

A vertical image on the left side of the slide shows a sugar cane stalk. At the top, a small flag with the SMRI logo is attached to the stalk. The stalk is green and has some brown spots.

SUGAR CRYSTAL

Image analysis

Industry representative:

Richard Loubser

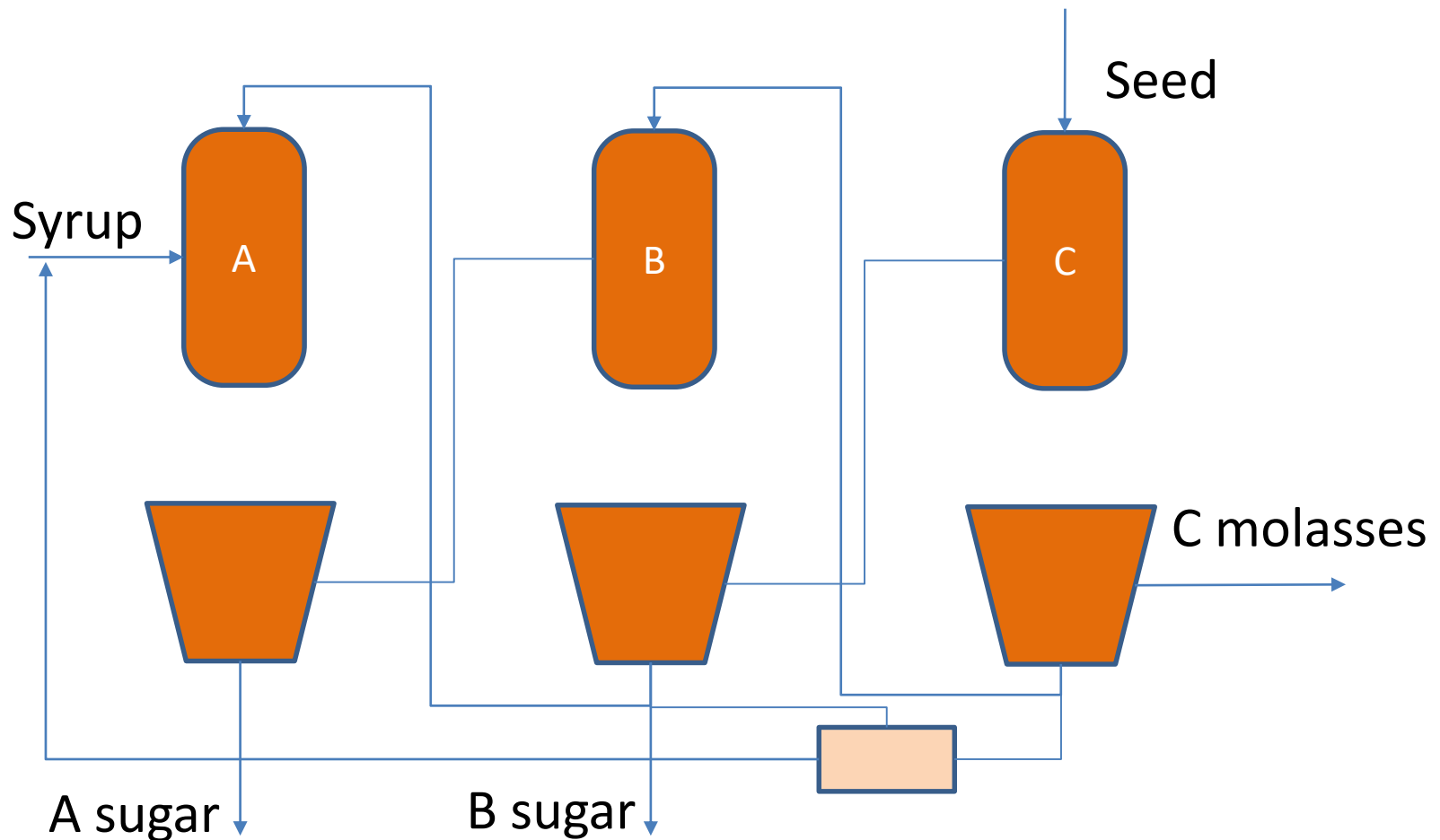
Sugar Milling Research Institute (NPC)

Sugar crystal analysis

- Crystal size distribution
 - Uniform product
 - Avoid handling difficulties
- Crystal shape
 - Impurities
 - Inhibition of crystal growth
- Crystal count
 - Correct amount of seed to achieve exhaustion

Crystallisation

- Three stage partial re-melt system

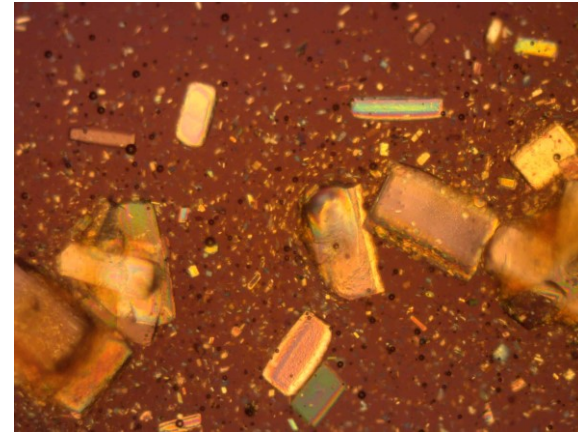


Crystallisation

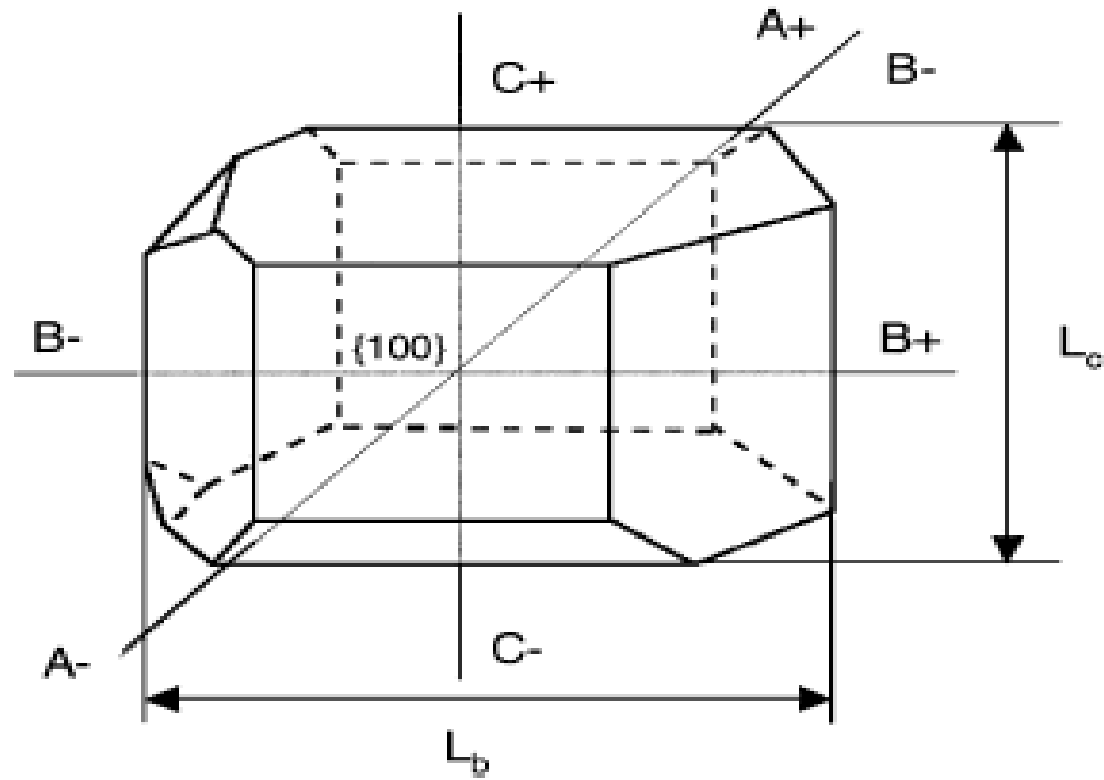


Analysis method

- Photomicrograph
 - Identify crystals
 - Measure/estimate parameters



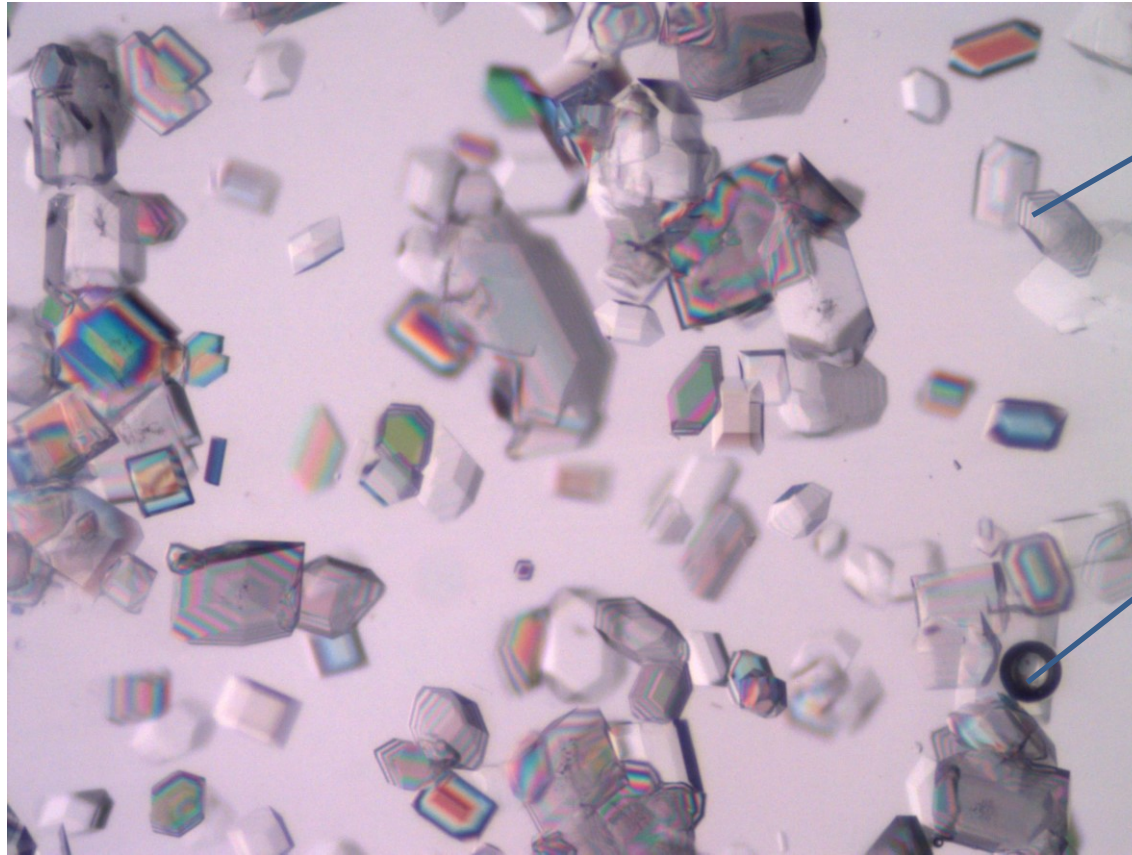
Ideal sucrose crystal



Faria *et al* (2003), Quantification of the morphology of sucrose crystals by image analysis, *Powder Technology* 133: 54-67

Counting

Pure solutions



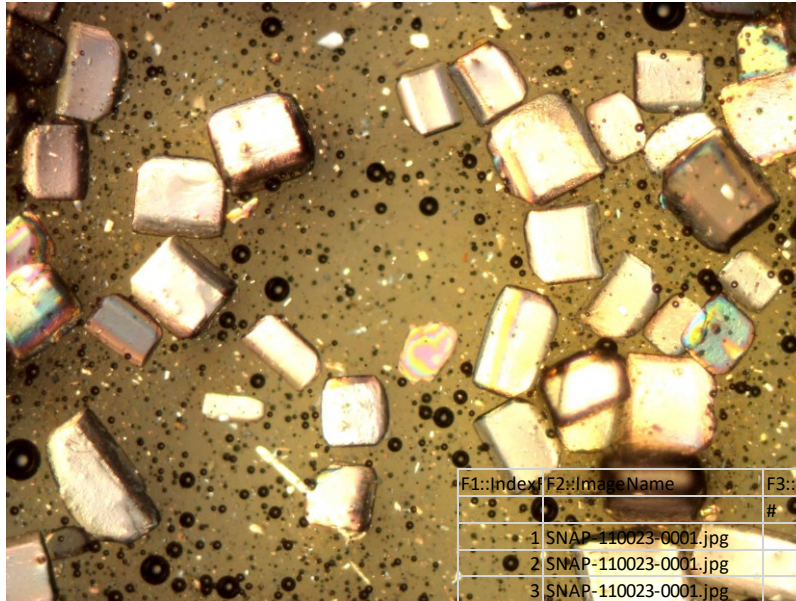
Overlap

Bubble

How many crystals do you see? $\sim 10^5$ /mL?

Crystal shape

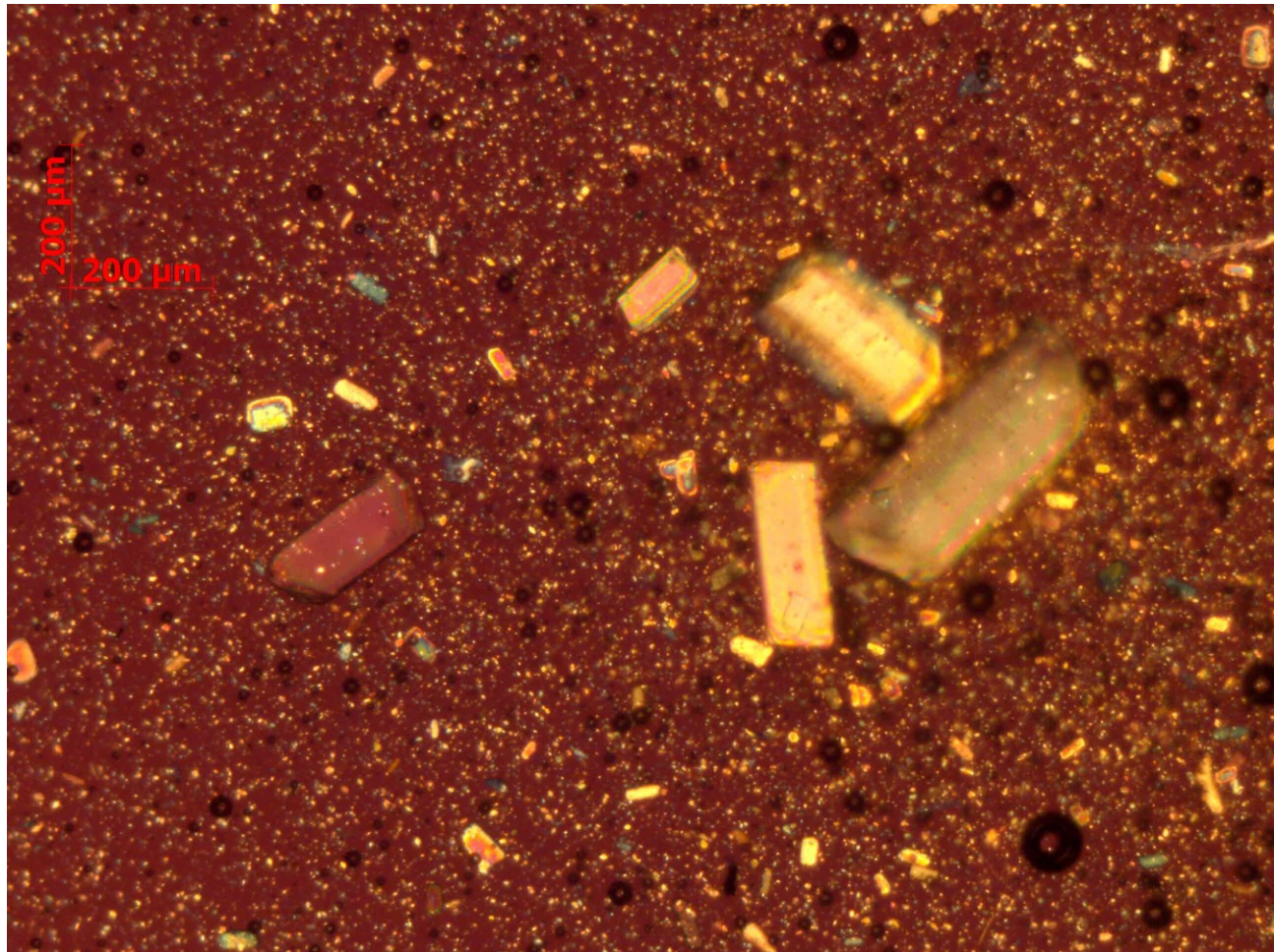
Mid-season



F1::Index	F2::ImageName	F3::Numb	F4::Length!!R	F5::Width	F6::MeanLength!!	F7::MeanWidth!!R	F8::Aspec	F9::Volum	F10::Mass
		#	μm	μm					
1	SNAP-110023-0001.jpg	19	291.8711698	204.7998	291.8711698	204.7997749	1.425154	17446643	2.76E+10
2	SNAP-110023-0001.jpg	19	176.7257553	142.9982	176.7257553	142.9981986	1.23586	4466119	7.06E+09
3	SNAP-110023-0001.jpg	19	146.6346298	85.41667	146.6346298	85.41666667	1.716698	1836605	2.9E+09
4	SNAP-110023-0001.jpg	19	158.2492806	114.8251	158.2492806	114.8250682	1.378177	2875545	4.54E+09
5	SNAP-110023-0001.jpg	19	155.2900775	72.92161	155.2900775	72.92161276	2.129548	1758505	2.78E+09
6	SNAP-110023-0001.jpg	19	192.6009172	150.6944	192.6009172	150.6944444	1.278089	5590027	8.83E+09
7	SNAP-110023-0001.jpg	19	201.1138185	148.0569	201.1138185	148.0568525	1.358355	5988421	9.46E+09
8	SNAP-110023-0001.jpg	19	330.9676369	171.3693	330.9676369	171.3693219	1.931312	18771723	2.97E+10
9	SNAP-110023-0001.jpg	19	247.2195725	189.6978	247.2195725	189.6978258	1.303228	11593860	1.83E+10
10	SNAP-110023-0001.jpg	19	236.0605933	150.6113	236.0605933	150.611266	1.56735	8392753	1.33E+10
11	SNAP-110023-0001.jpg	19	140.9874315	94.26712	140.9874315	94.26712489	1.495616	1873791	2.96E+09
12	SNAP-110023-0001.jpg	19	198.8915726	152.2996	198.8915726	152.2995953	1.305923	6024646	9.52E+09
13	SNAP-110023-0001.jpg	19	198.0274831	134.2868	198.0274831	134.2868163	1.474661	5266042	8.32E+09
14	SNAP-110023-0001.jpg	19	340.6081761	232.5074	340.6081761	232.5073889	1.464935	26974096	4.26E+10
15	SNAP-110023-0001.jpg	19	295.6489504	184.8923	295.6489504	184.8923252	1.599033	16161124	2.55E+10
16	SNAP-110023-0001.jpg	19	122.0997351	76.16032	122.0997351	76.16031915	1.603194	1135424	1.79E+09
17	SNAP-110023-0001.jpg	19	220.8459919	127.557	220.8459919	127.5569993	1.731351	6221331	9.83E+09
18	SNAP-110023-0001.jpg	19	321.5337971	249.6565	321.5337971	249.6565324	1.287905	25810487	4.08E+10

Crystal elongation

Raw solutions



Can we:

- Identify seed crystals and count them
- Characterise the crystal length to width ratio
- Comment on 'D' shape crystal occurrence



Thank you for your interest

