OLIVE OIL PROCESSING COURSE

modern olives

OLIVE OIL PROCESSING COURSE

Solid - Liquid Phase Separation

Extraction efficiency

Very good efficiency:	>90.0%
Benchmark efficiency:	>85.0%
Unacceptable:	<70.0%

Extraction efficiency

E.E.=1-(Oil pomace*(100-Oil fruit))/(Oil fruit*(100-Oil pomace)

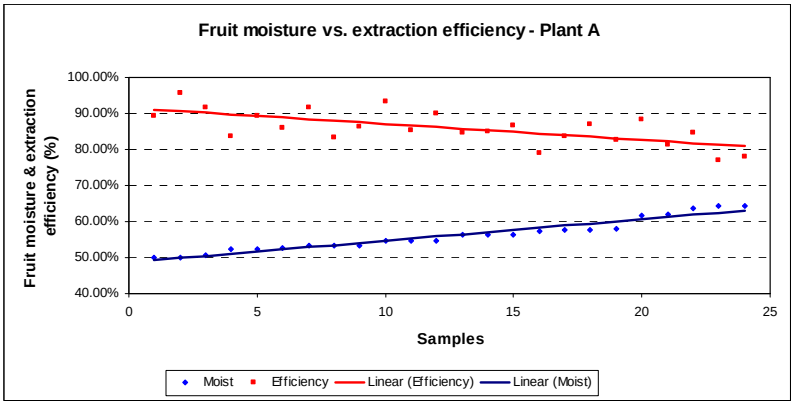
Or

< 8.0% oil/dry matter in the pomace

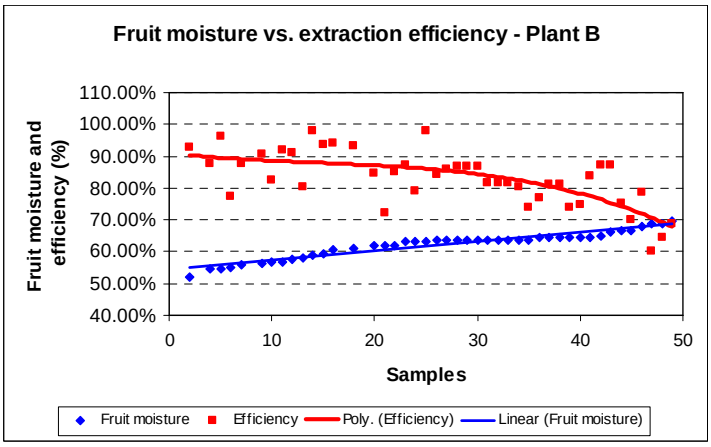
With 50% moisture fruit = 3.0% oil/fresh in pomace

With 60% moisture fruit = 2.0% oil/fresh in pomace

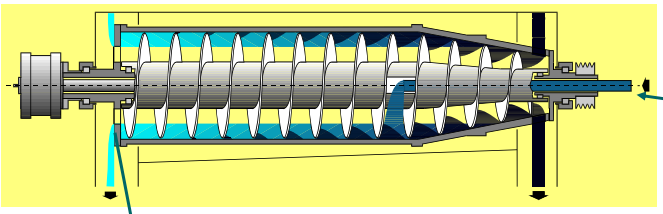
Fruit and moisture levels

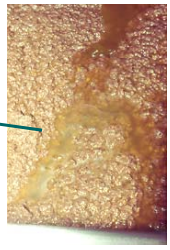


Fruit and soil moisture



Decanter





Decanter

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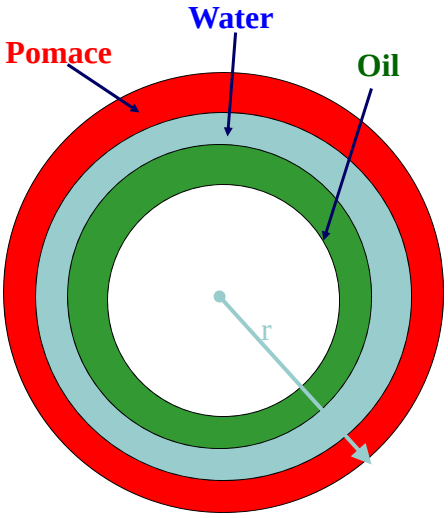


Decanter

- Capacity.
- Efficiency.

Capacity of the Decanter

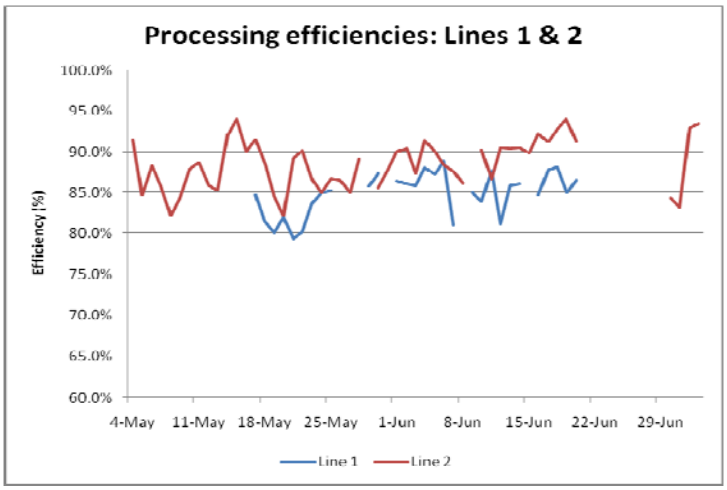
- Viscosity (Temperature).
- Length.
- Diameter.
- Differential between screw and bowl.
- Particle size (Crushing).

Capacity of the Decanter

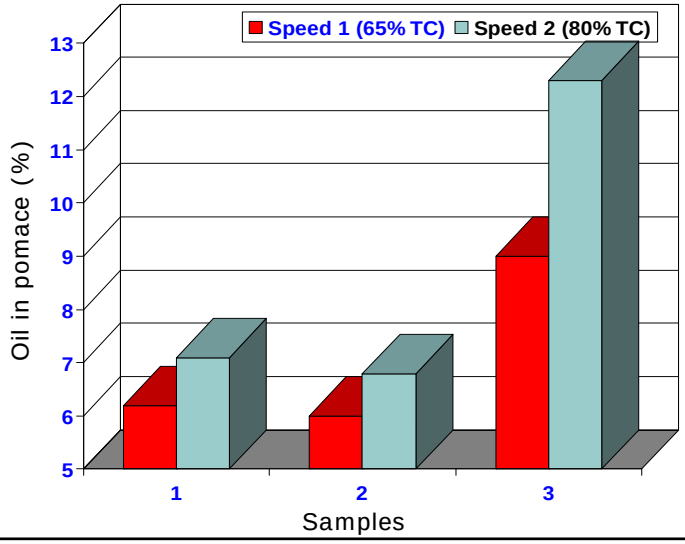
Efficiency of the Decanter

- Density difference between phases (Talc – Water - Crushing).
- Speed of rotation.
- Size of phases (Decanter plates).
- Separation time (Pumping speed).

Capacity vs. Equipment



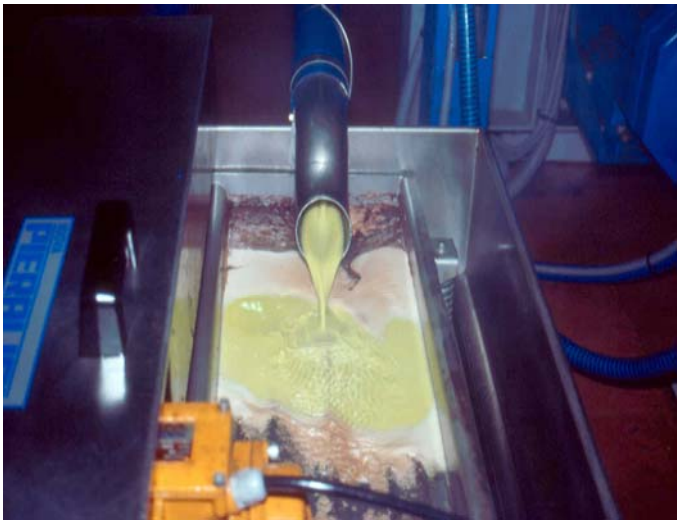
Pumping speed



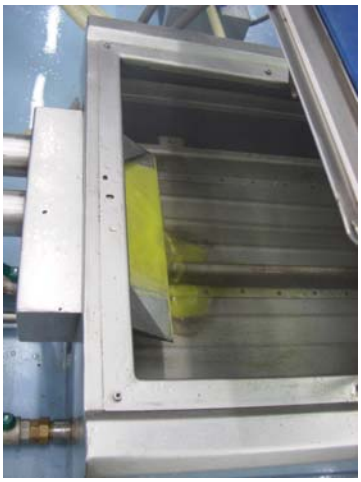
Pumping speed

- How do I know if I am pumping too fast?
  - Oil losses above limit.
  - Oil comes out dirty (Not always).
- How do I know if I am pumping to slow?
  - No problems apart from increased costs.
  - Do not go under 40% NC of the Decanter.

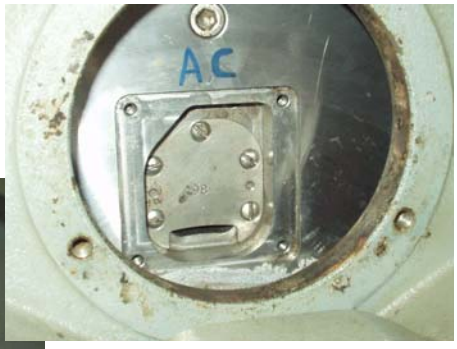
Pumping speed



Pumping speed



Decanter plates



Decanter plates

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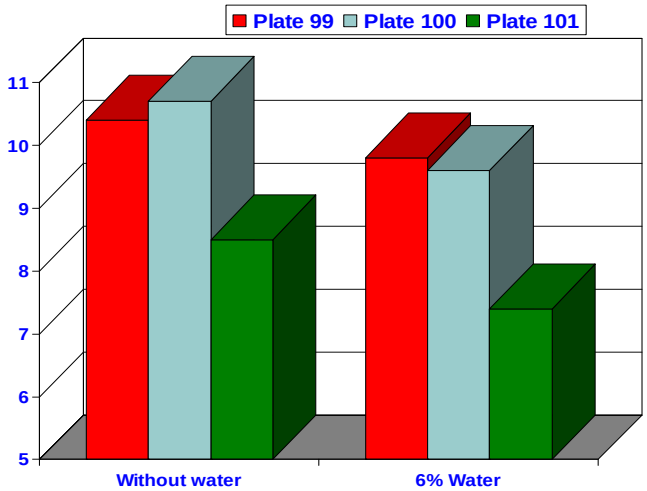

Marino Uceda – Australia 2005

Decanter plates

- How do I know when to change the plate?
  - Once you have tried everything else and the oil still comes out very dirty and with very low Decanter capacity. Put an smaller plate.
  - Or if there is too much oil in the decanter. Stop the feeding pump into decanter, flush it with water and the amount of oil that is obtained should not exceed 1.5 % of the TC of the decanter. E.g.: 5 tn/hr should not produce more than 50-75 litres. Put a larger plate.

Processing

Fruit Processing Chart

Grid size	Paste		Coadjuvants		Oil			Pomace		Final
	T°	Speed	Talc	Enzymes	T°	Flow	Acidity	Oil	Moisture	Tank

Extraction efficiencies per plant and operator

Operator	< 1 year	1-2 years	>2 years
Plant A	-	84.67%	90.10%
Plant B	75.93%	83.20%	-
Plant C	-	89.31%	92.15%

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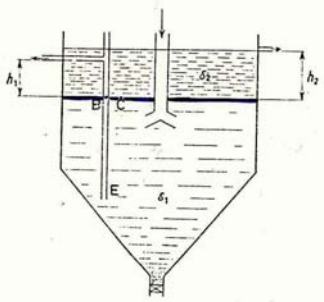
Liquid - Liquid Phase Separation

Centrifugation

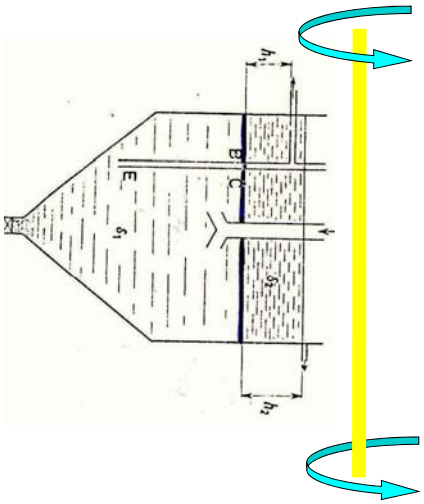
Centrifugation



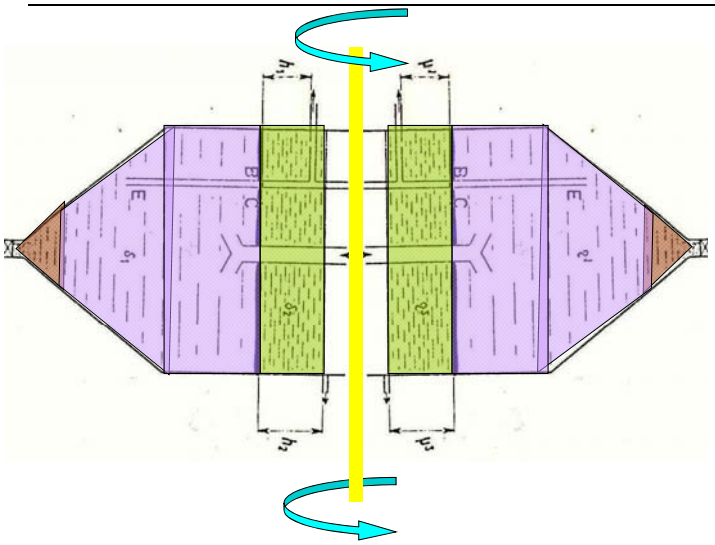
$$h_1 \cdot d_1 = h_2 \cdot d_2$$

$$\frac{h_1}{h_2 - h_1} = \frac{d_2}{d_1 - d_2} = \text{Cte}$$

Centrifugation



Centrifugation



Centrifugation

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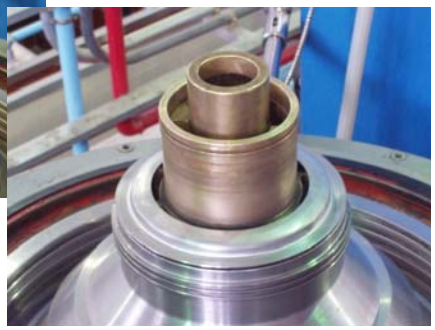
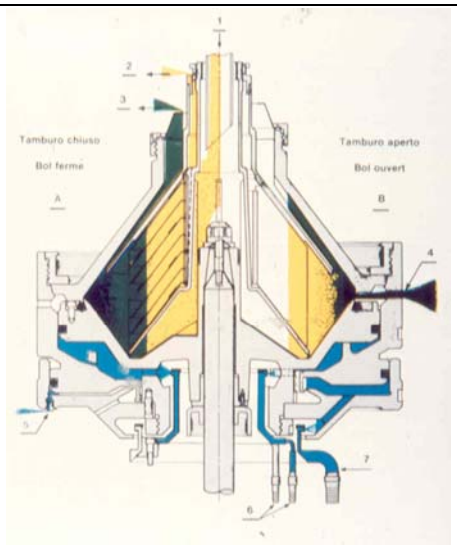


Centrifugation



Centrifugation

Oil in water:

Ideal:	< 0.1%
Unacceptable:	> 0.3%

Water in oil:

Ideal:	< 0.2%
Unacceptable:	> 0.6%

Oil temperature:

Ideal:	1-2ºC higher than malaxing Tº
Unacceptable:	Lower than malaxing Tº.
	> 5ºC higher than malaxing Tº

Centrifugation

- Accurate selection of regulation ring.
- Check oil aspect at all times (Clean milky aspect).
- Check foam aspect at all times (White as soon as it is formed).
- Do not over feed the separator.
- Do not add more than 40% of water/oil.
- Temperature of water between 35-38ºC. Never colder than the oil.
- Constant flow of oil and water.
- Regulate discharge times (1-2 hours).
- Maintain clean all parts.

Centrifugation

Settling

Settling

- Maintain oil in settling for 24-48 h.
- Drain settlings every two hours.
- Remove foam every six hours.
- Avoid contact with open air or light.
- If we drain more than 1% settlings for total oil produced we have to check the separator.
- Maintain temperature above 18ºC.
- Check acidity and peroxides before sending to final tank.