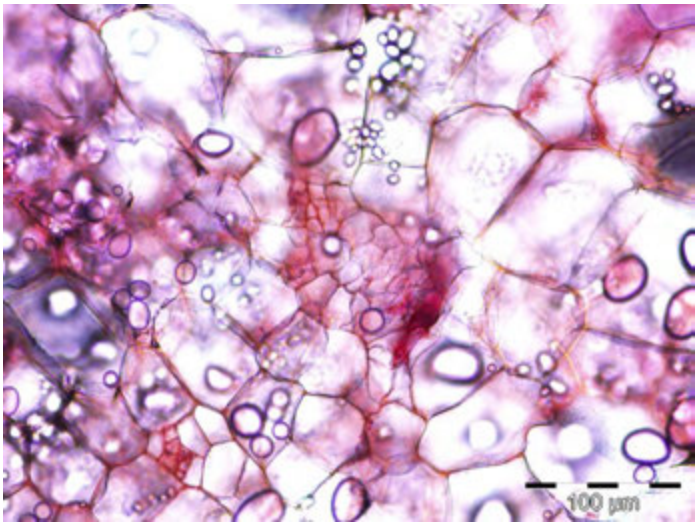


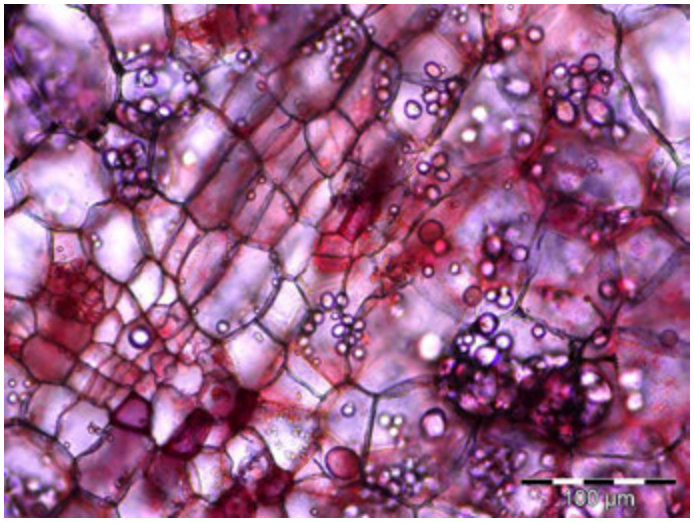


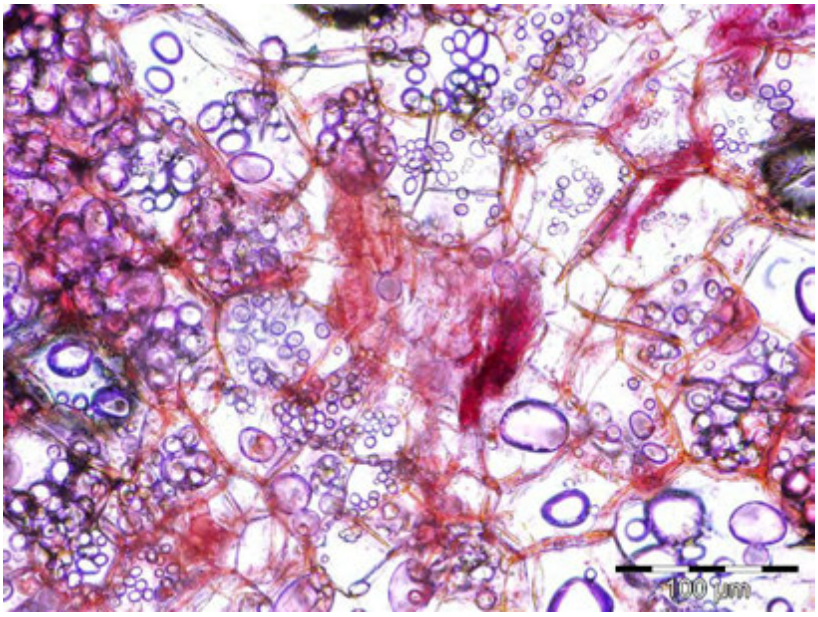


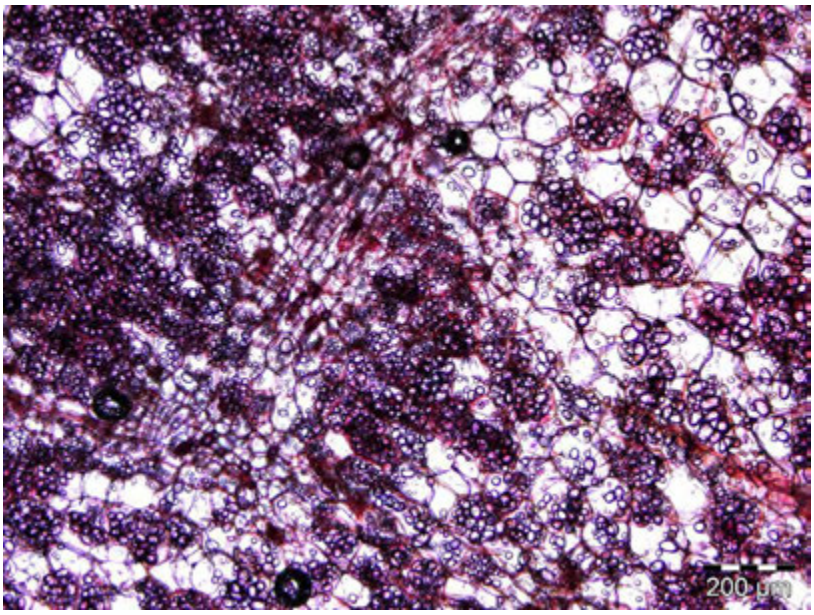
Solanum
SOLANACEAE

Common Name: Papa
Sample Type: Stained





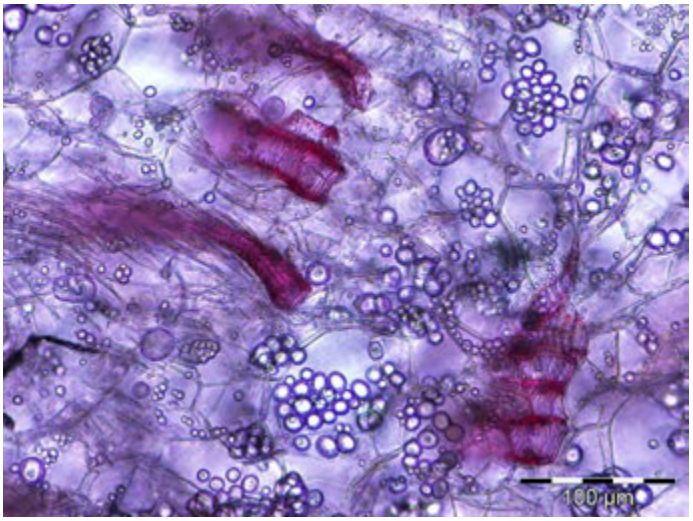


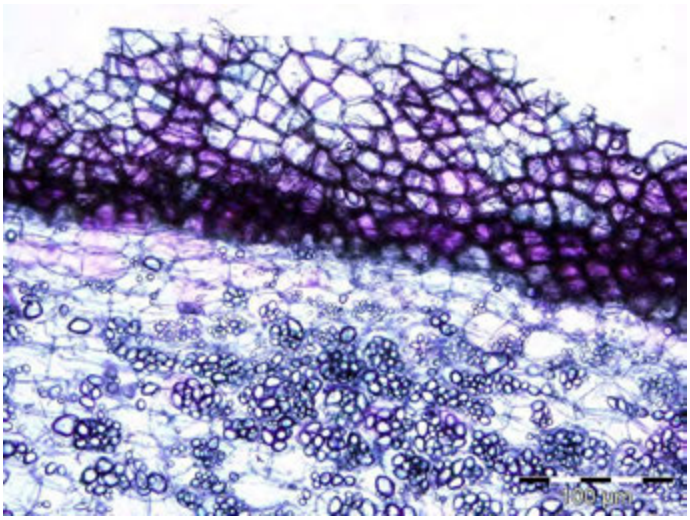


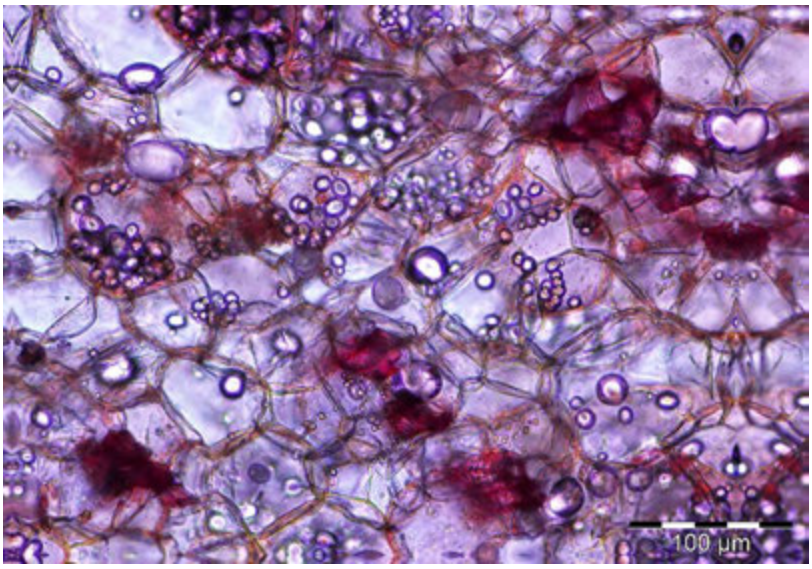
Solanum
SOLANACEAE

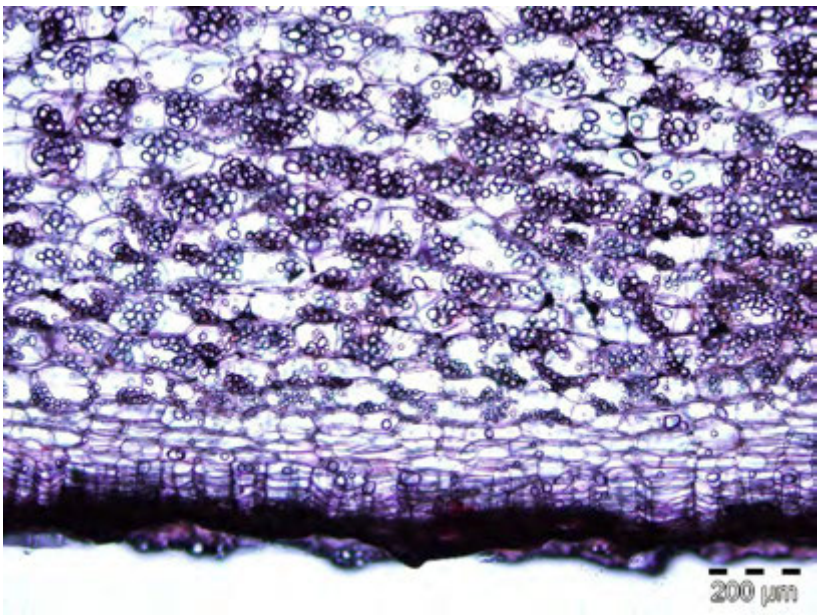
Common Name: Papa
Sample Type: Stained

(Continued)







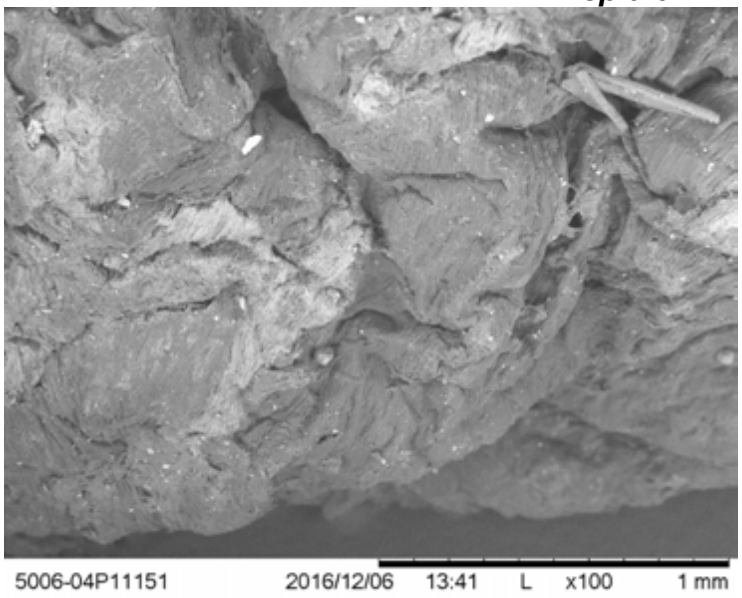


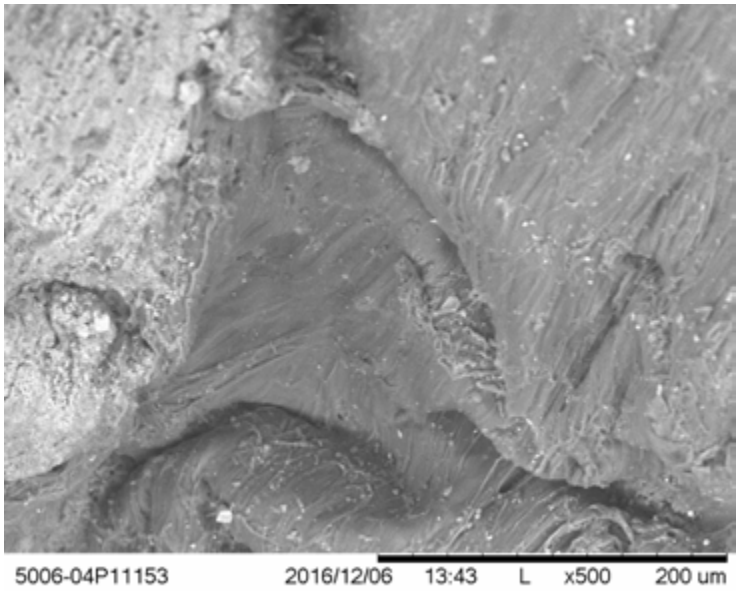
Diagnostic Feature Comparisons:

Exterior Surfaces

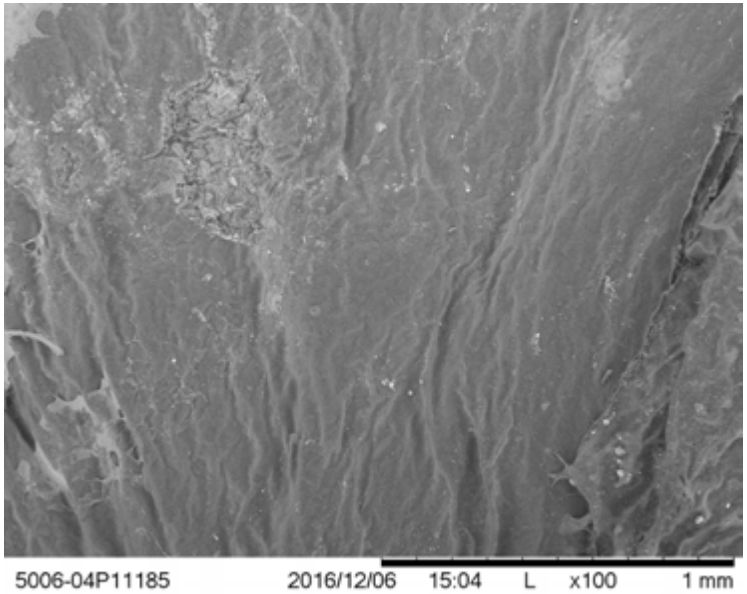
Exterior Surface Texture – Charred at 250^{o} (100x and 500x)

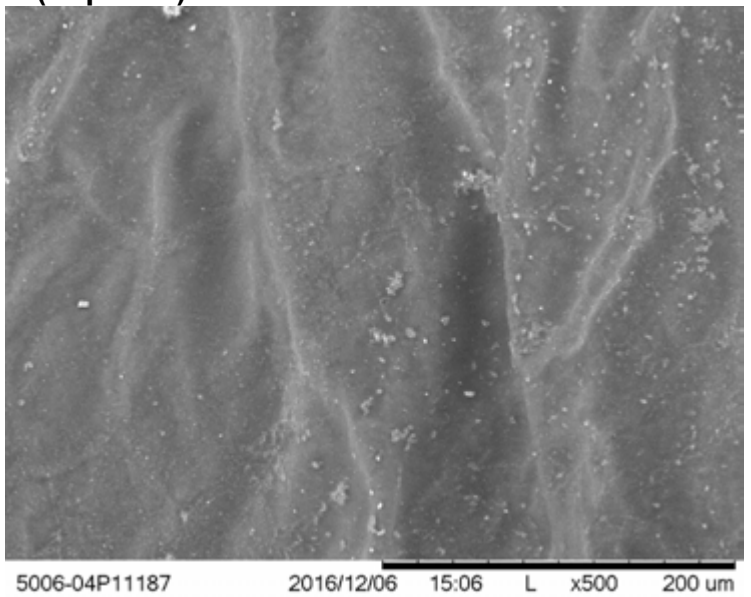
***Lepidium meyenii* (Maca)**





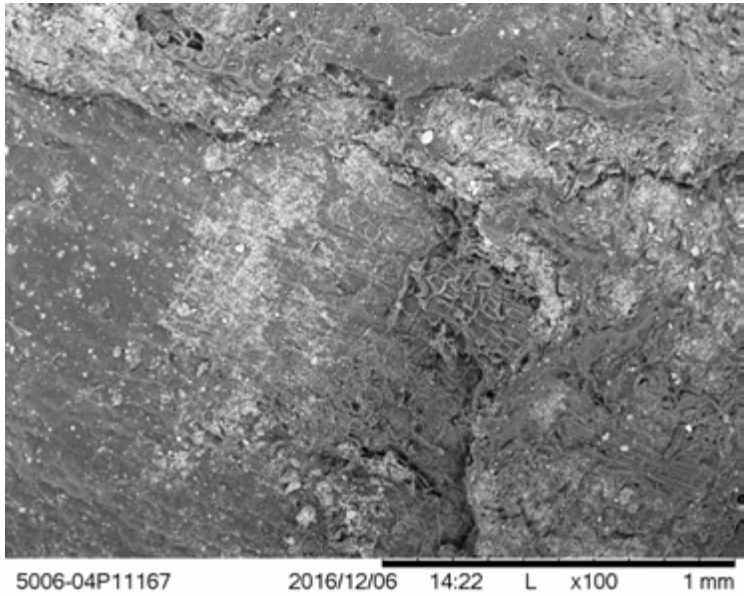
***Ullucus tuberosus* (Papalisa)**

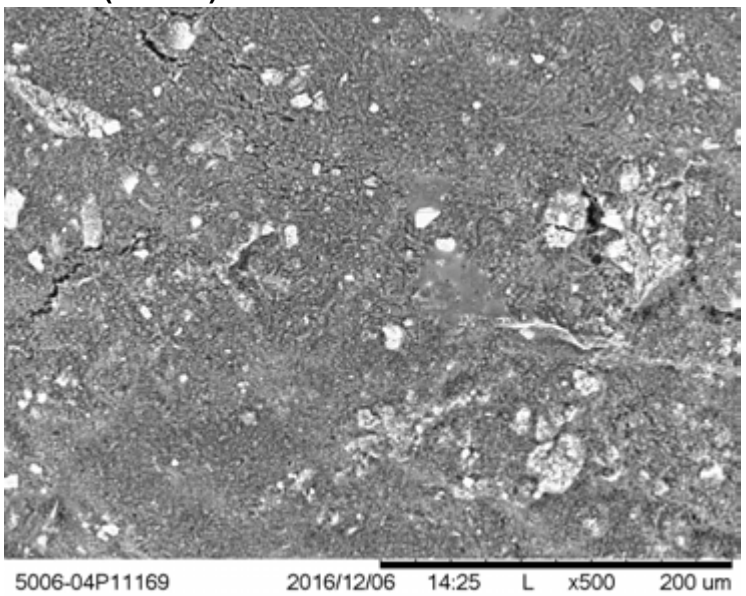




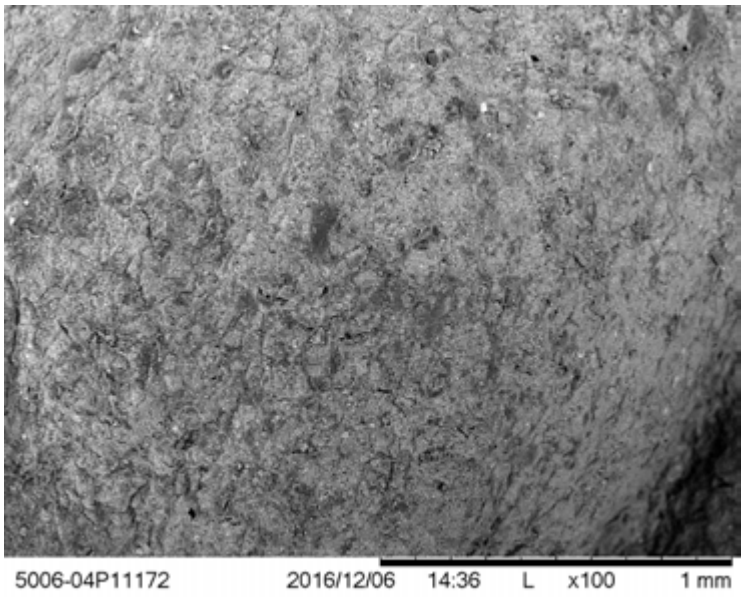
Exterior Surface Texture – Charred at 250° (100x and 500x)

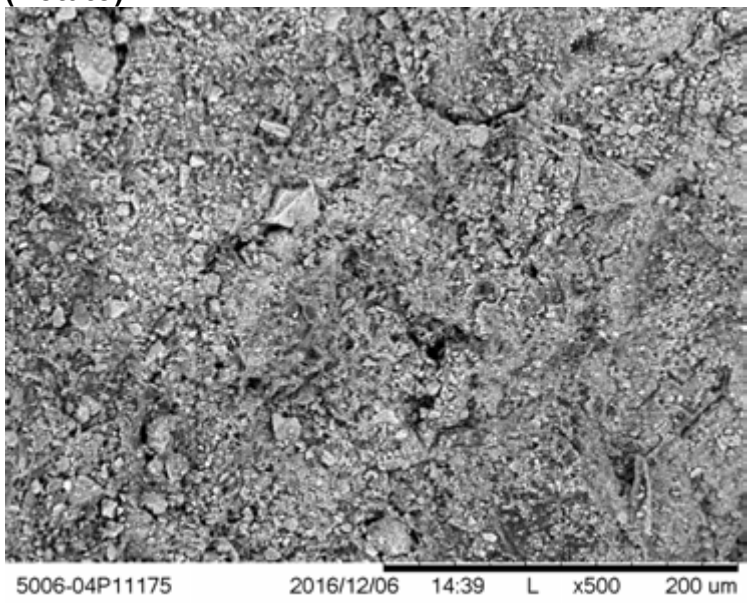
***Smallanthus sonchifolius* (Yacon)**





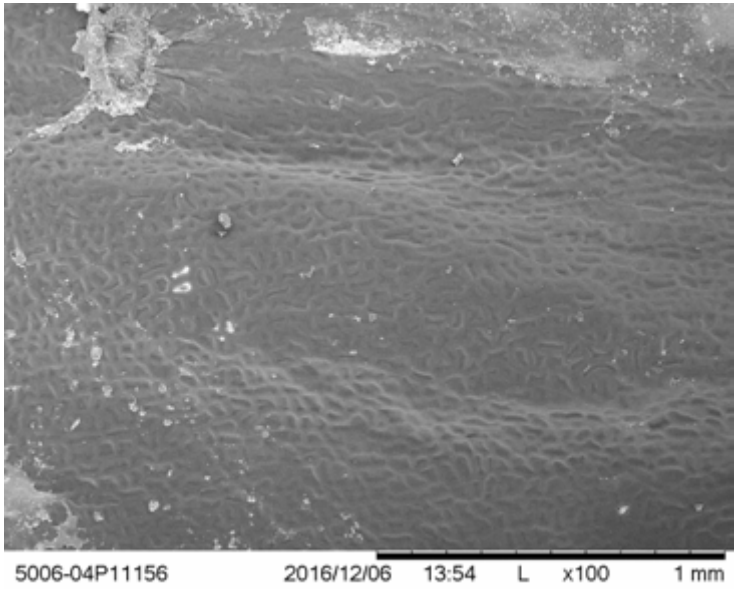
***Solanum* (Potato)**

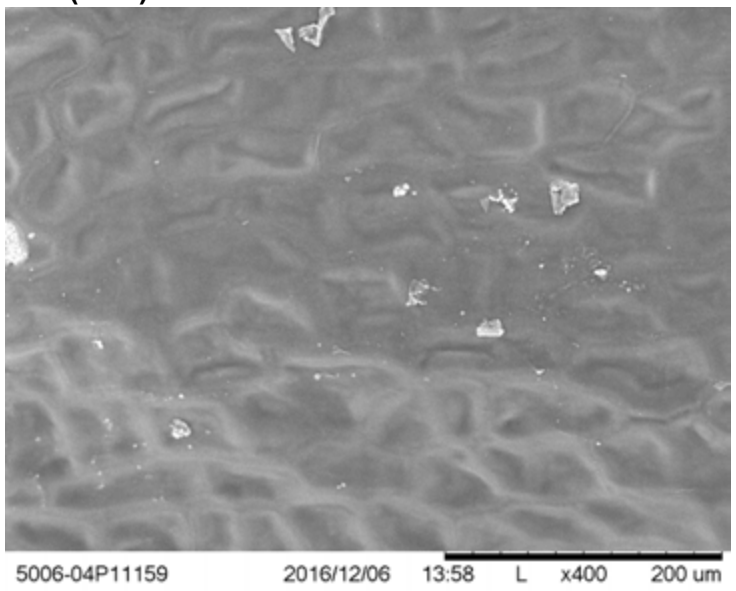




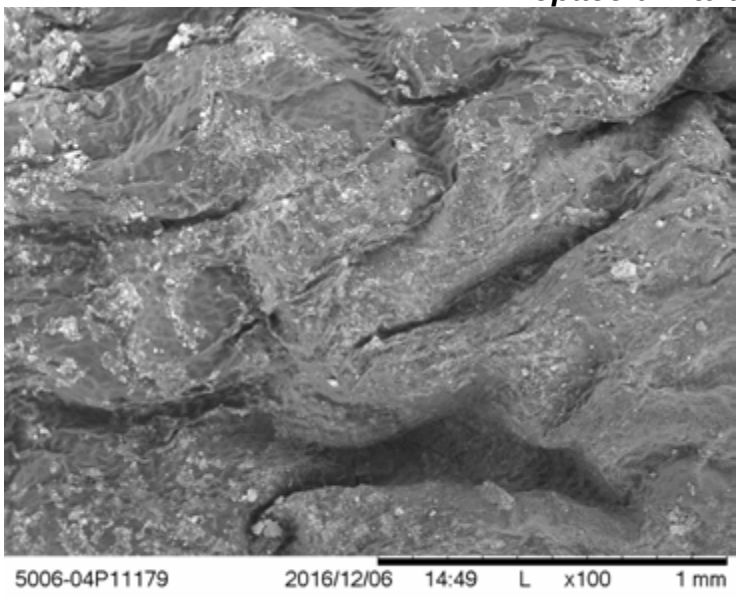
Exterior Surface Texture – Charred at 250^{o} (100x and 500x)

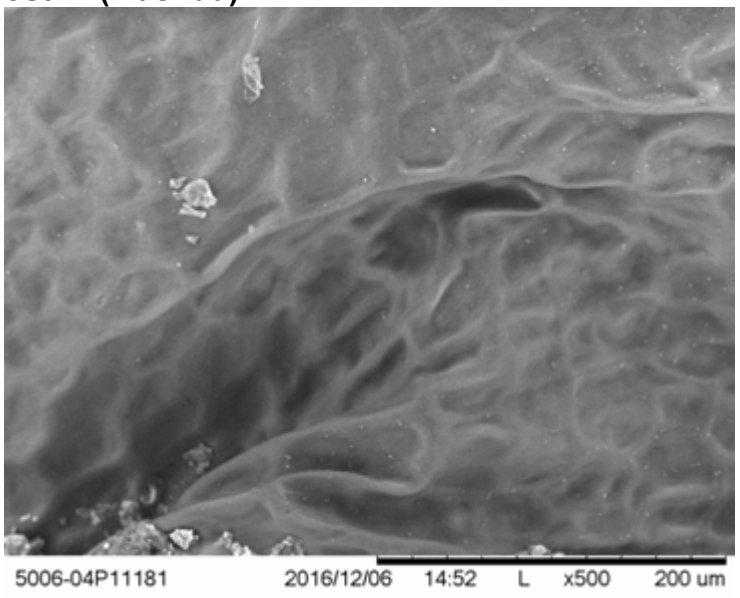
***Oxalis tuberosa* (Oca)**





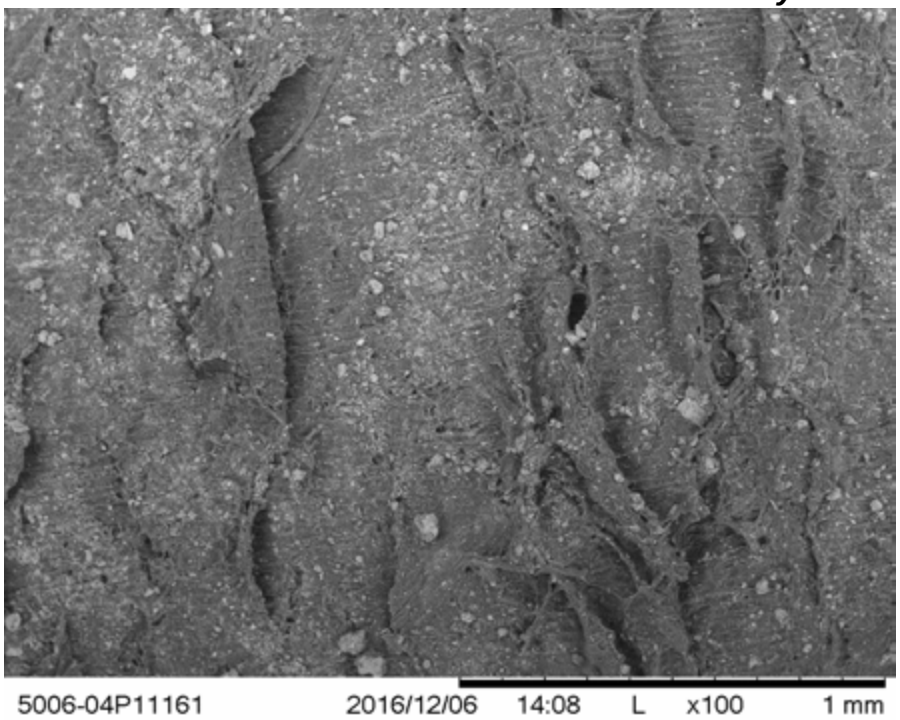
***Tropaeolum tuberosum* (Mashua)**

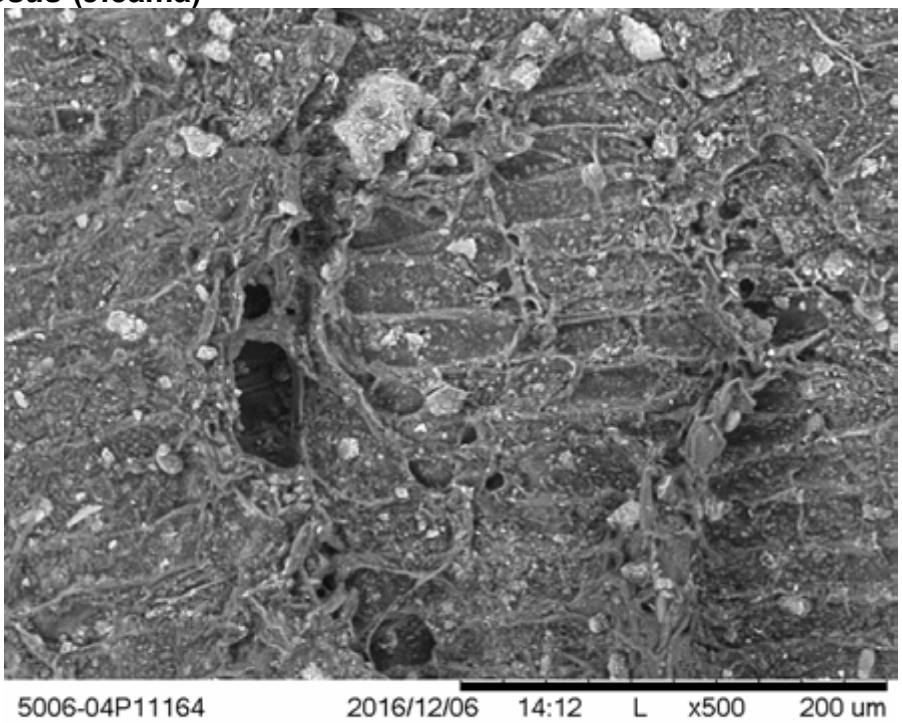




Exterior Surface Texture – Charred at 250^{o} (100x and 500x)

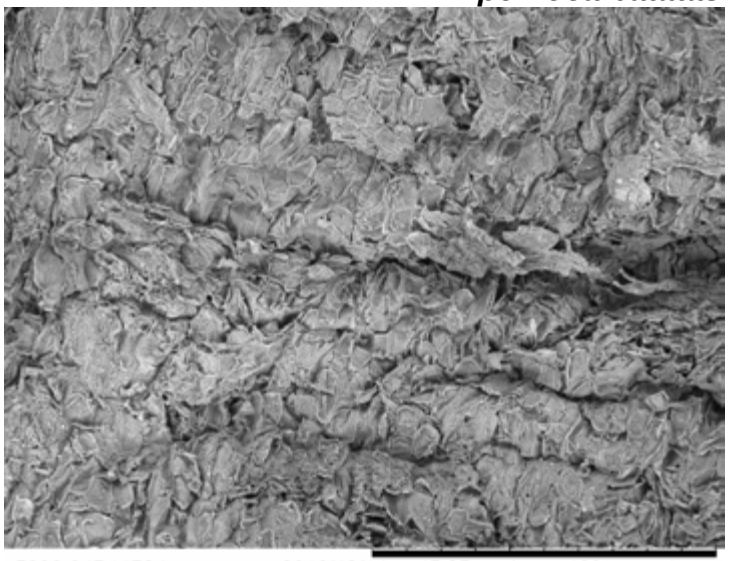
***Pachyrhizus erosus* (Jicama)**

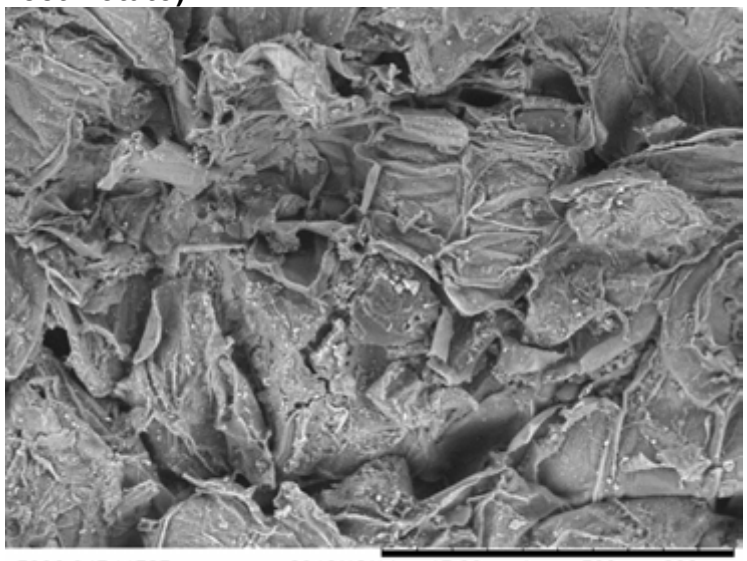




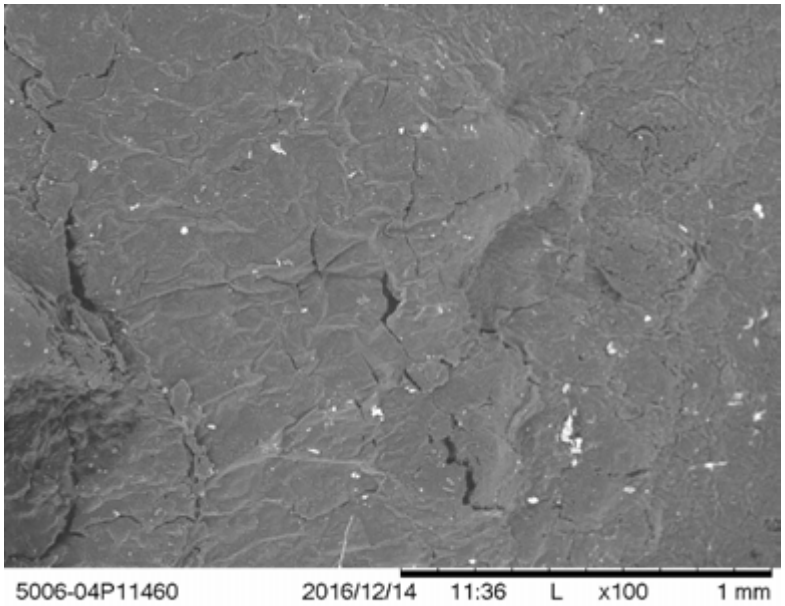
Exterior Surface Texture – Fresh Samples (100x and 500x)

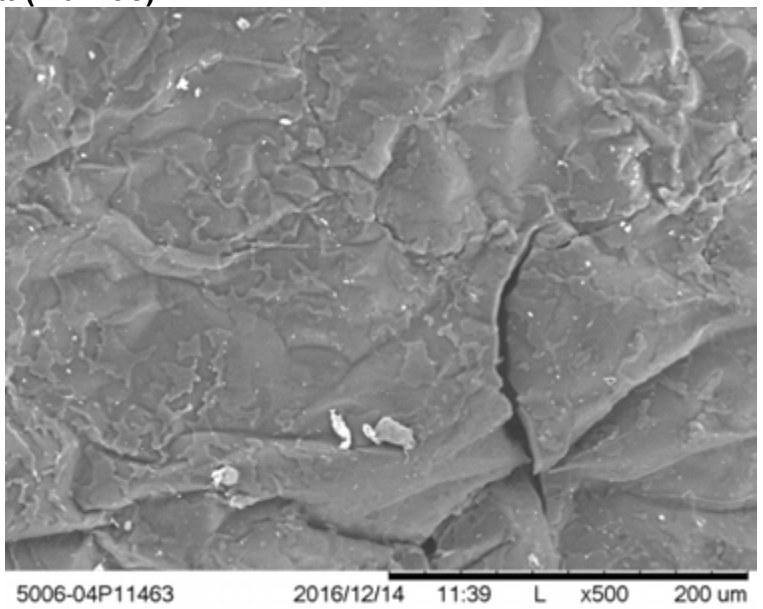
***Ipomoea batatas* (Sweet Potato)**





***Manihot esculenta* (Manioc)**





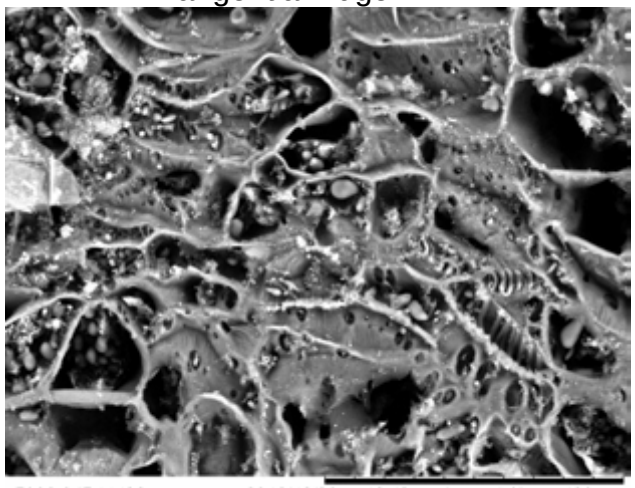
Diagnostic Feature Comparisons:

Xylem Wall Pitting

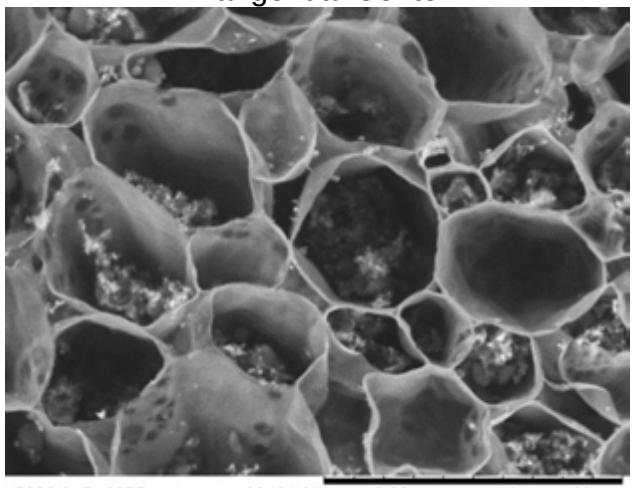
Xylem Wall Pitting Fresh Specimen 1000x

Lepidium meyenii (Maca)

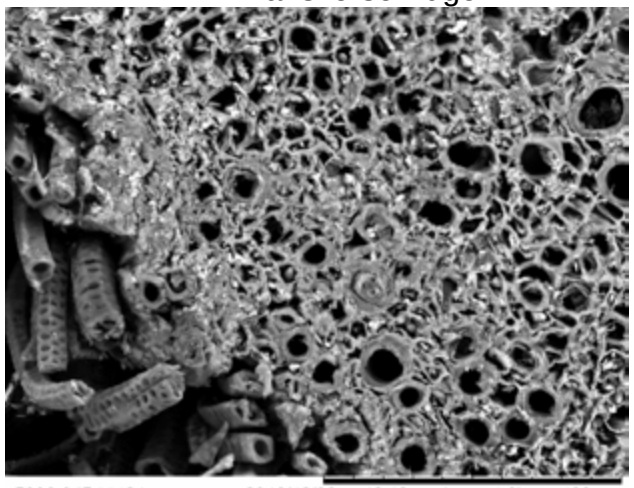
Tangential Edge



Tangential Center

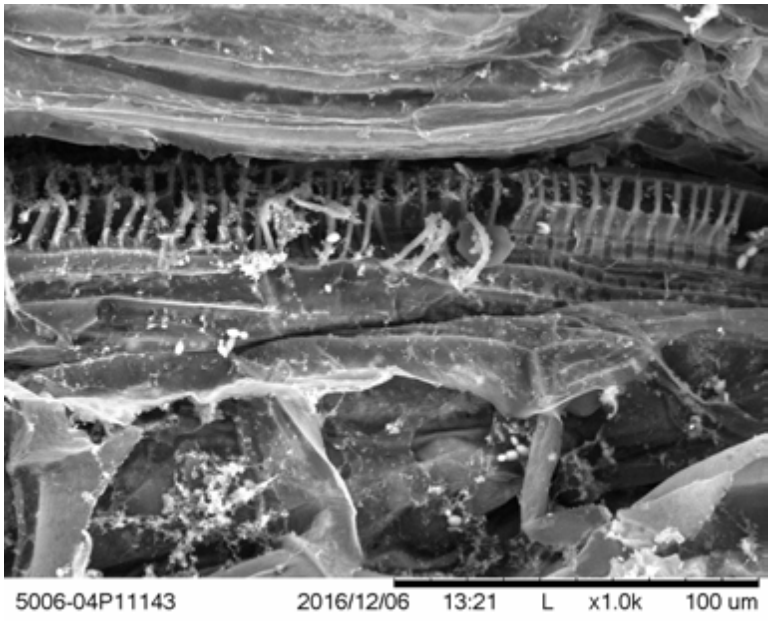


Transverse Edge

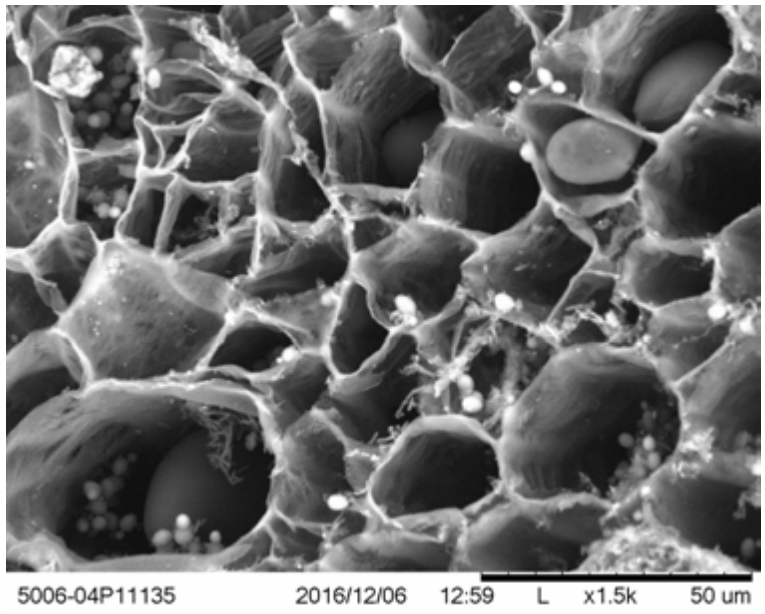


Oxalis tuberosa (Oca)

Radial



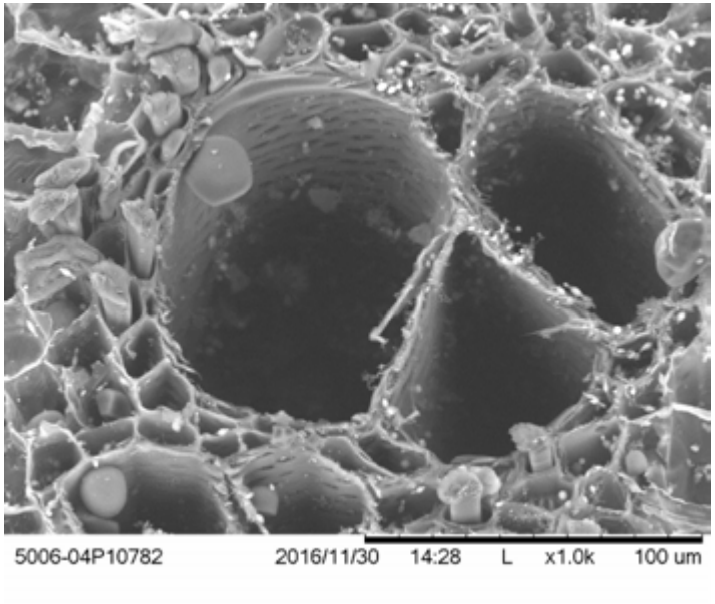
Transverse Edge



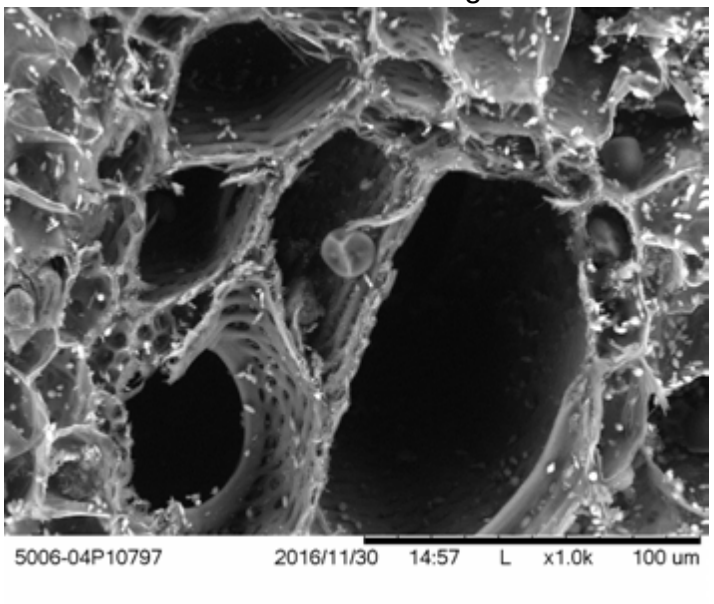
Xylem Wall Pitting Fresh Specimen 1000x

***Pachyrhizus erosus* (Jicama)**

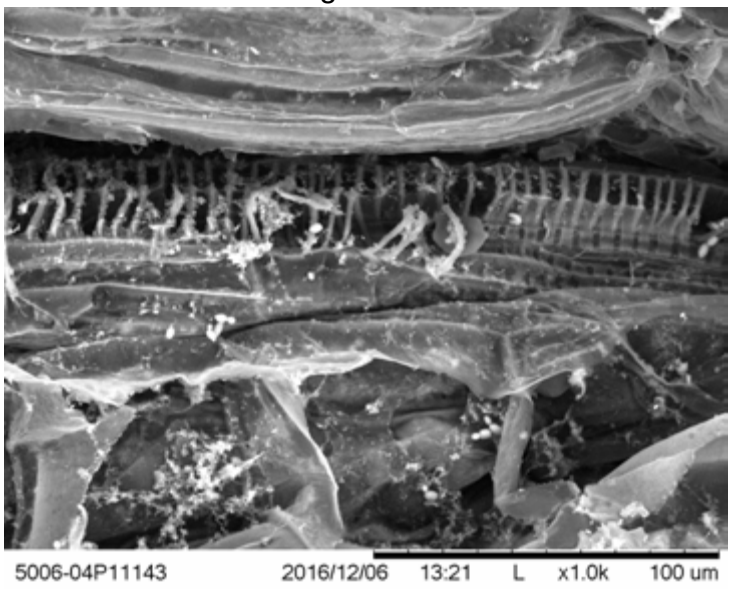
Transverse Center



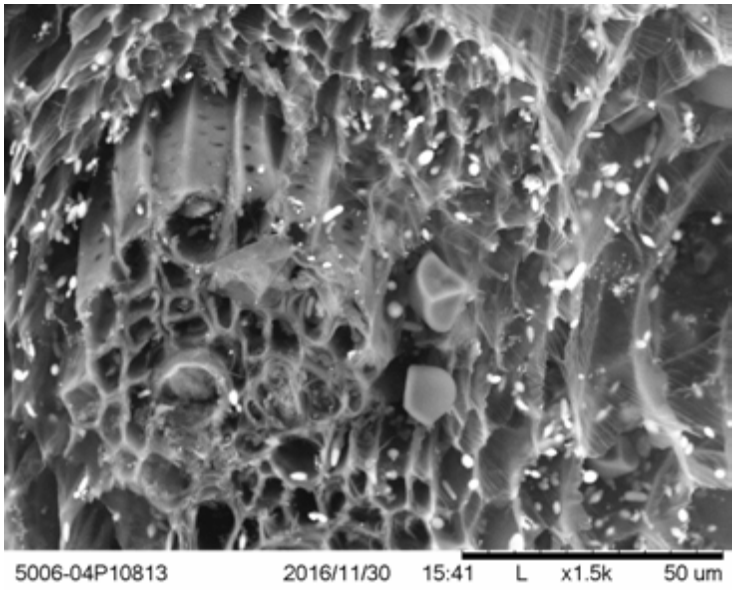
Transverse Edge



Tangential Center



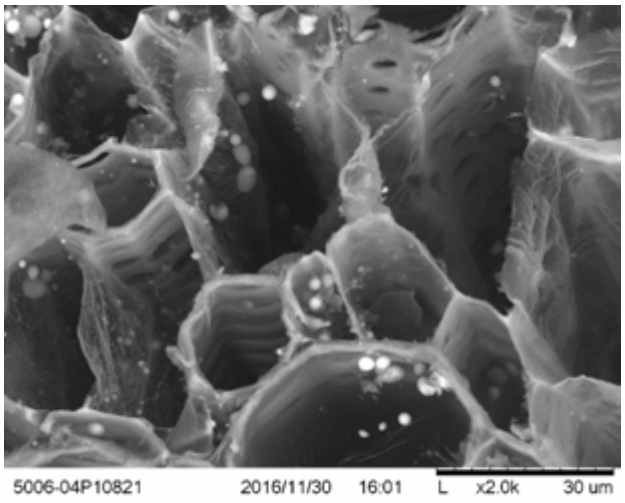
Radial



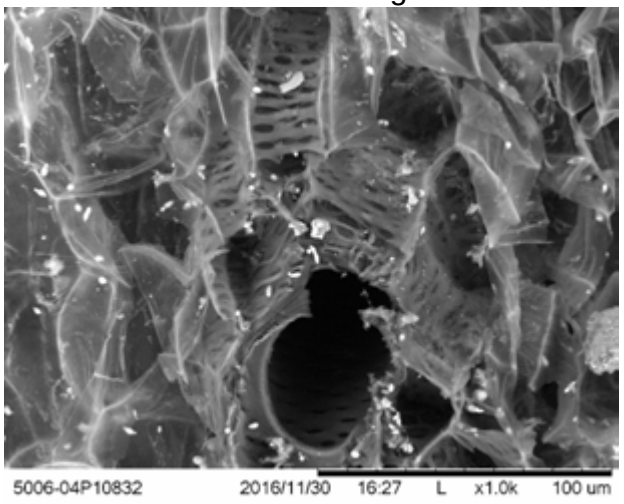
Xylem Wall Pitting Fresh Specimen 1000x – 2000x

***Smallanthus sonchifolius* (Yacon)**

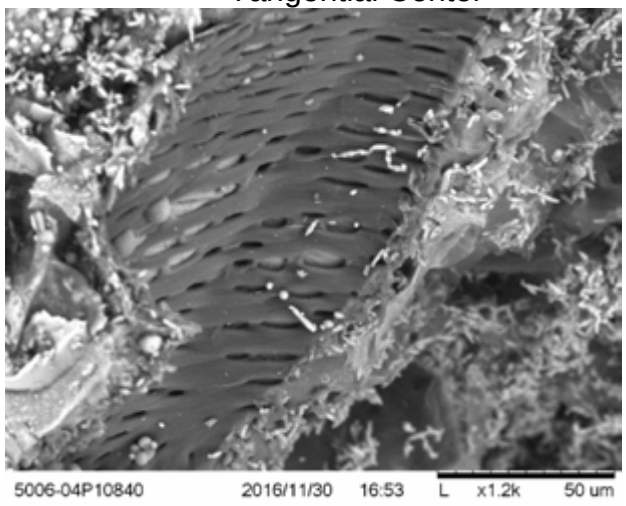
Transverse Center



Transverde Edge

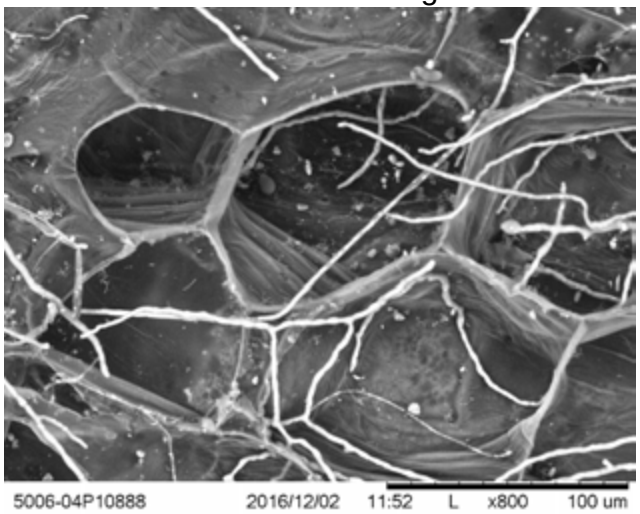


Tangential Center

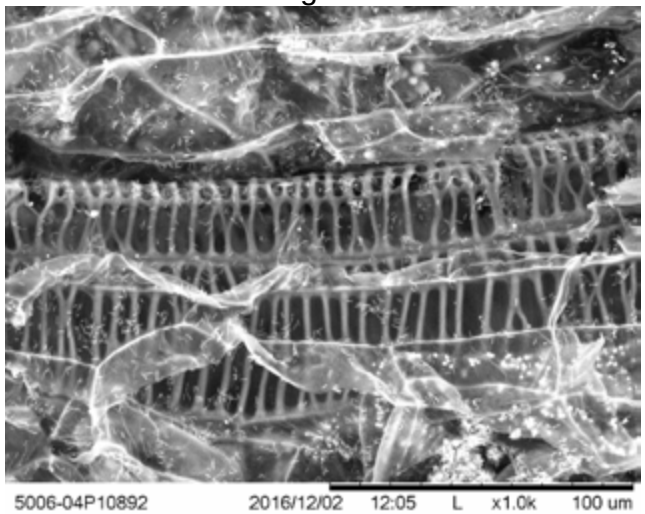


***Solanum* (Potato)**

Transverse Edge



Tangential Center



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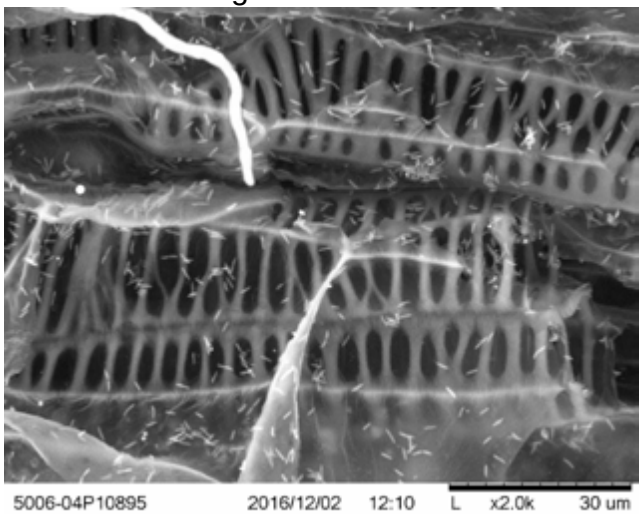
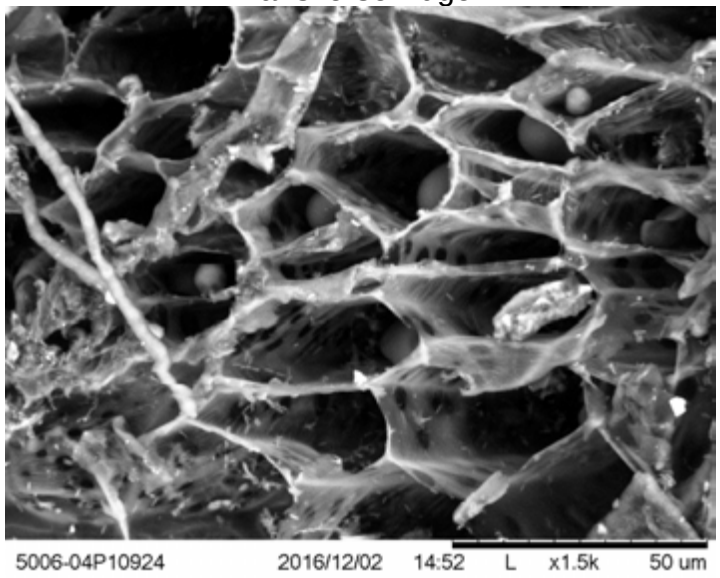


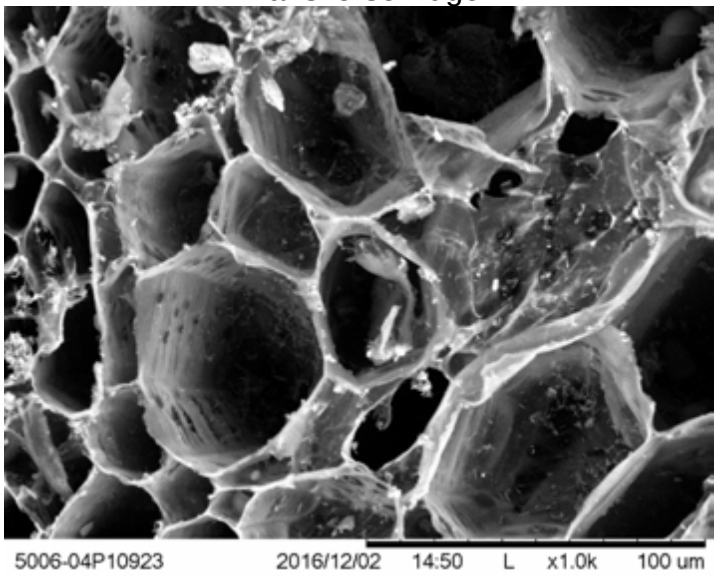
Xylem Wall Pitting **Fresh Specimen** **1000x – 1500x**

***Tropaeolum tuberosum* (Mashua)**

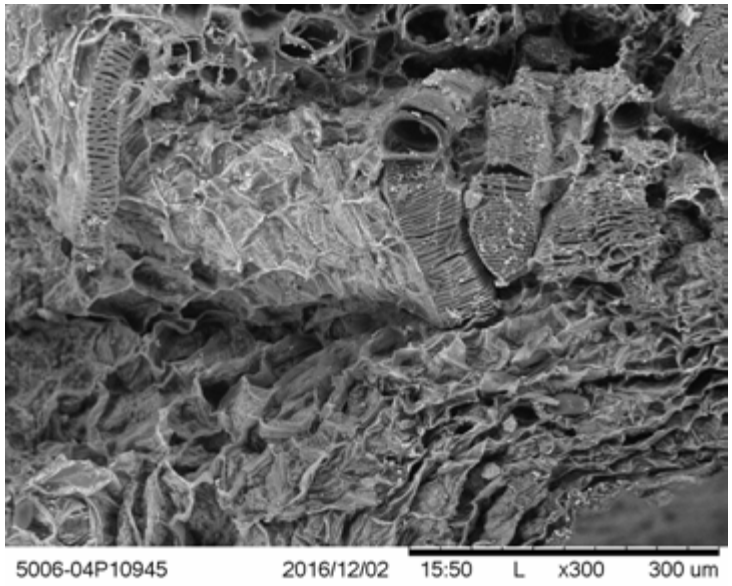
Transverse Edge



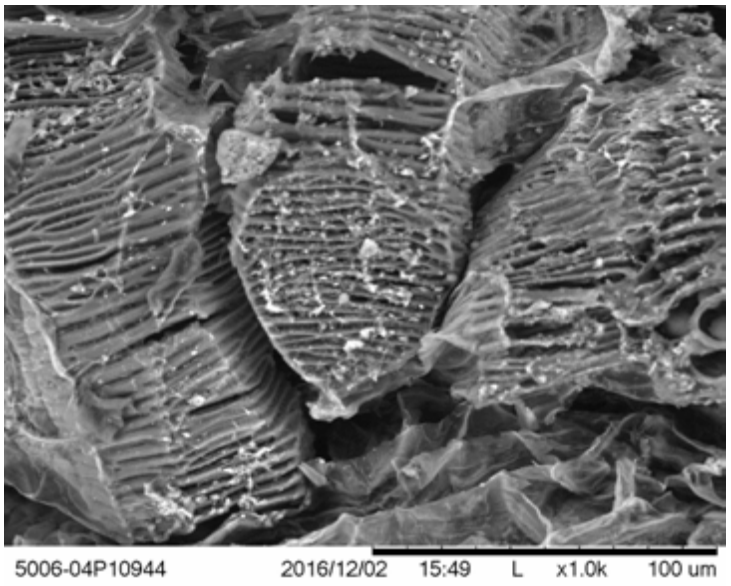
Transverse Edge



Radial



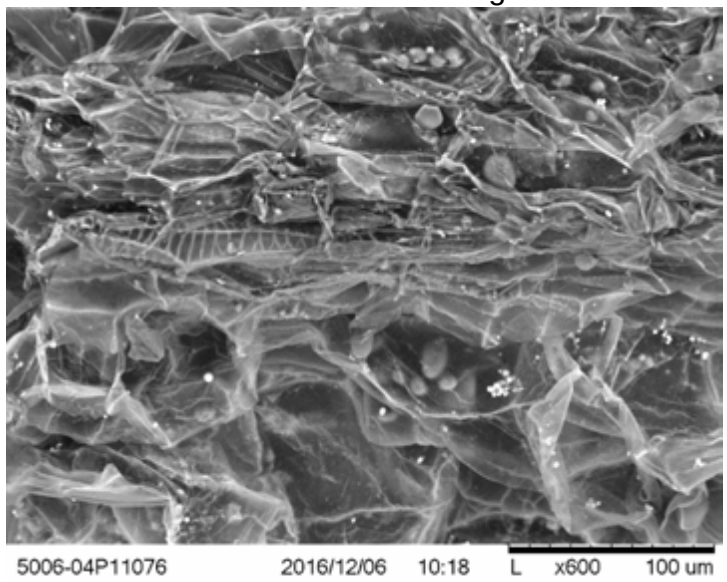
Radial



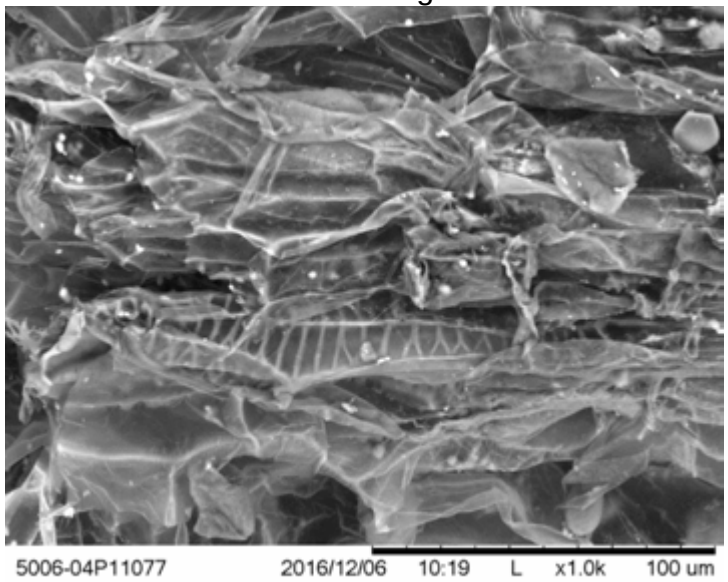
Xylem Wall Pitting Fresh Specimen 1000x

***Ullucus tuberosus* (Papalisa)**

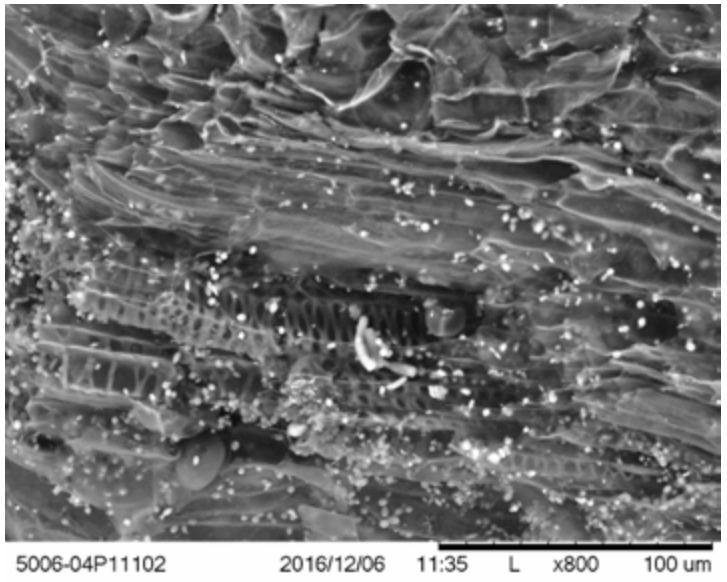
Transverse Edge



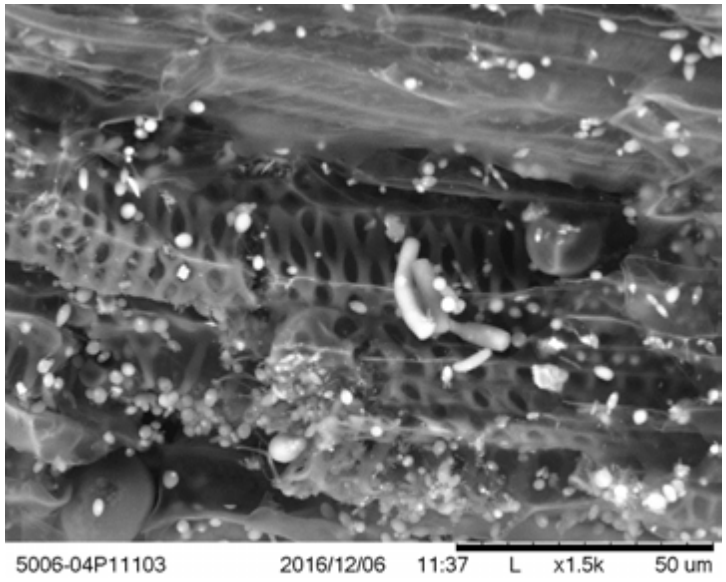
Transverse Edge



Radial



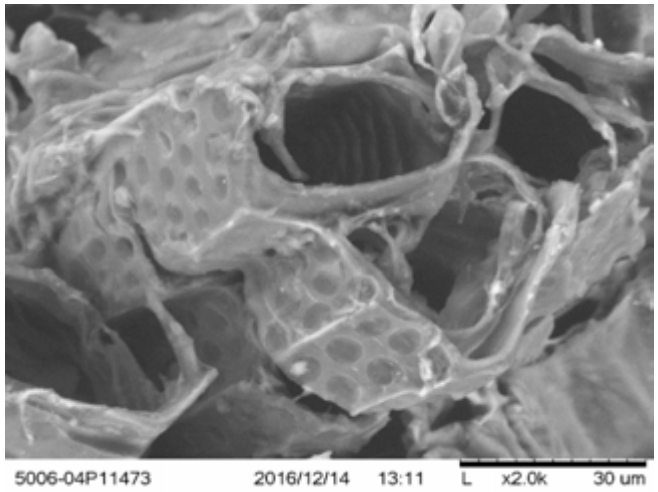
Radial



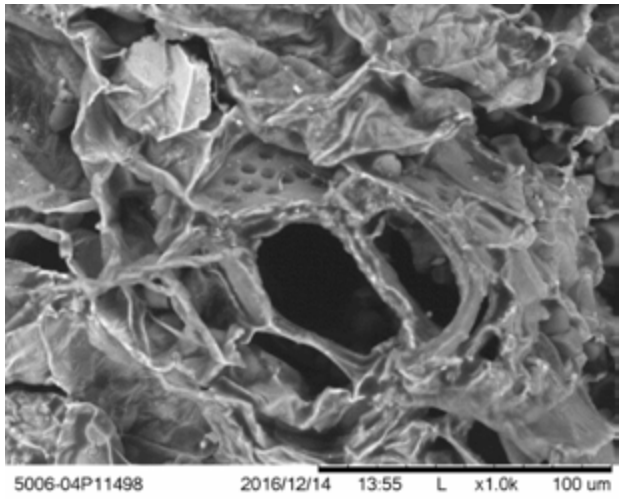
Xylem Wall Pitting Fresh Specimen 1000x – 2000x

***Ipomoea batatas* (Sweet Potato)**

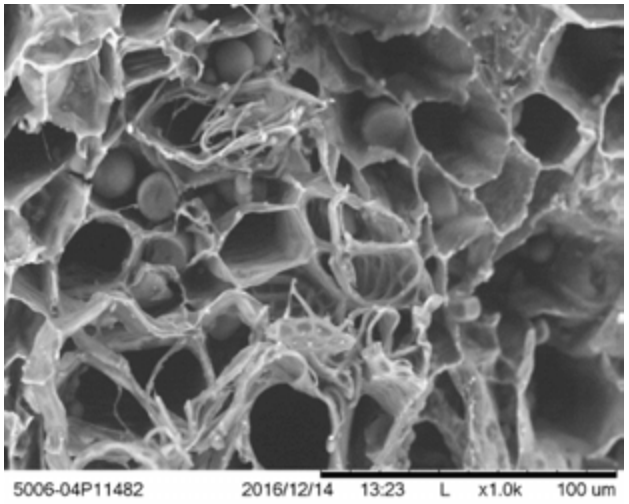
Transverse Center



Transverde Edge

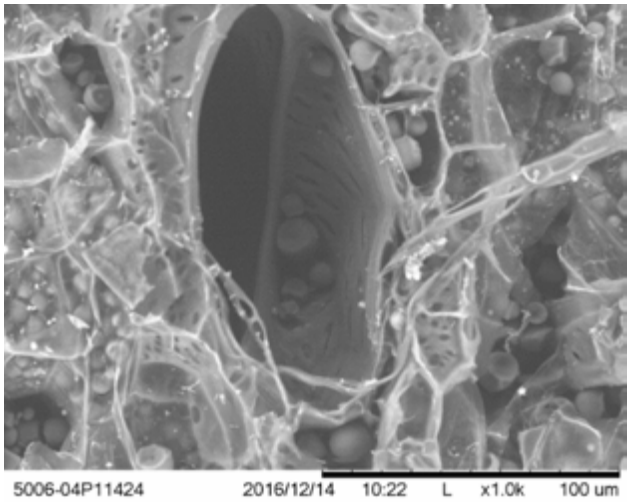


Tansverse Center

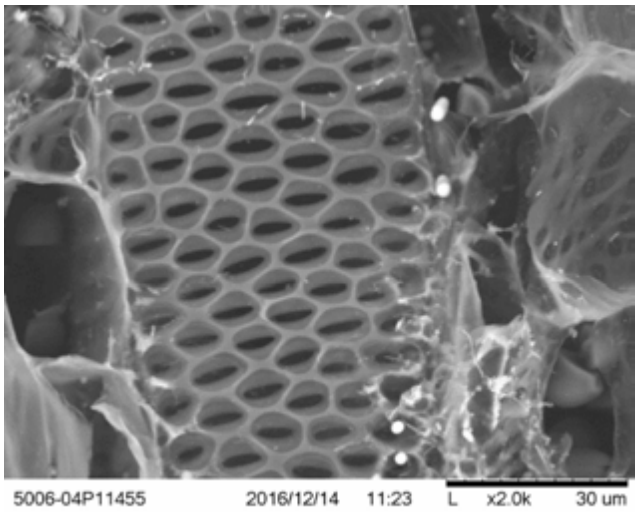


***Manihot esculenta* (Manioc)**

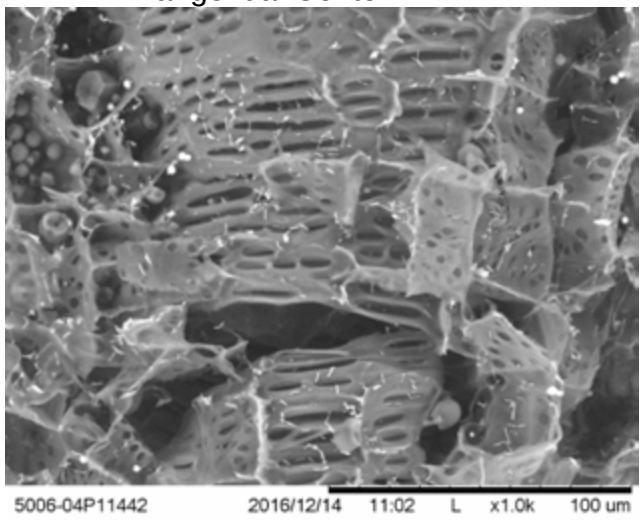
Transverse Center



Radial



Tangential Center



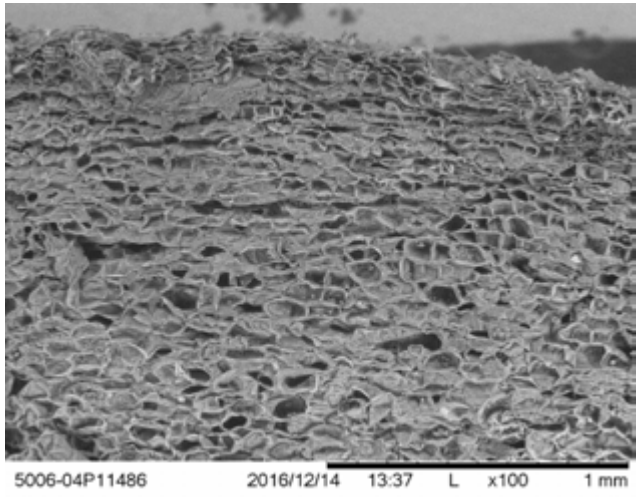
Diagnostic Feature Comparisons:

Periderm Thickness

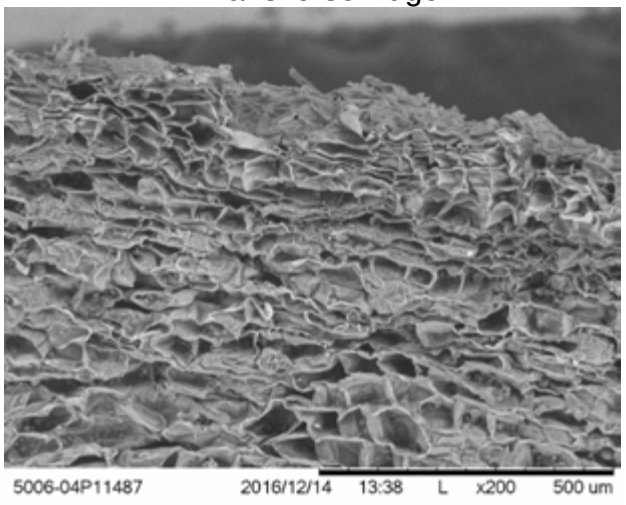
Periderm Thickness Fresh Specimen

***Ipomoea batatas* (Sweet Potato)**

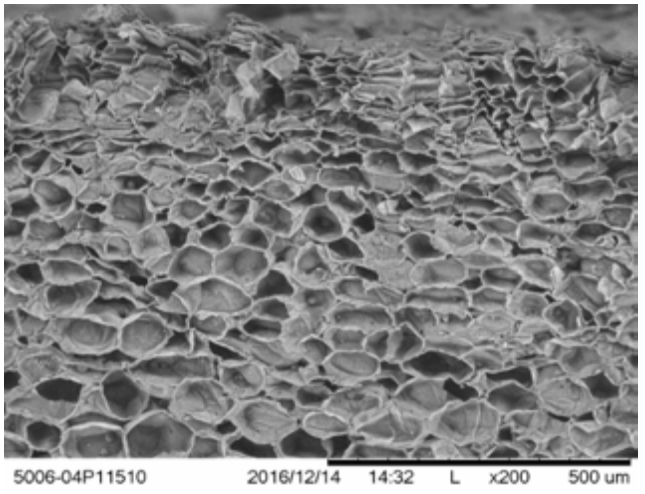
Transverse Edge



Transverse Edge

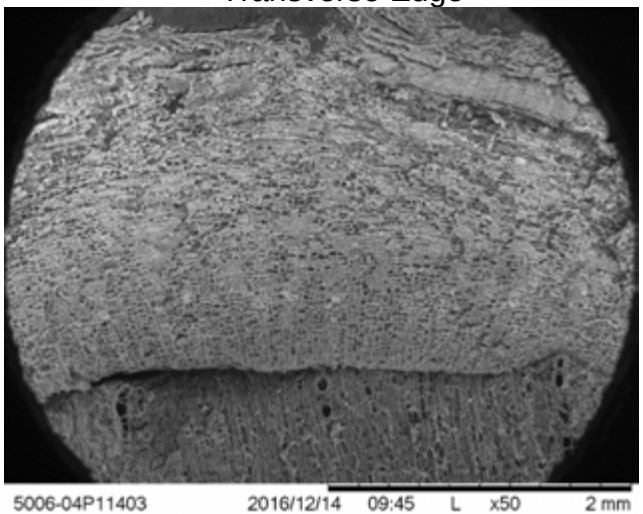


Tangential Edge

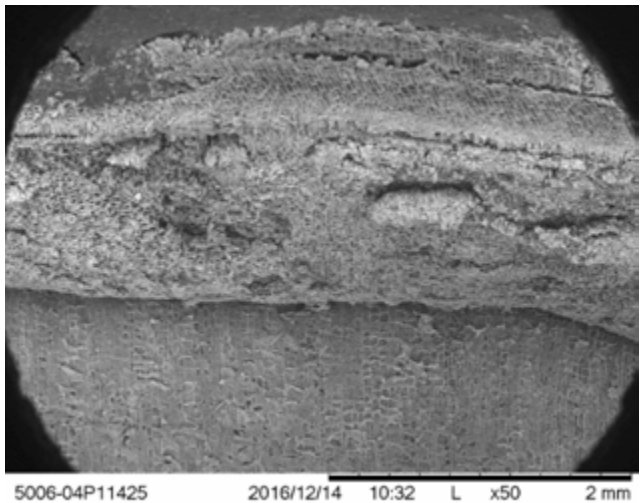


***Manihot esculenta* (Manioc)**

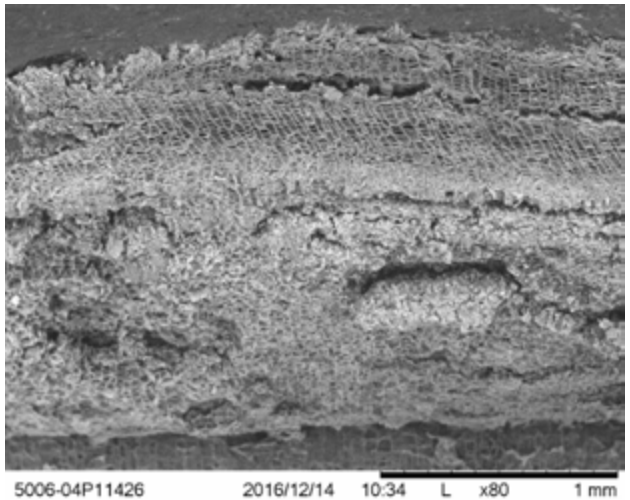
Transverse Edge



Tangential Edge



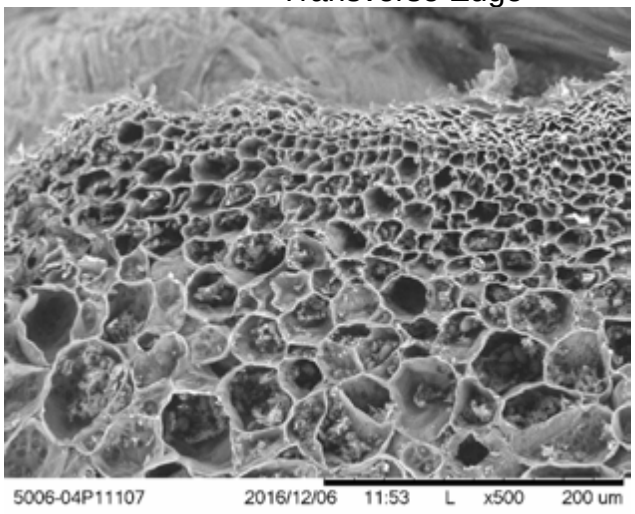
Tangential Edge



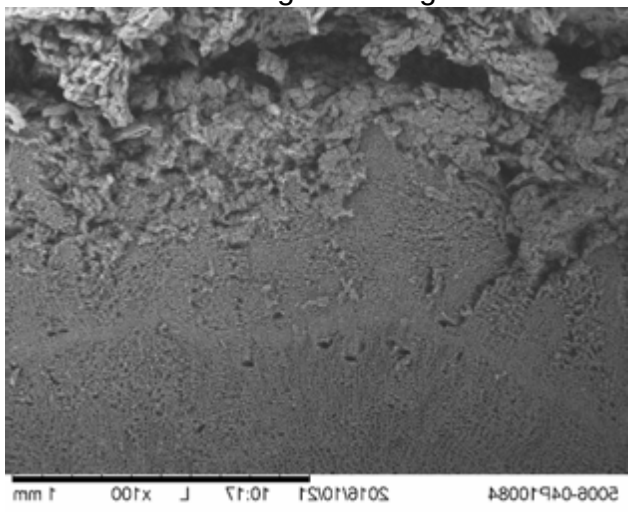
Periderm Thickness Fresh Specimen

Lepidium meyenii (Maca)

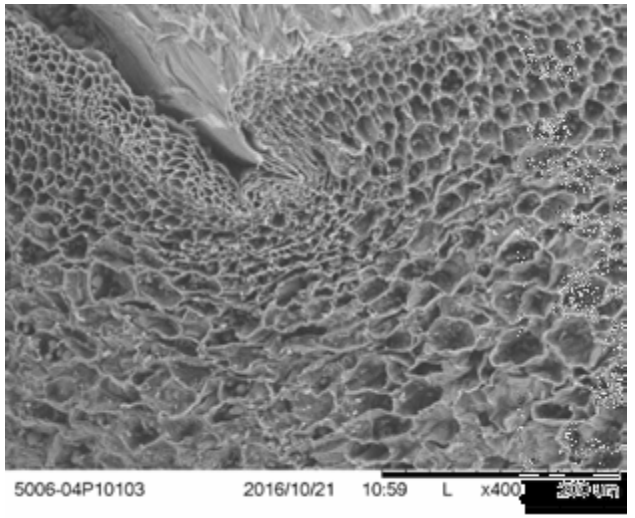
Transverse Edge



Tangential Edge

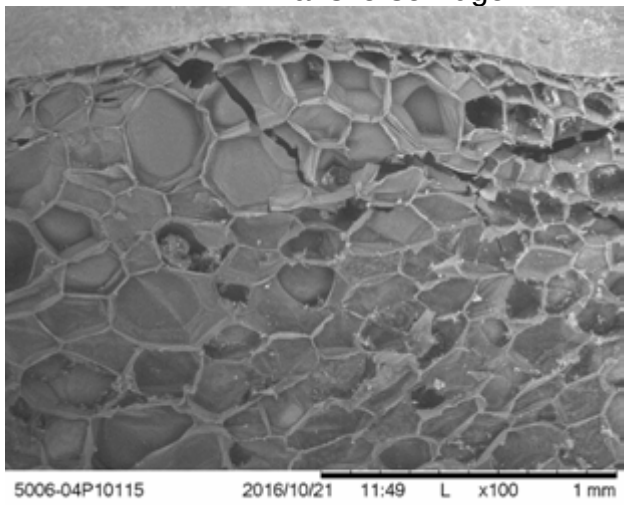


Radial

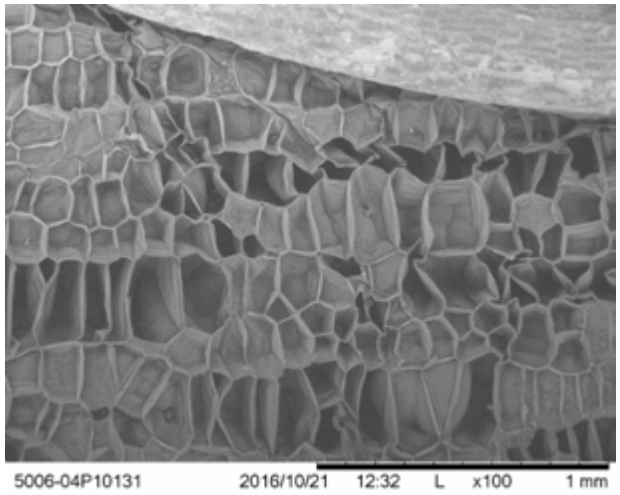


Oxalis tuberosa (Oca)

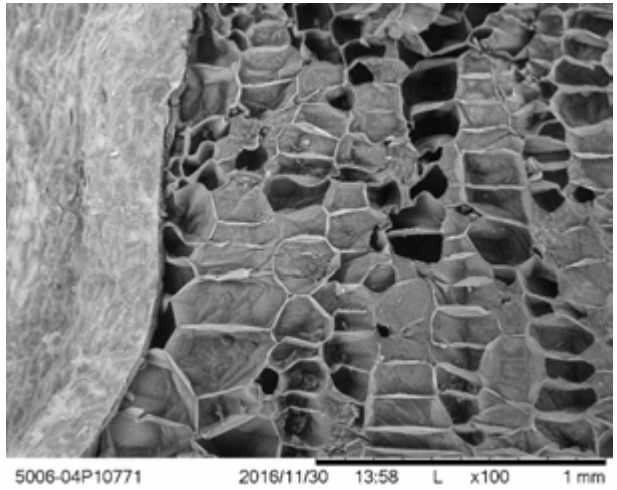
Transverse Edge



Tangential Edge



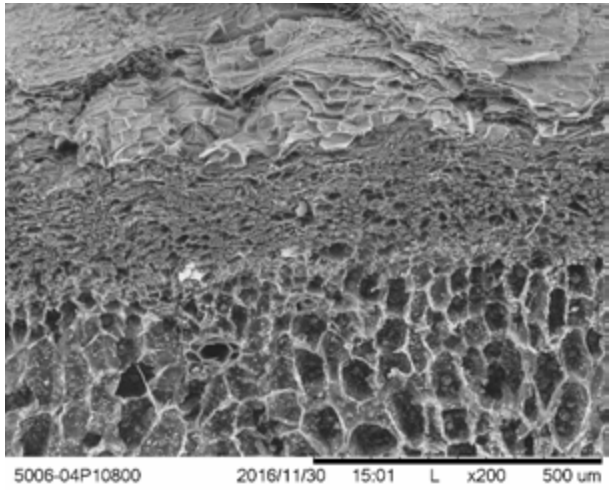
Radial



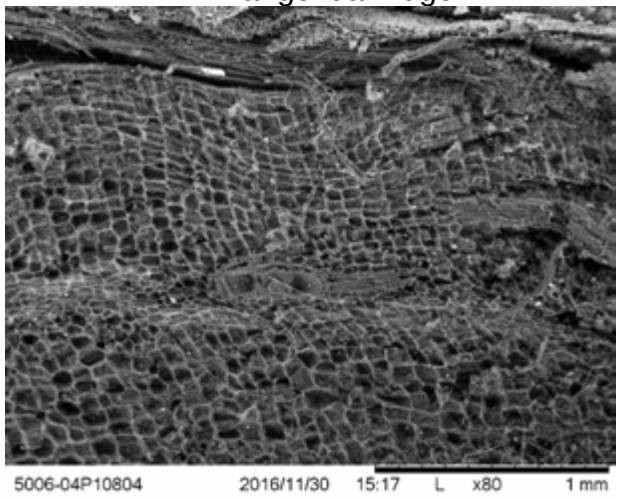
Periderm Thickness Fresh Specimen

Pachyrhizus erosus (Jicama)

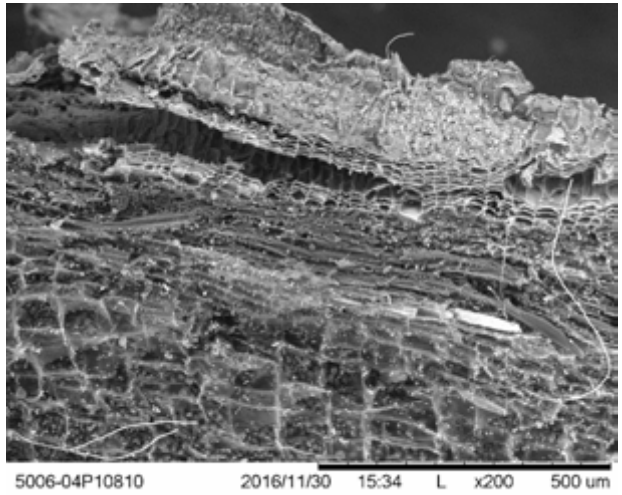
Transverse Edge



Tangential Edge

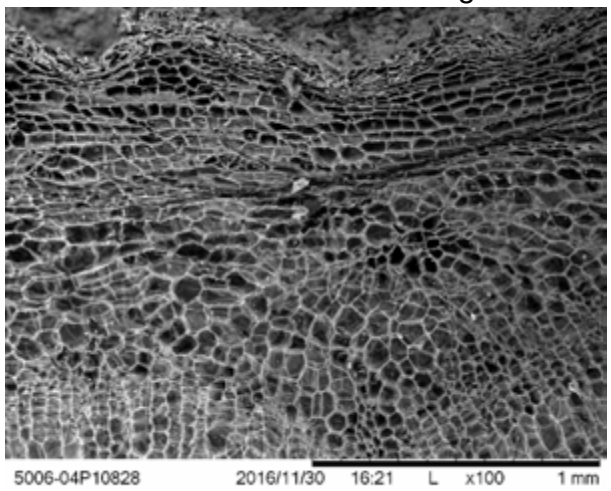


Radial

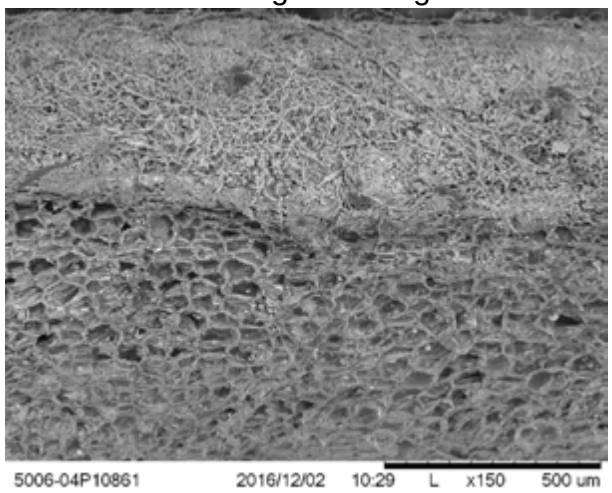


Smallanthus sonchifolius (Yacon)

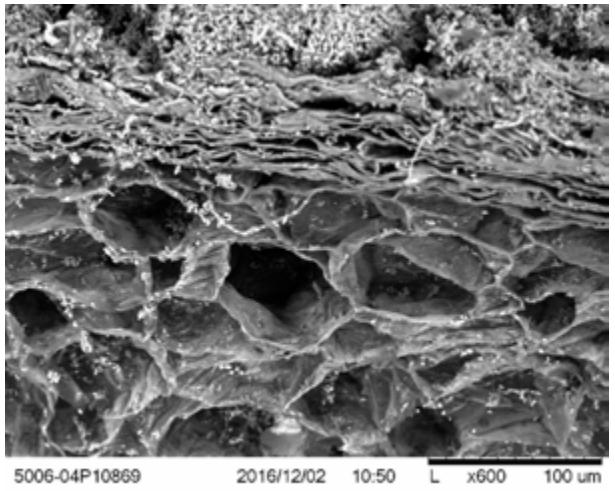
Transverse Edge



Tangential Edge



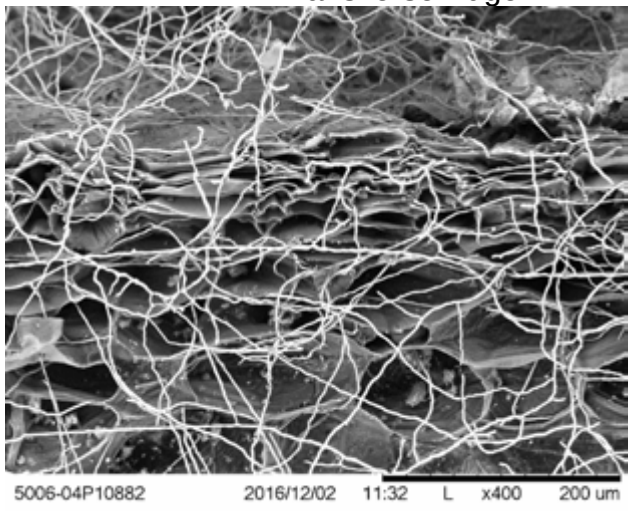
Radial



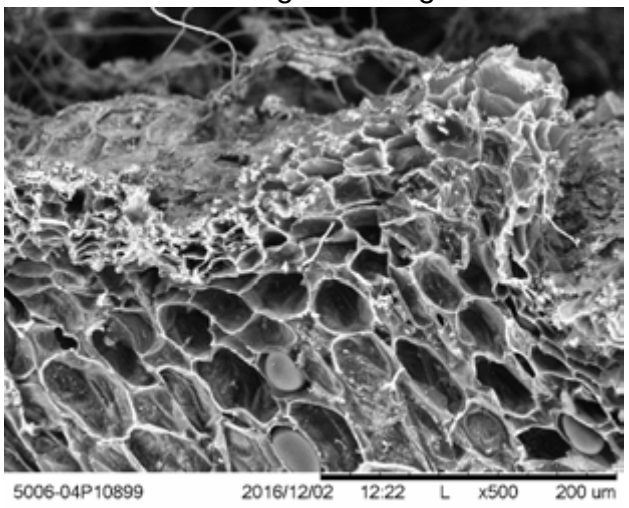
Periderm Thickness Fresh Specimen

Solanum (Potato)

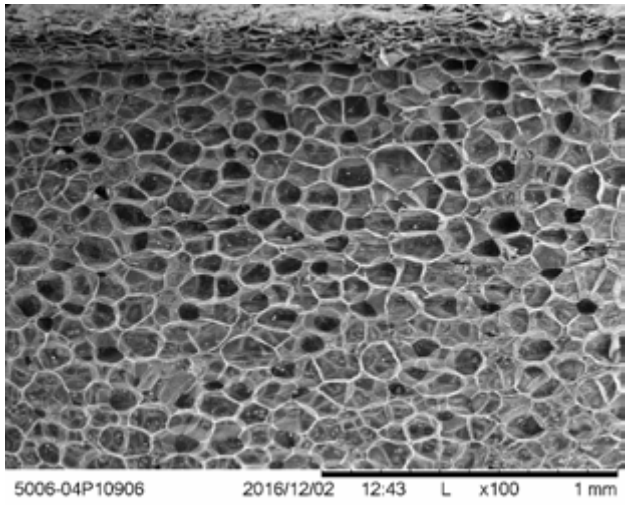
Transverse Edge



Tangential Edge

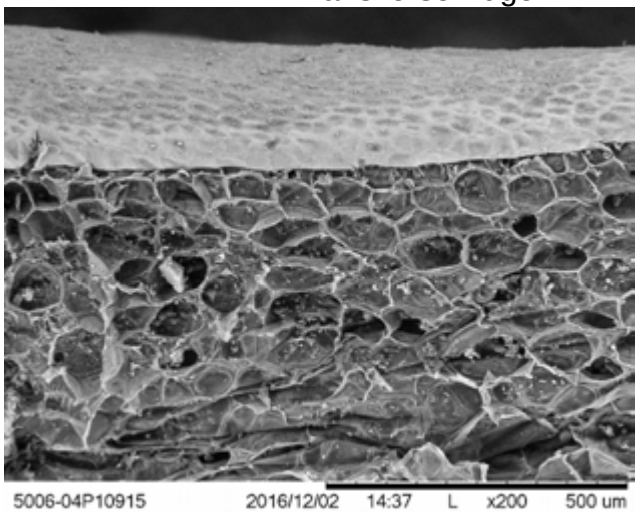


Radial

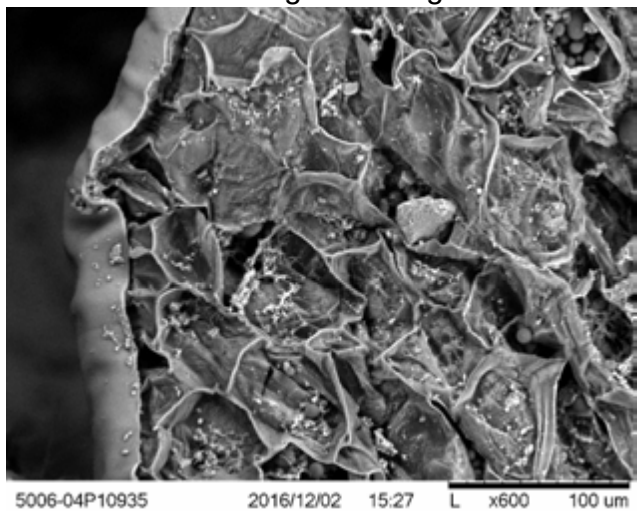


Tropaeolum tuberosum (Mashua)

Transverse Edge



Tangential Edge



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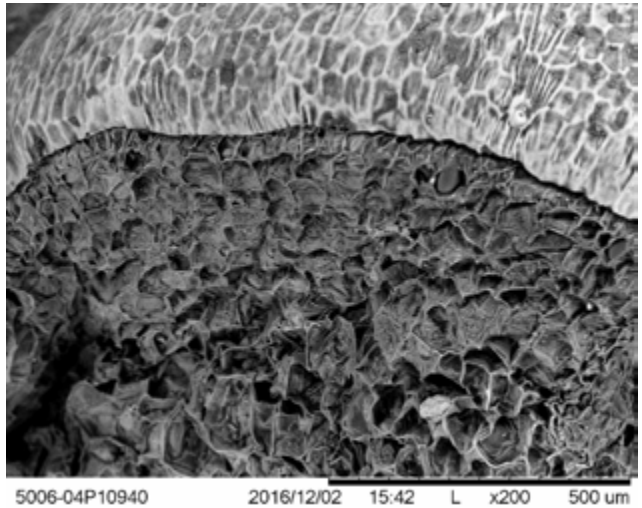
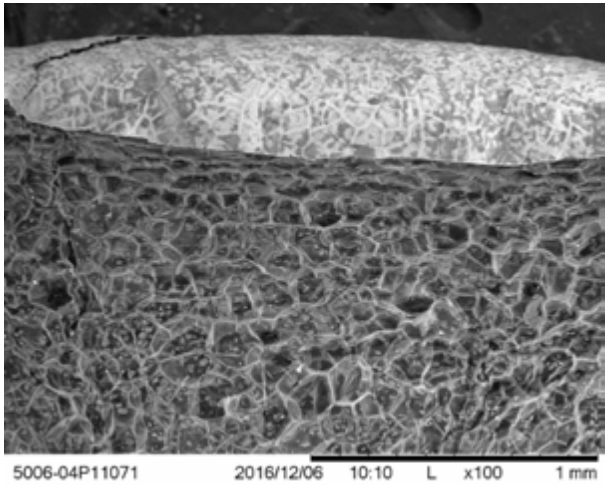


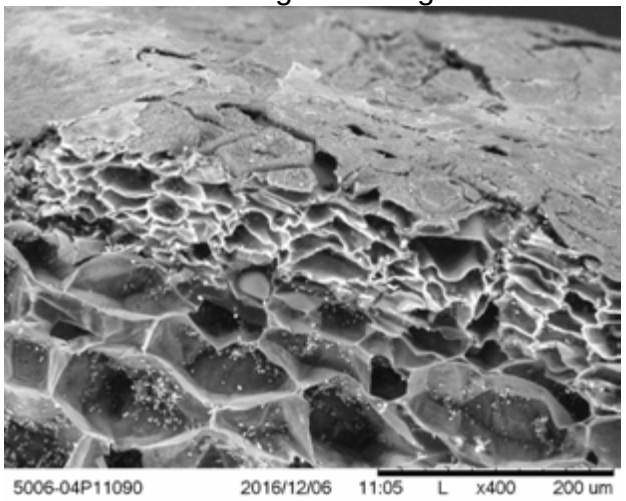
Periderm Thickness Fresh Specimen

Ullucus tuberosus (Papalisa)

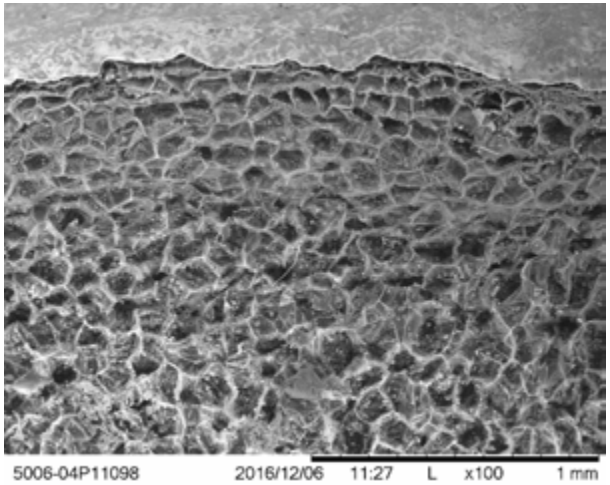
Transverse Edge



Tangential Edge



Radial



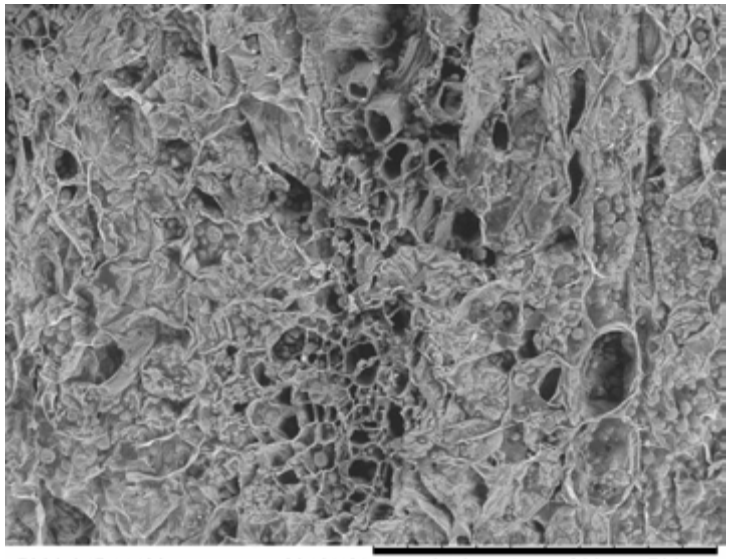
Diagnostic Feature Comparisons:

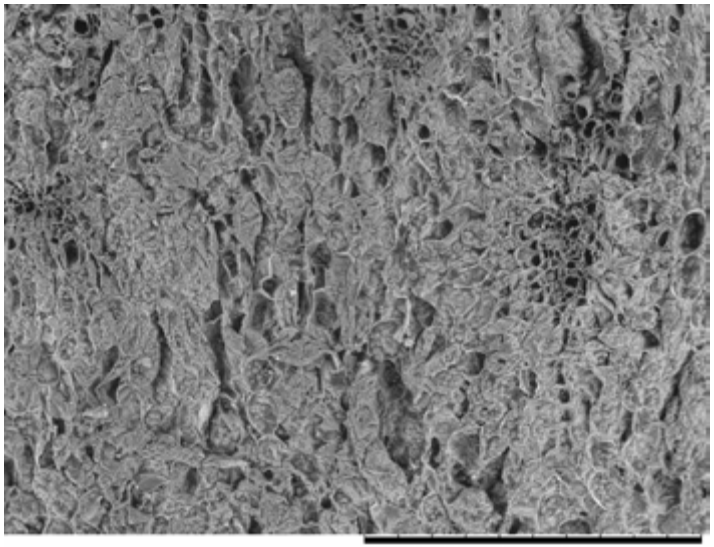
Xylem/Phloem Arrangement

Xylem/Phloem Arrangement Fresh Specimen

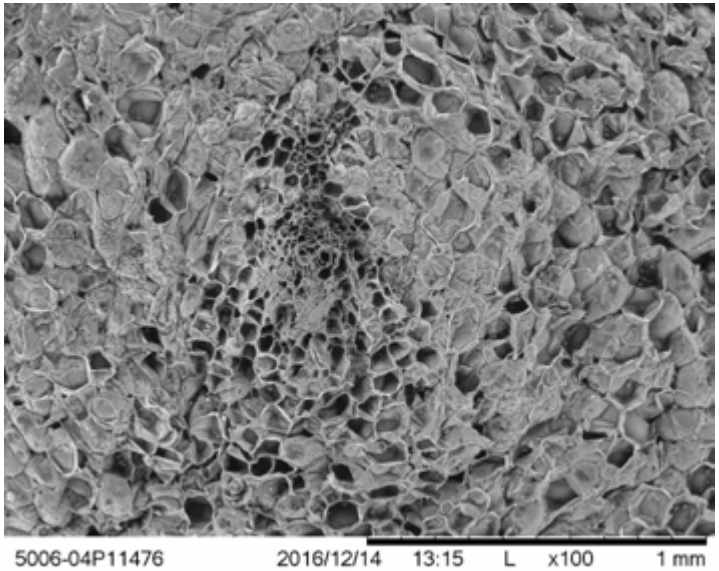
***Ipomoea batatas* (Sweet Potato)**

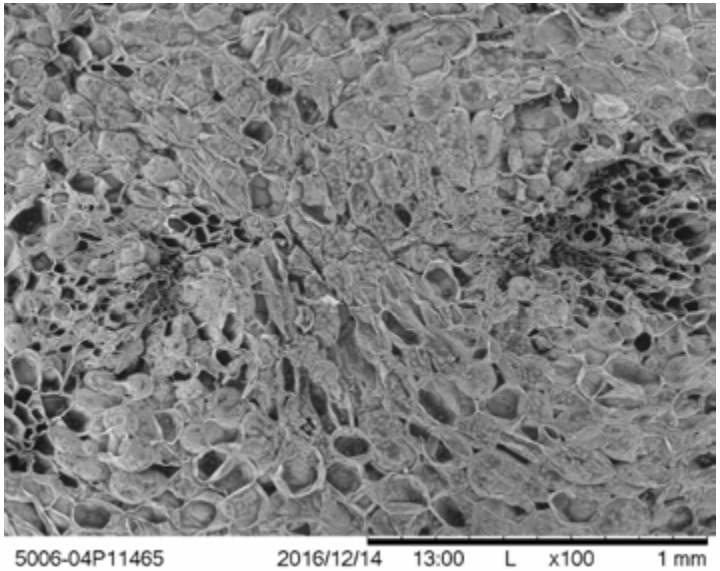
Transverse Edge





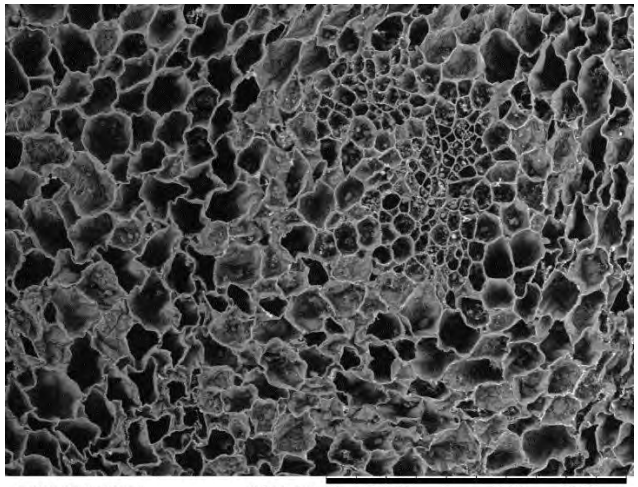
Transverse Center

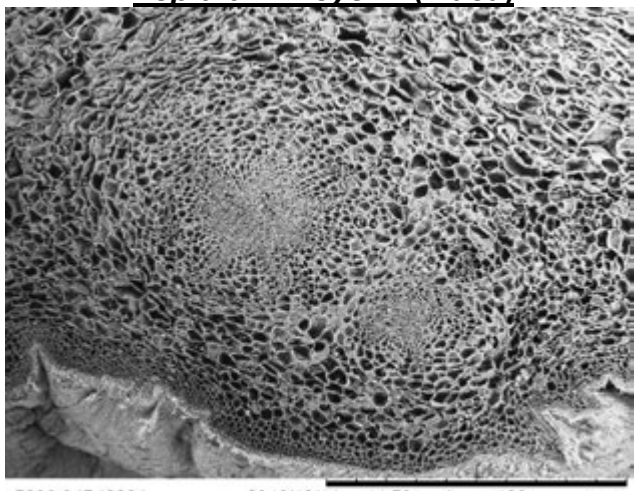


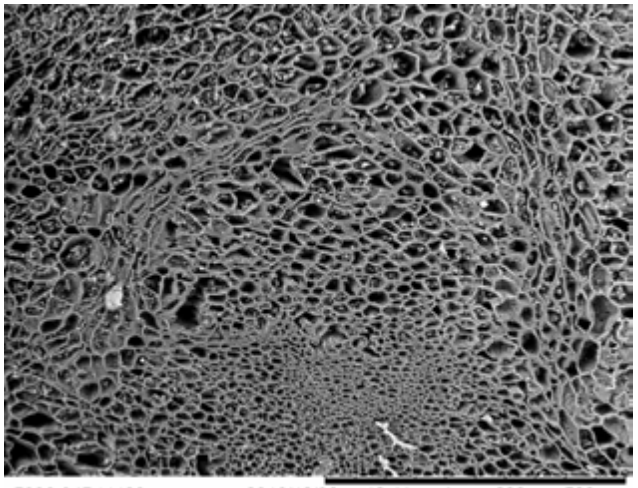


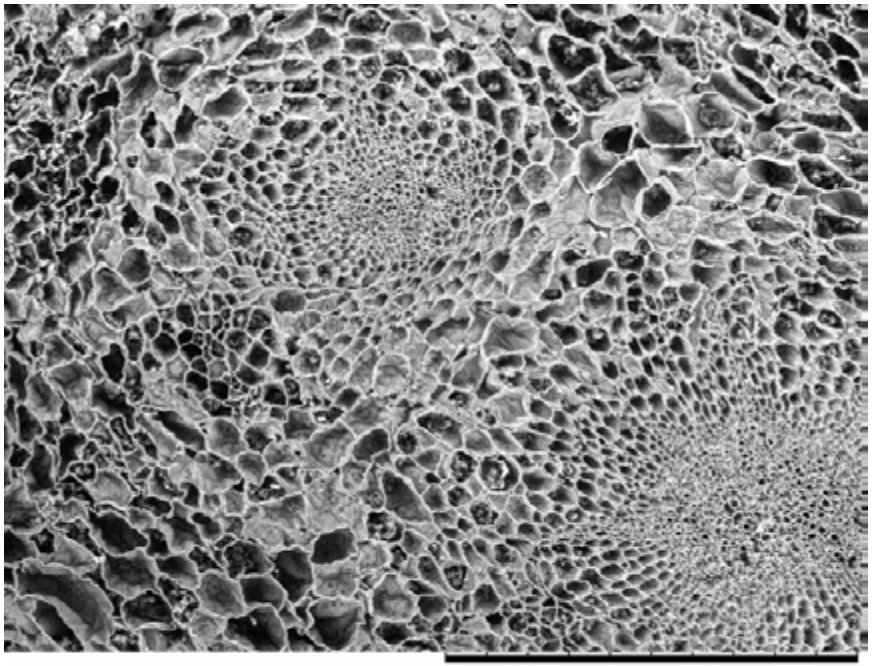
Xylem/Phloem Arrangement Fresh Specimen

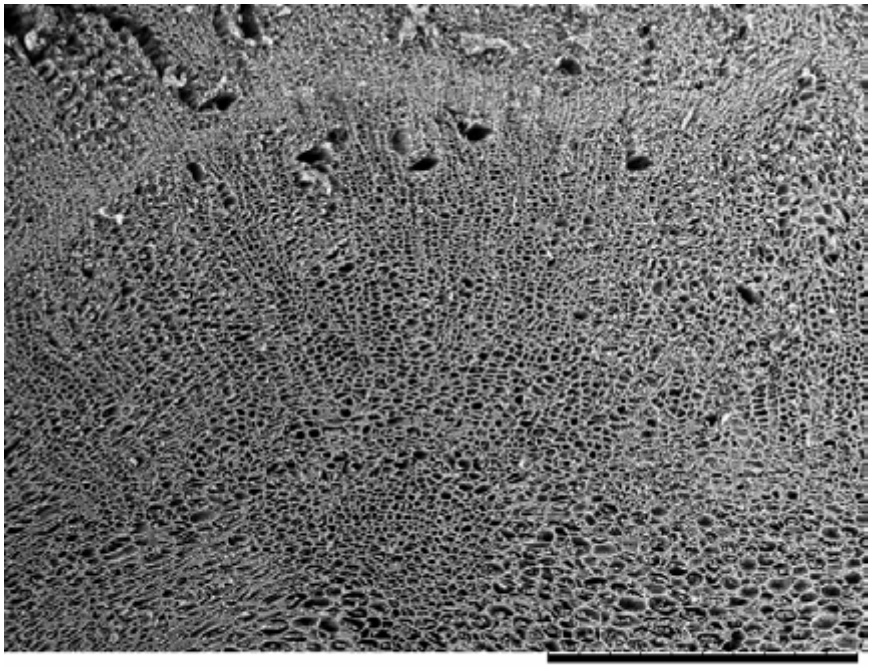
***Lepidium meyenii* (Maca)**







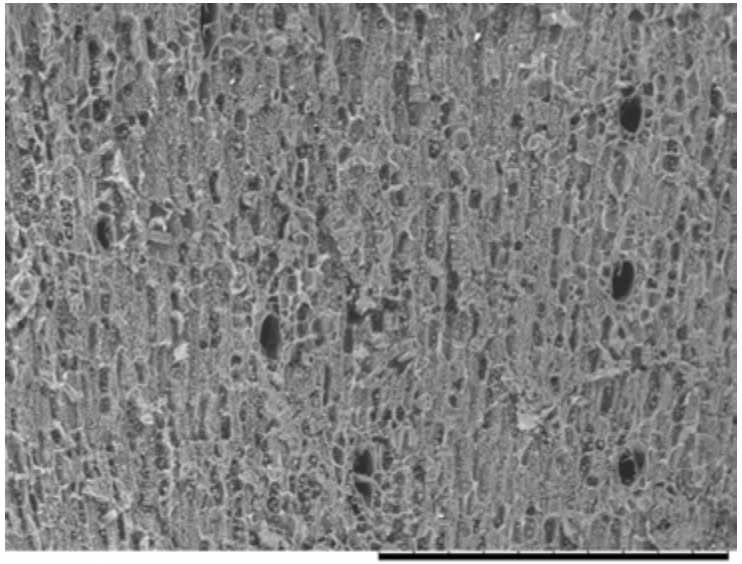


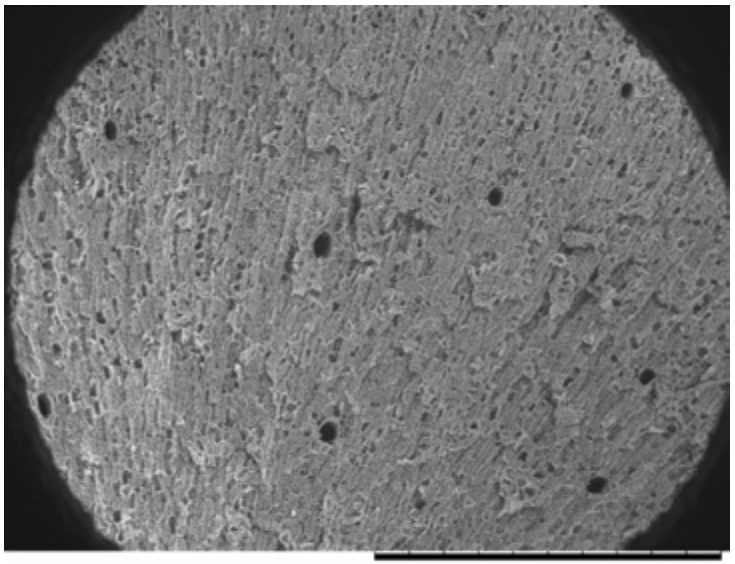


Xylem/Phloem Arrangement Fresh Specimen

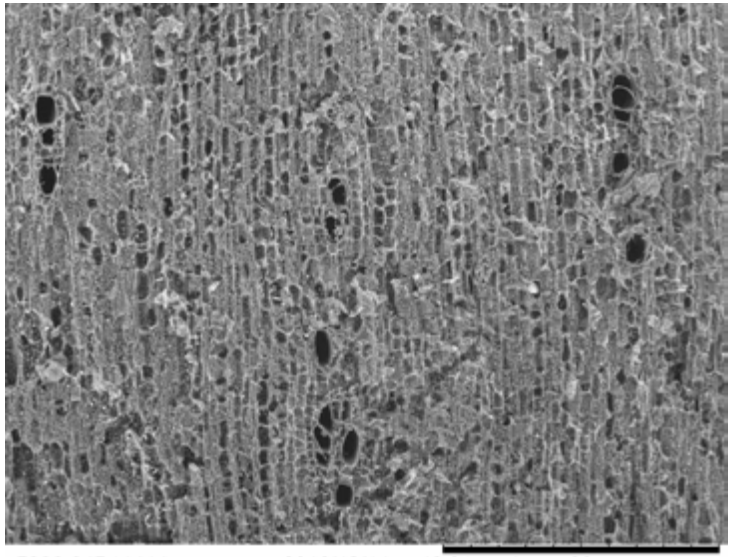
***Manihot esculenta* (Manioc)**

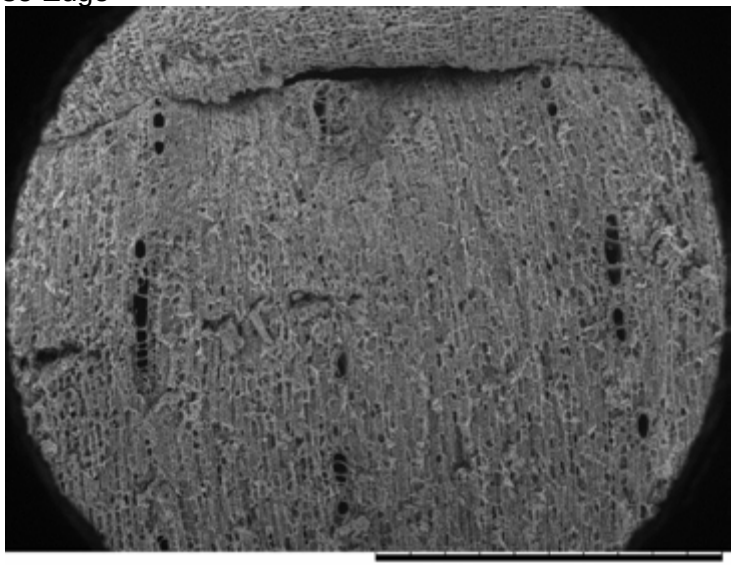
Transverse Center





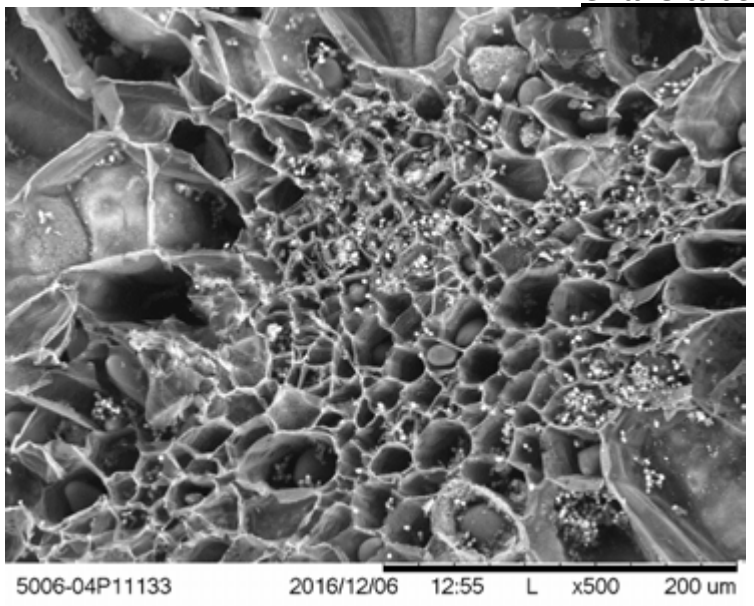
Transverse Edge

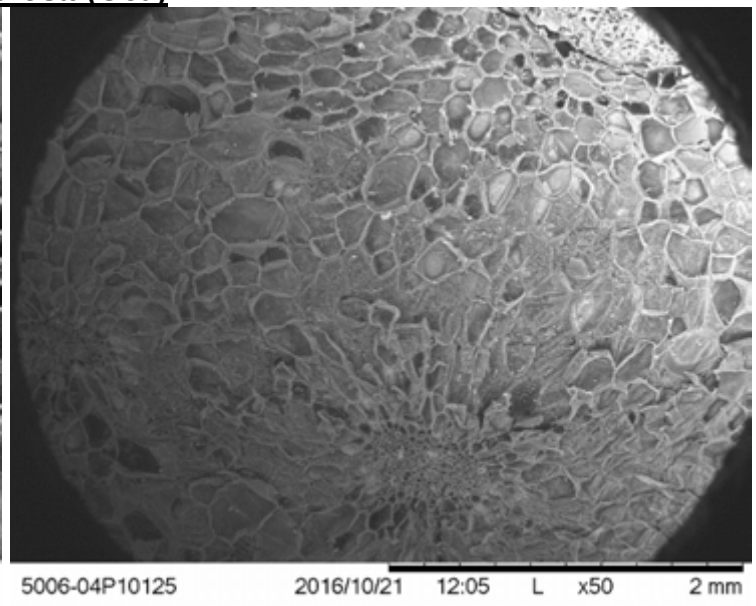


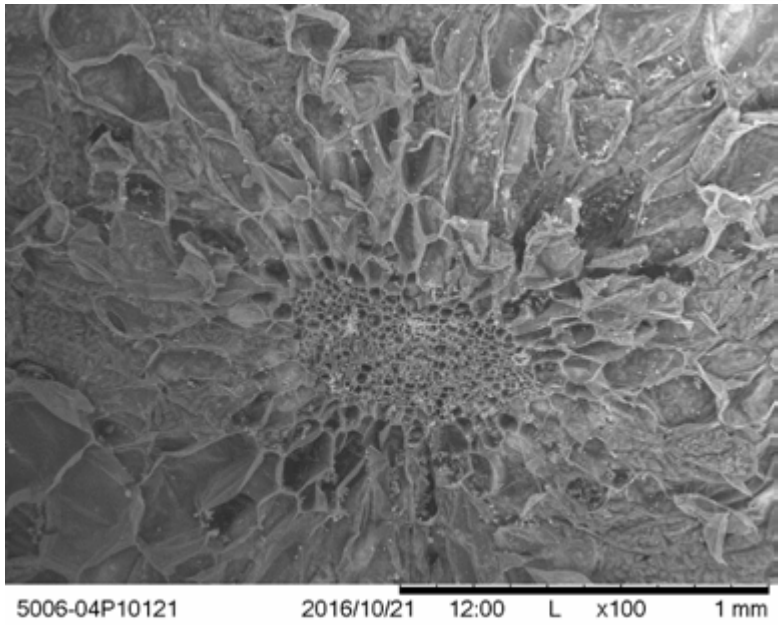


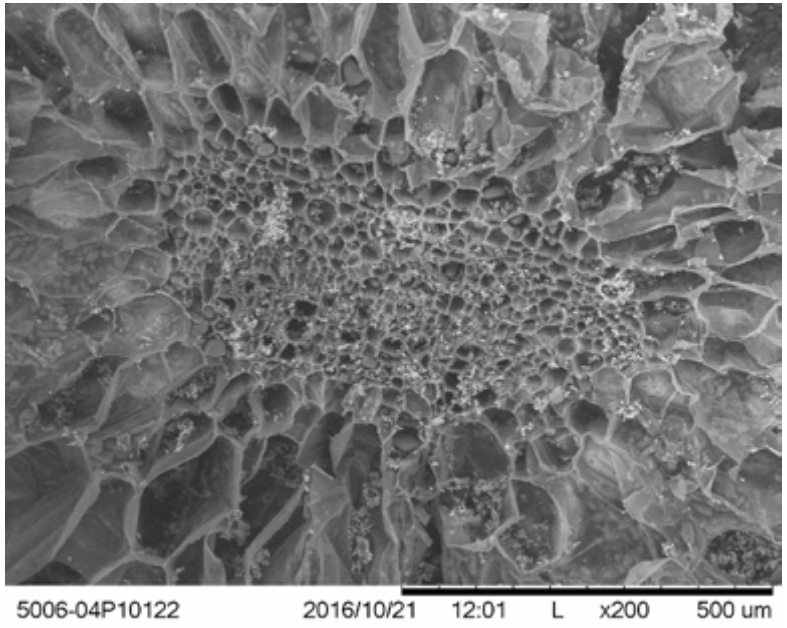
Xylem/Phloem Arrangement Fresh Specimen

***Oxalis tuberosa* (Oca)**



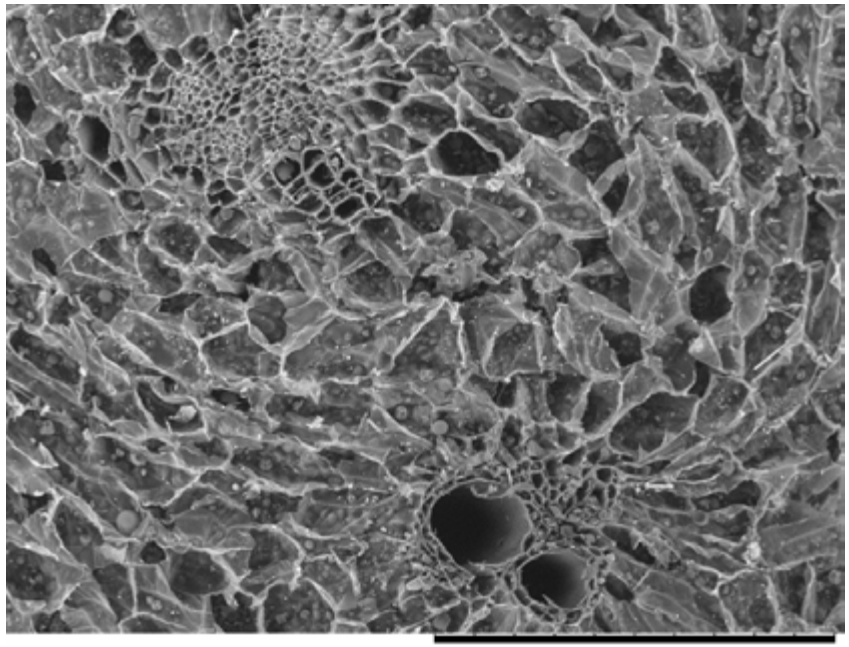


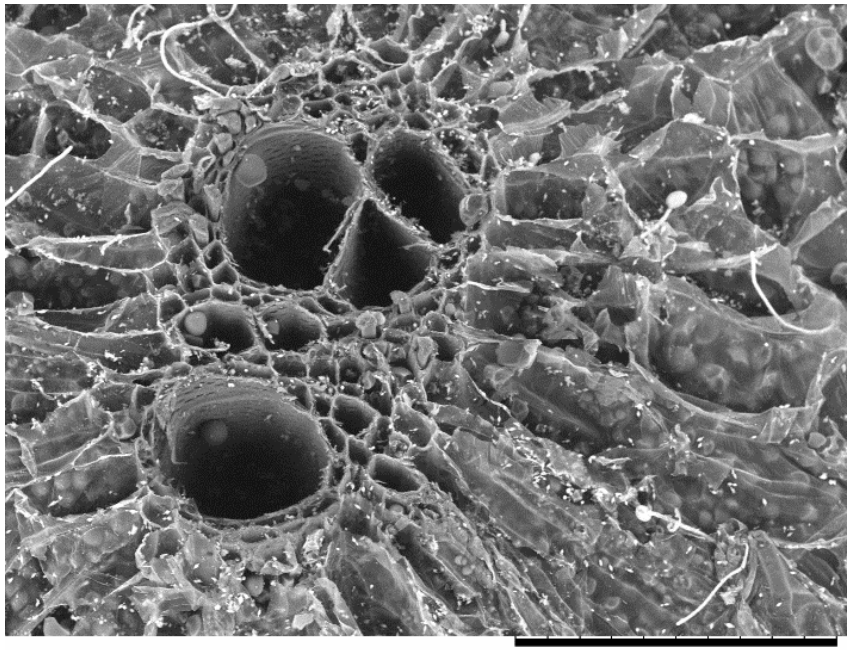


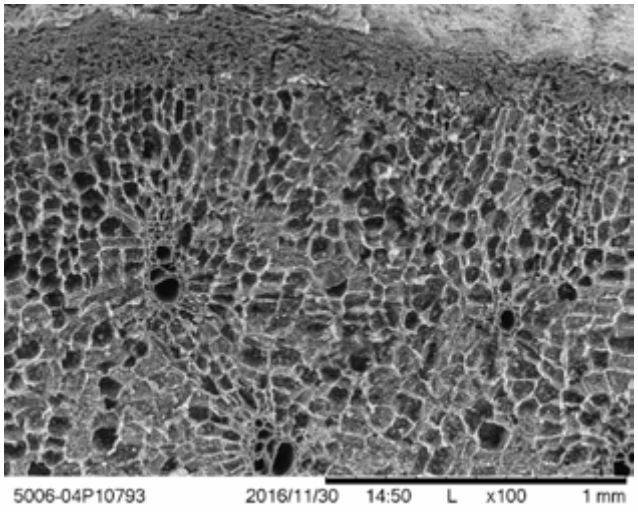


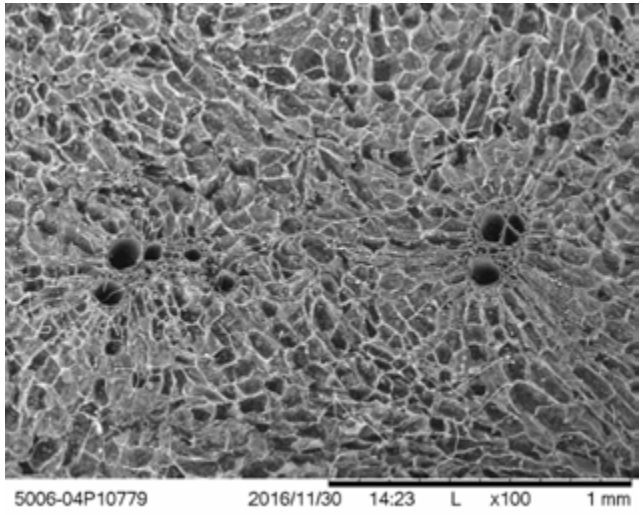
Xylem/Phloem Arrangement Fresh Specimen

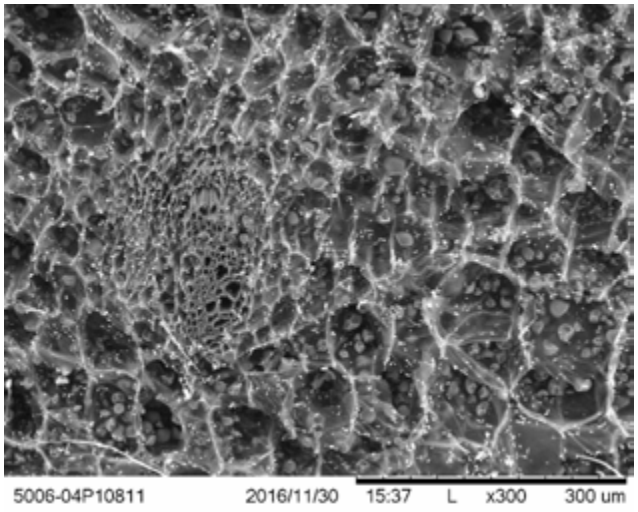
Pachyrhizus erosus (Jicama)





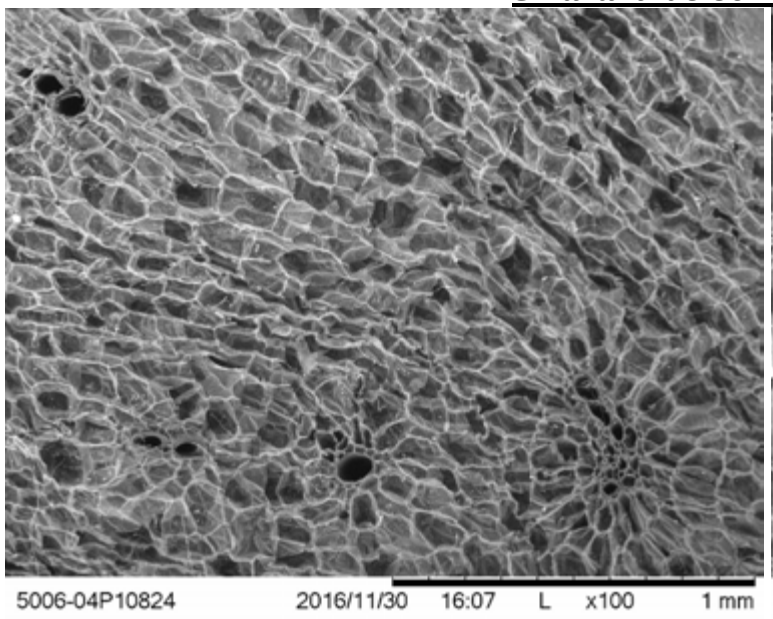


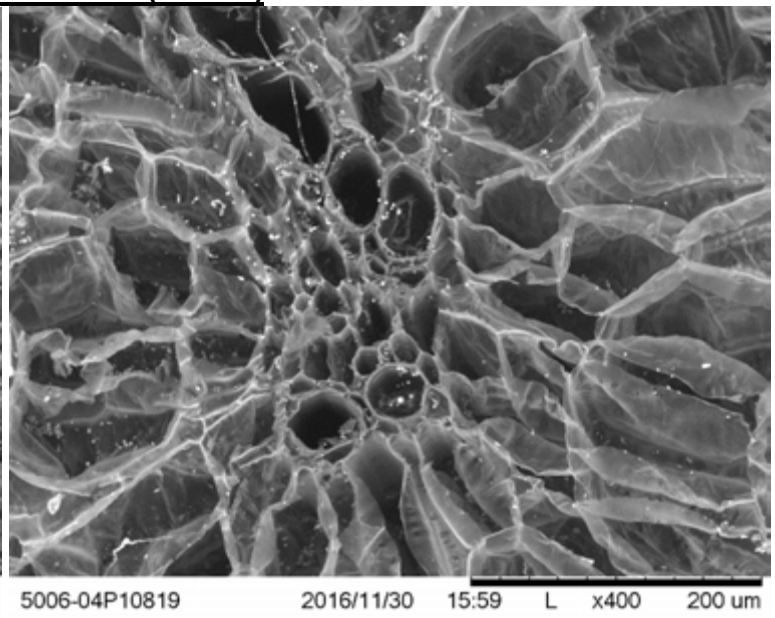


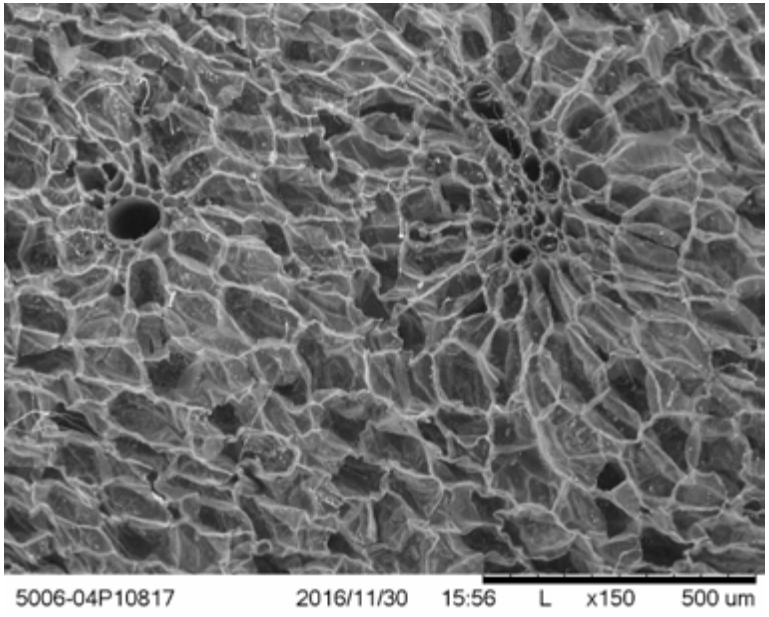


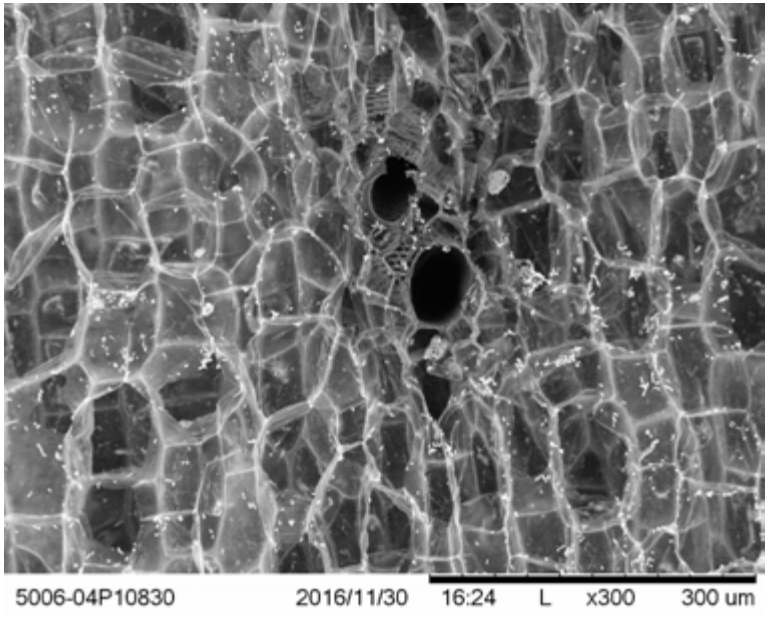
Xylem/Phloem Arrangement Fresh Specimen

***Smallanthus sonchifolius* (Yacon)**









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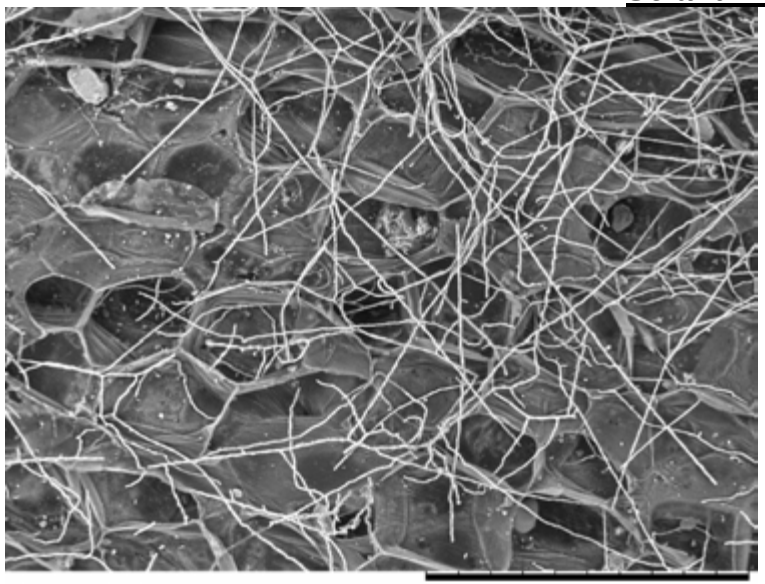
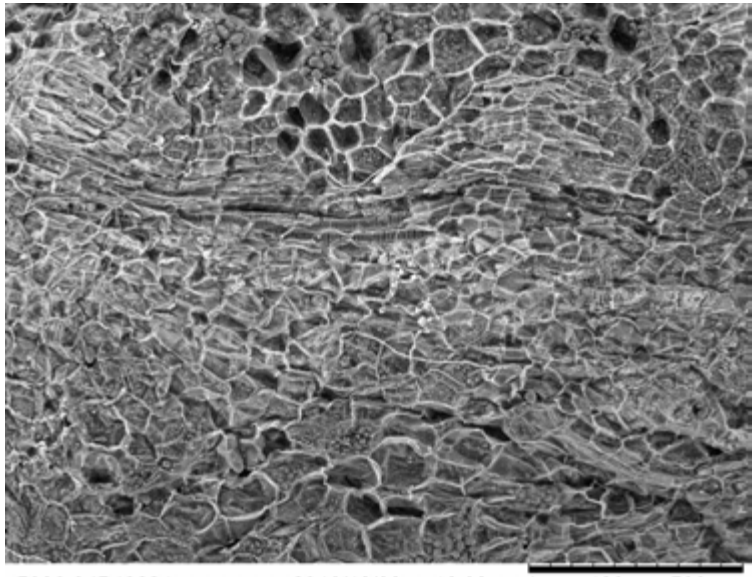
Xylem/Phloem Arrangement Fresh Specimen

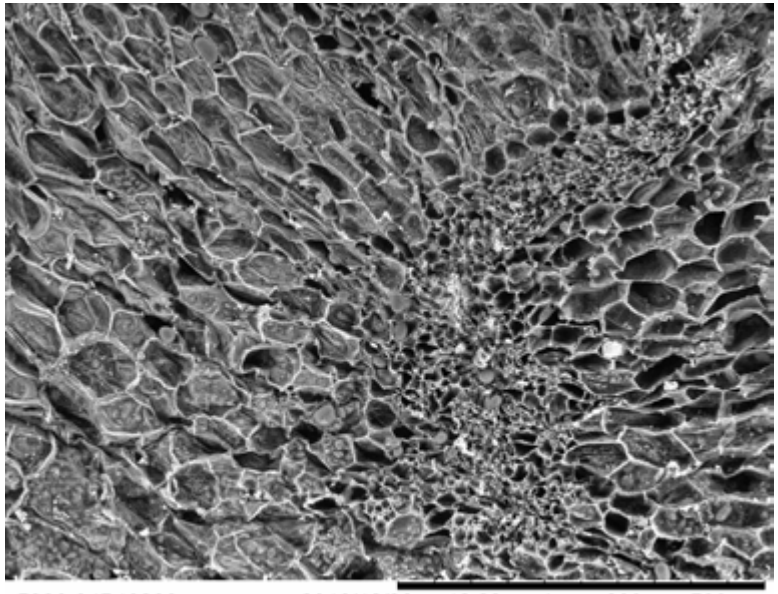
***Solanum* (Potato)**



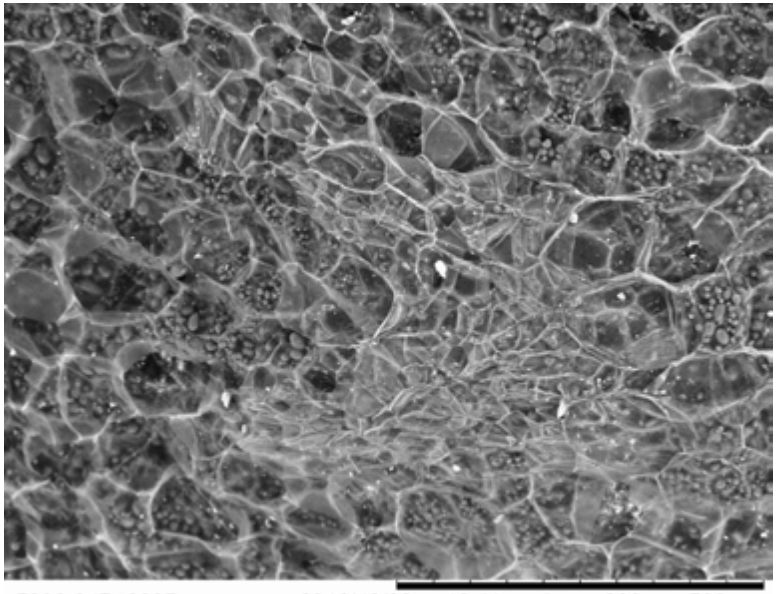
5006-04P10885 2016/12/02 11:43 L x300 300 um



5006-04P10891 2016/12/02 12:03 L x120 500 um



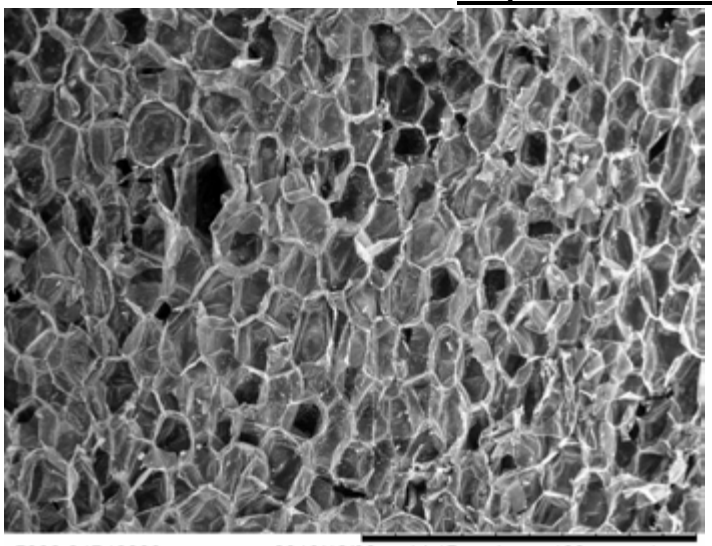
5006-04P10900 2016/12/02 12:23 L x200 500 um

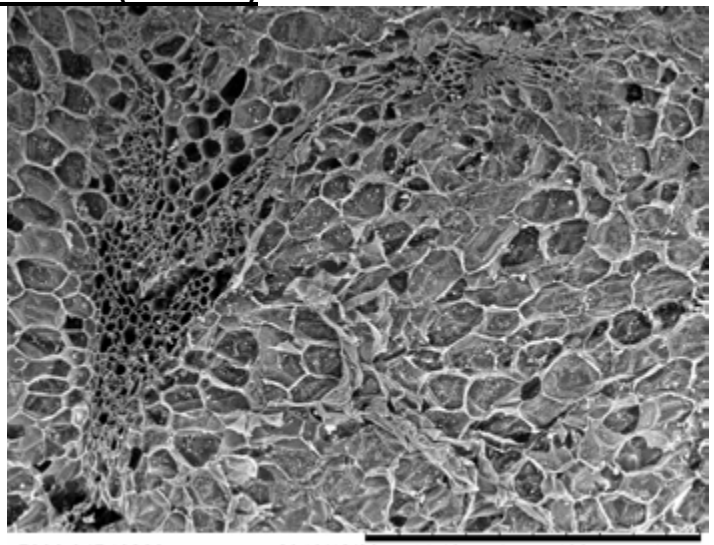


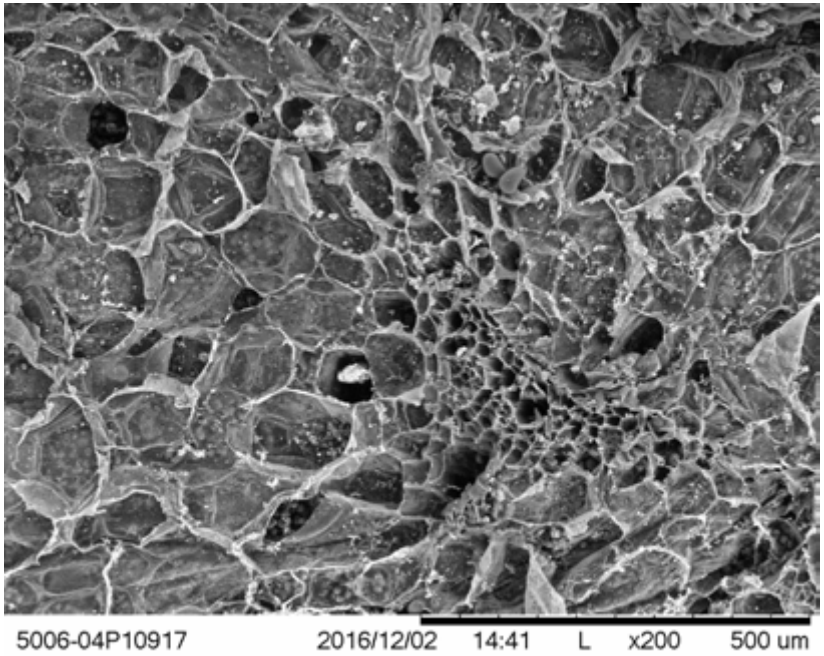
5006-04P10905 2016/12/02 12:41 L x200 500 um

Xylem/Phloem Arrangement Fresh Specimen

***Tropaeolum tuberosum* (Mashua)**







Xylem/Phloem Arrangement Fresh Specimen

Ullucus tuberosus (Papalisa)