



OliOnostrum

Biodiversità e innovazione per un olio  
EVO di qualità della Valdambra

## Composizione e Tecnologie di produzione degli oli vergini di oliva. Parte 2

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DEGLI STUDI  
FIRENZE

- Qualità olio
  - =
  - Qualità olive +
  - Qualità di processo



Processo di estrazione o  
di trasformazione??

## Olive fruit storage: a Critical Control Point for EVOO quality



From  
olives...

- Fruit metabolism
- Mechanical damages
- Natural microflora  
(yeasts, moulds, bacteria)



- Warming/Fermentation
- Microbial development
- Contact between oil and O<sub>2</sub>,  
enzymes, MO

to olive oil



- Quality parameters FFA, PV, K<sub>232</sub>, K<sub>270</sub>, ΔK
- Sensory defects (*fusty, musty, rancid...*)
- Loss of oxidative stability
- Loss of positive attributes (*fruity, bitter, pungent*)
- Loss of health/nutritional properties

## How to manage the period between harvesting and milling?

- Time
- Temperature

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- (Atmosphere)
- Good Manufacturing Practices

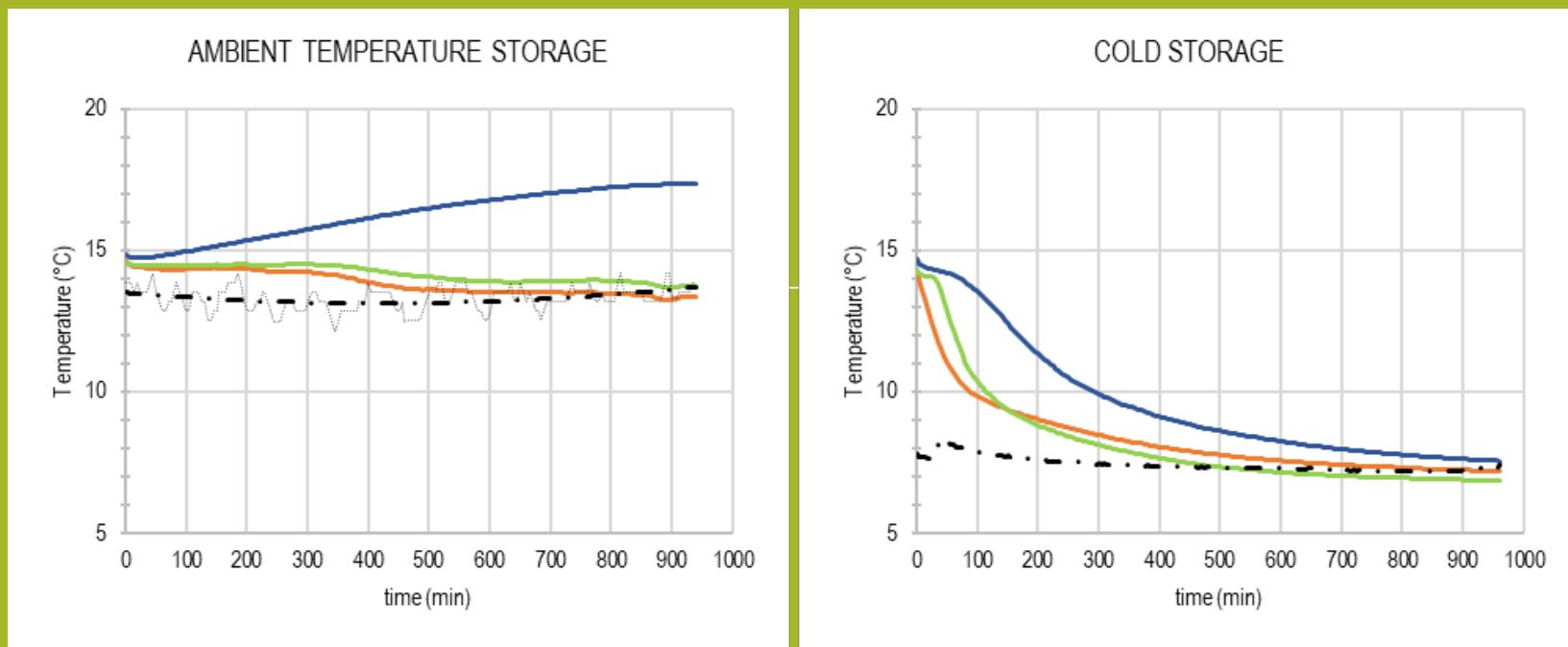


## RACCOLTA E STOCCAGGIO OLIVE



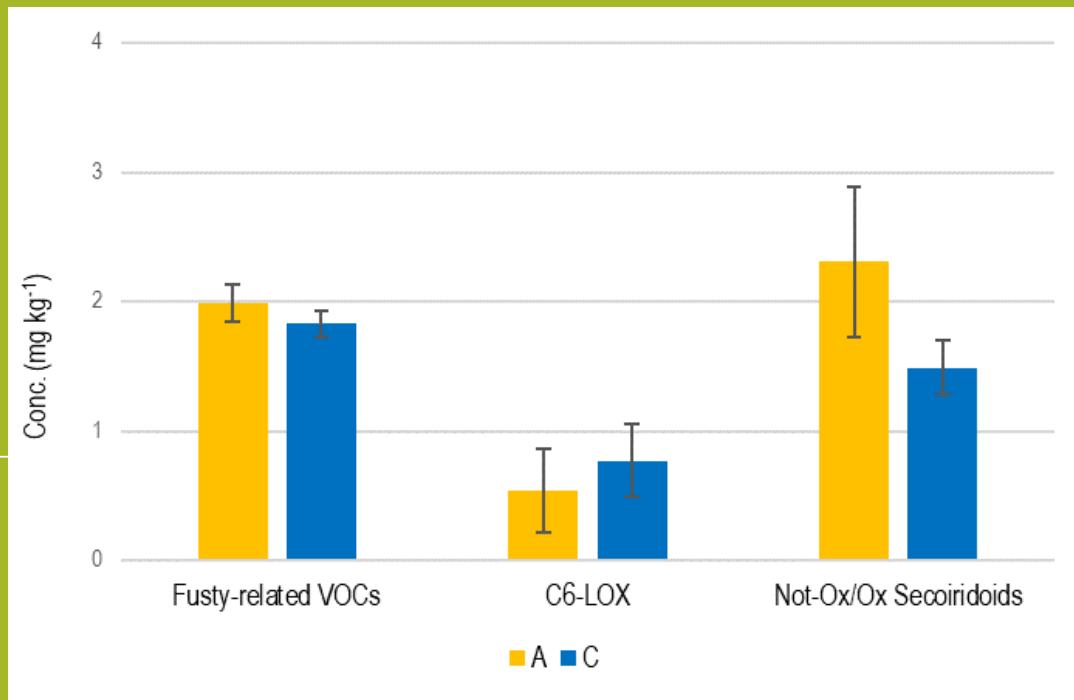
## Results: Trial 2 (Mill-scale) - *Temperature tracking*

Ambient temperature remained stable at  $13.5 \pm 1$  °C, while cold temperature inside the container never dropped below 7 °C. Thus, the effect of a 5–6 °C fall in temperature, for roughly 16 h, was evaluated.



BIN - HALF-FILLED BIN - BOX

## Results: Trial 2 (Mill-scale) – To summarize



Balance of positive and negative volatile organic compounds and oxidation products between the two storage treatments: cold storage (C) and environmental storage (A). The bar report the average values obtained from each temperature treatment, taking into account only those compounds that resulted significantly different.

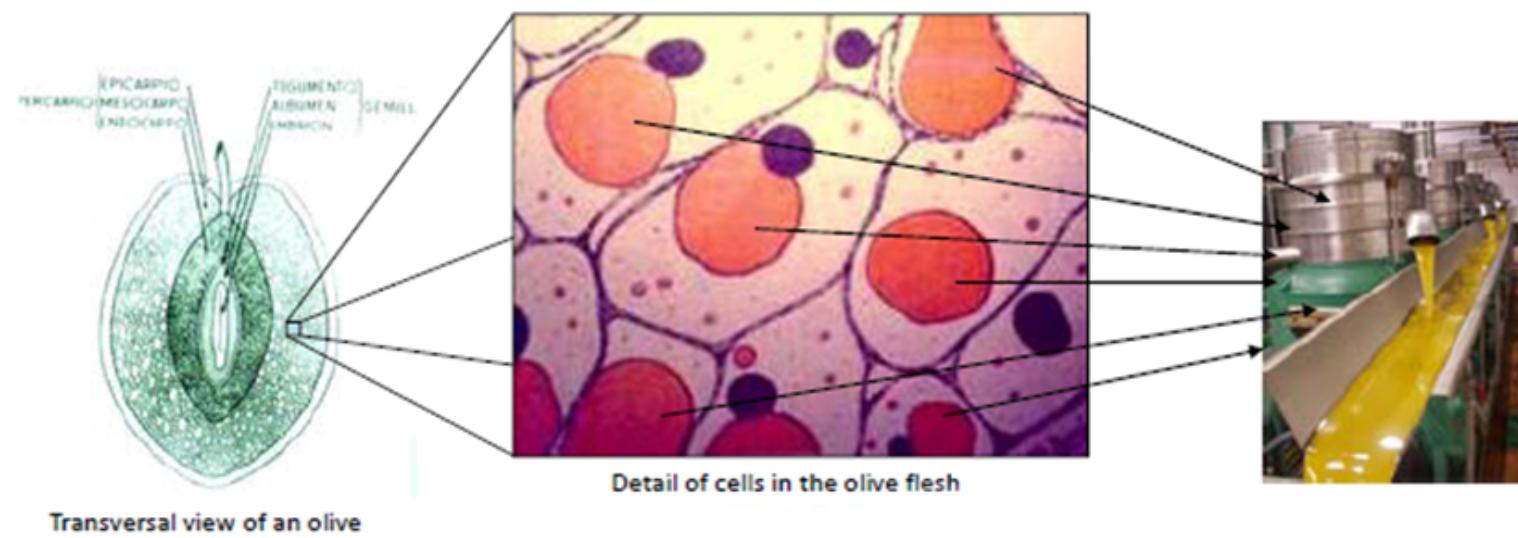
## Rimozione foglie e rametti



## Lavaggio olive

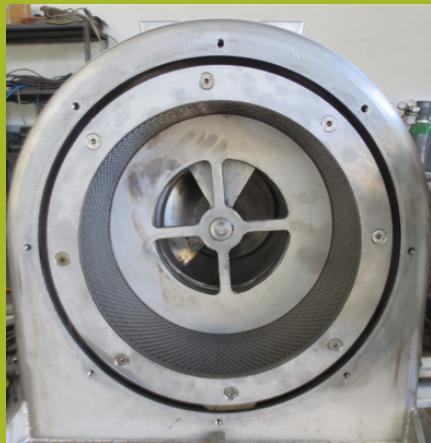


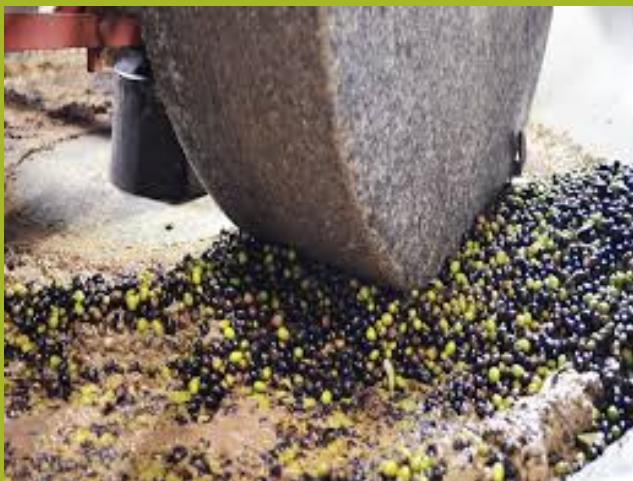
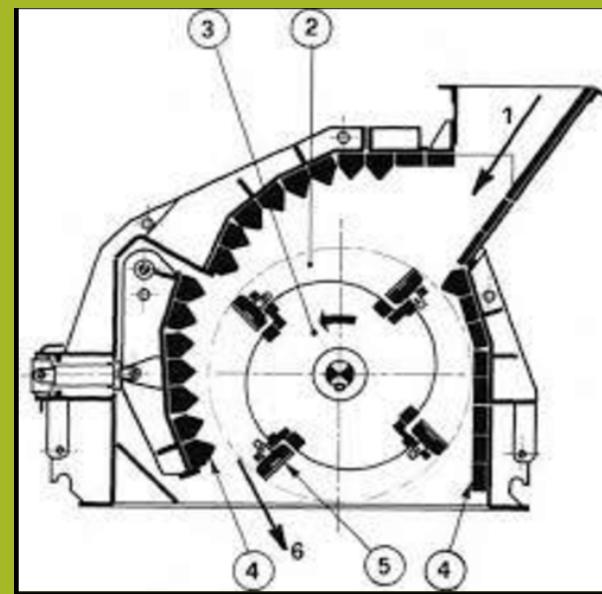
## Rottura delle pareti cellulari e delle membrane

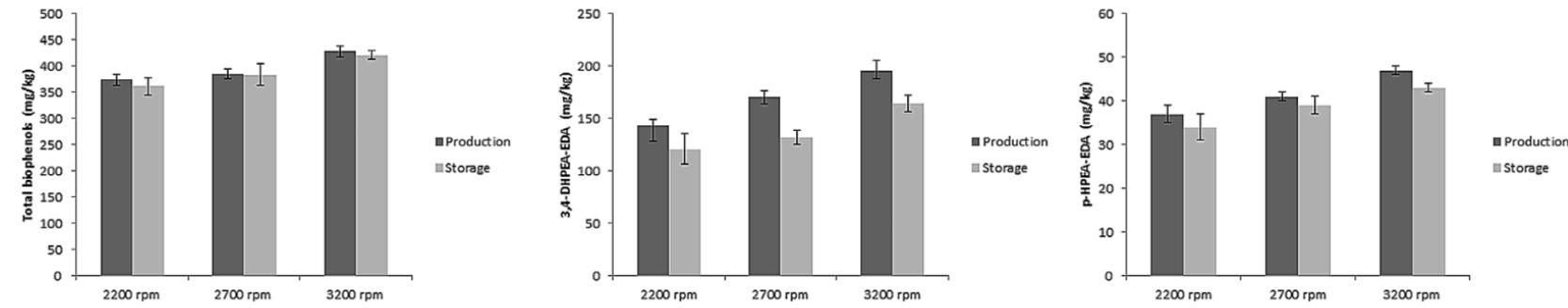


Source: Leandro Ravetti, Modern Olives, 2009

# Frangitura

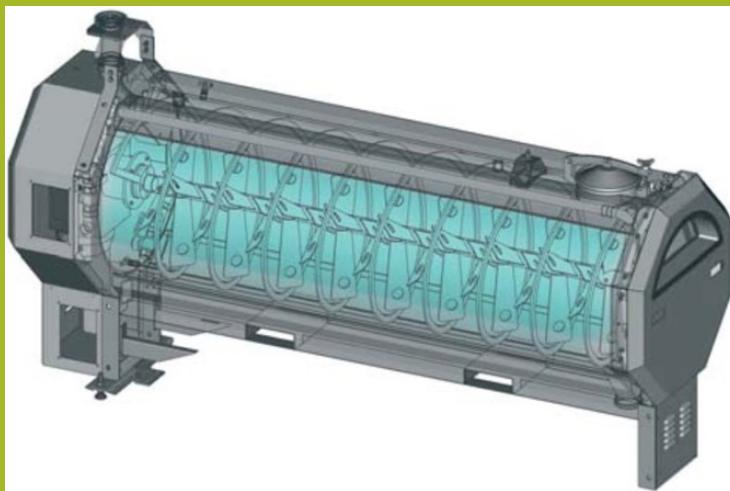




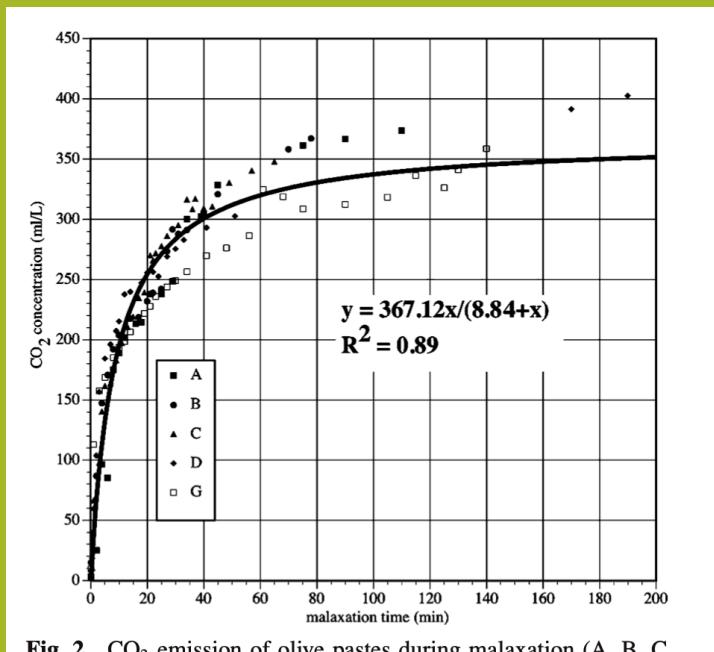


**Figure 1.** Total biophenol concentration (right plot), 3,4-DHPEA-EDA concentration (central plot), and p-HPEA-EDA concentration (left plot) in oil produced with a crusher speed of 2200, 2700, and 3200 rpm. Dark bars represent the oil immediately after production, while light grey bars show results after 8 months of storage. Error bars represent the standard deviation.

## Gramolazione

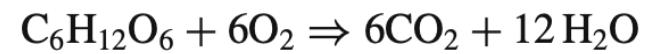


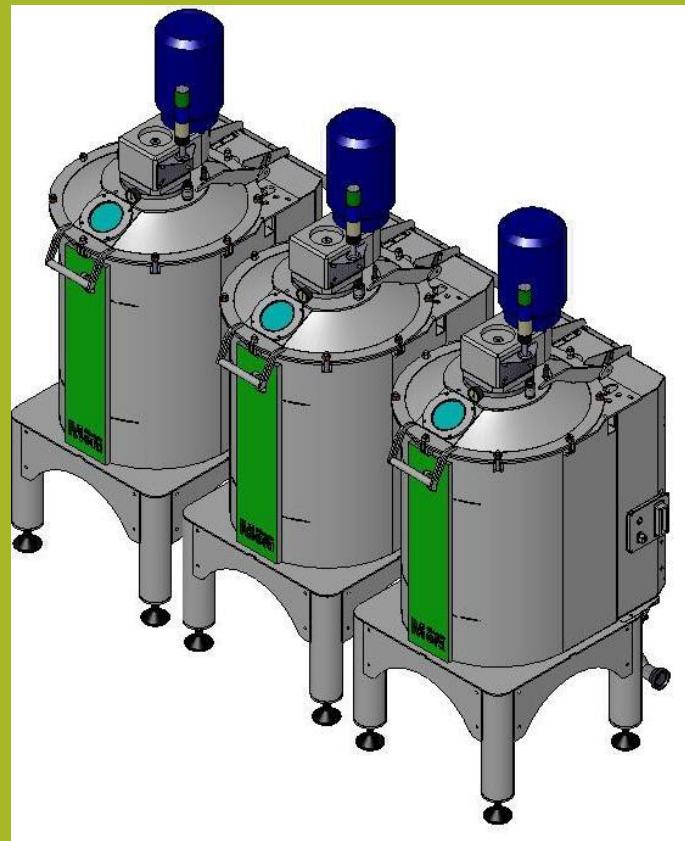
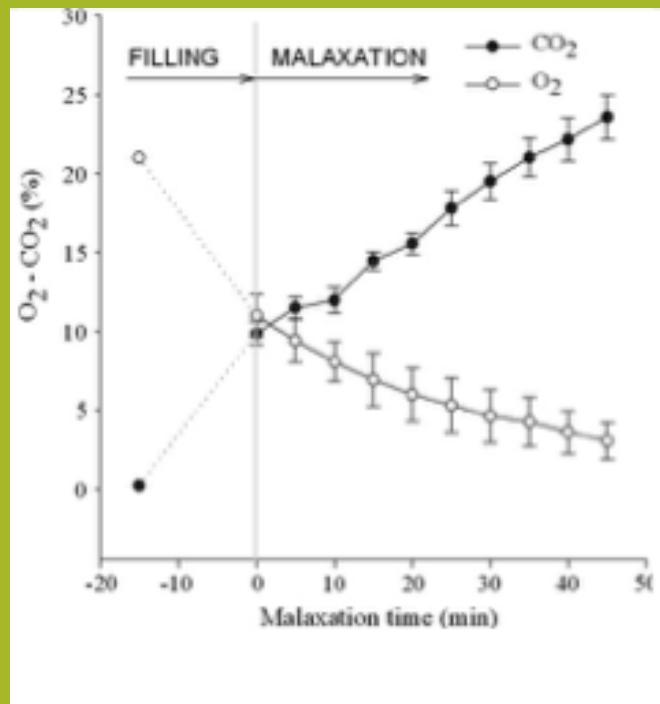
2006



**Fig. 2** CO<sub>2</sub> emission of olive pastes during malaxation (A, B, C, D, G). The trend line is the line of best fit of all data from the sealed trials

According to the general respiration equation:





**Table 2** Minor components concentrations ( $\text{mg kg}^{-1}$ ) in virgin olive oil from open-to-air malaxation and sealed malaxation

Parameter	Open-to-air	Sealed	MD
Chlo	24.6 (6.7)	35.1 (11.8)	-10.5 (6.0)*
Caro	17.3 (3.2)	21.2 (4.4)	-3.9 (1.4)**
Sph	1.5 (0.7)	2.4 (1.8)	-0.9 (1.2) <sup>ns</sup>
Lign	38.0 (5.0)	44.4 (4.7)	-6.4 (8.7) <sup>ns</sup>
Seco	94.9 (21.0)	131.3 (27.7)	-36.4 (25.1)*
Total HPLC	134.4 (23.3)	178.1 (27.1)	-43.7 (26.5)*
Total phenols <sup>#</sup>	142.6 (35.5)	175.8 (39.6)	-33.2 (15.2)**

<sup>#</sup> Colorimetric method

*MD* mean difference, *ns* not significant

Data are means of five independent replicated experiments; standard deviation are reported in brackets; significance of mean differences was tested by the paired *t* test, \* *p* at 0.05, \*\* *p* at 0.01

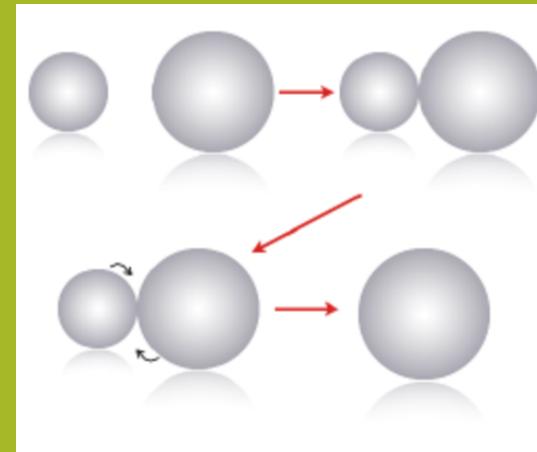
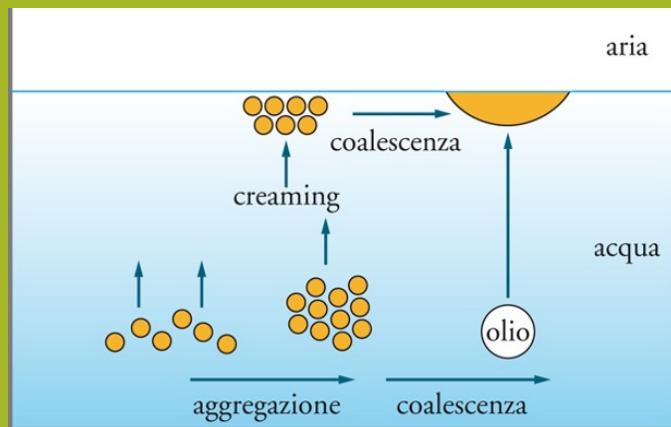
**Table 3** Volatile compounds concentrations ( $\mu\text{g kg}^{-1}$ ) in virgin olive oil from open-to-air malaxation and sealed malaxation

Volatile classes	Open-to-air	Sealed	MD
Amm/Ferm	1,428 (136)	1,158 (198)	270 (209) <sup>ns</sup>
C5/LnA	6,162 (1,753)	5,166 (920)	1,484 (890) <sup>ns</sup>
C6/LA	20,270 (9,839)	23,422 (19,401)	9,228 (13,006) <sup>ns</sup>
C6/LnA	145,538 (21,749)	115,054 (30,030)	31,680 (27,779) <sup>ns</sup>
Esters	2,560 (1,684)	1,666 (178)	1,114 (1,632) <sup>ns</sup>
Others	17,166 (3,407)	16,516 (3,188)	3,066 (2,322) <sup>ns</sup>
Total volatiles	193,124 (20,116)	162,982 (15,363)	30,142 (17,559)*

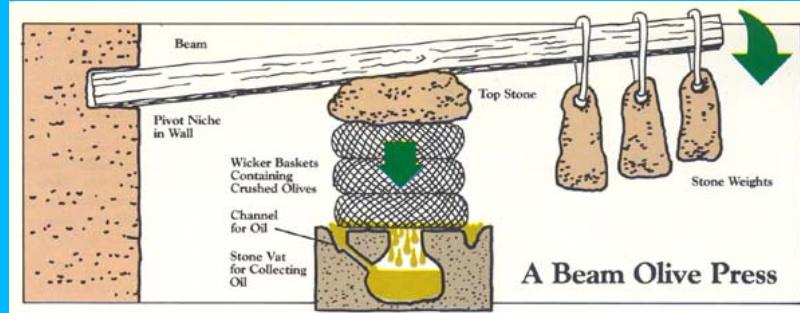
*MD* mean difference, *ns* not significant

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## Coalescenza



## Estrazione tradizionale



## Decanter



Sostanze con pesi specifici diversi tendono a disporsi in ordine.

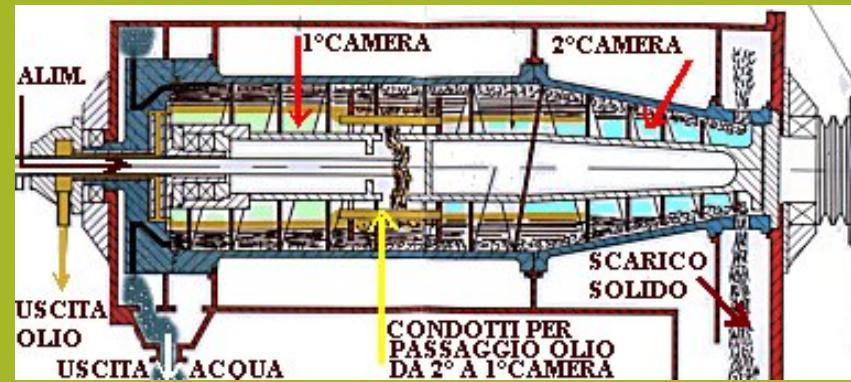
In basso la più pesante in alto la più leggera.

Densità della pasta di olive:

Solido 1270 kg/m<sup>3</sup>

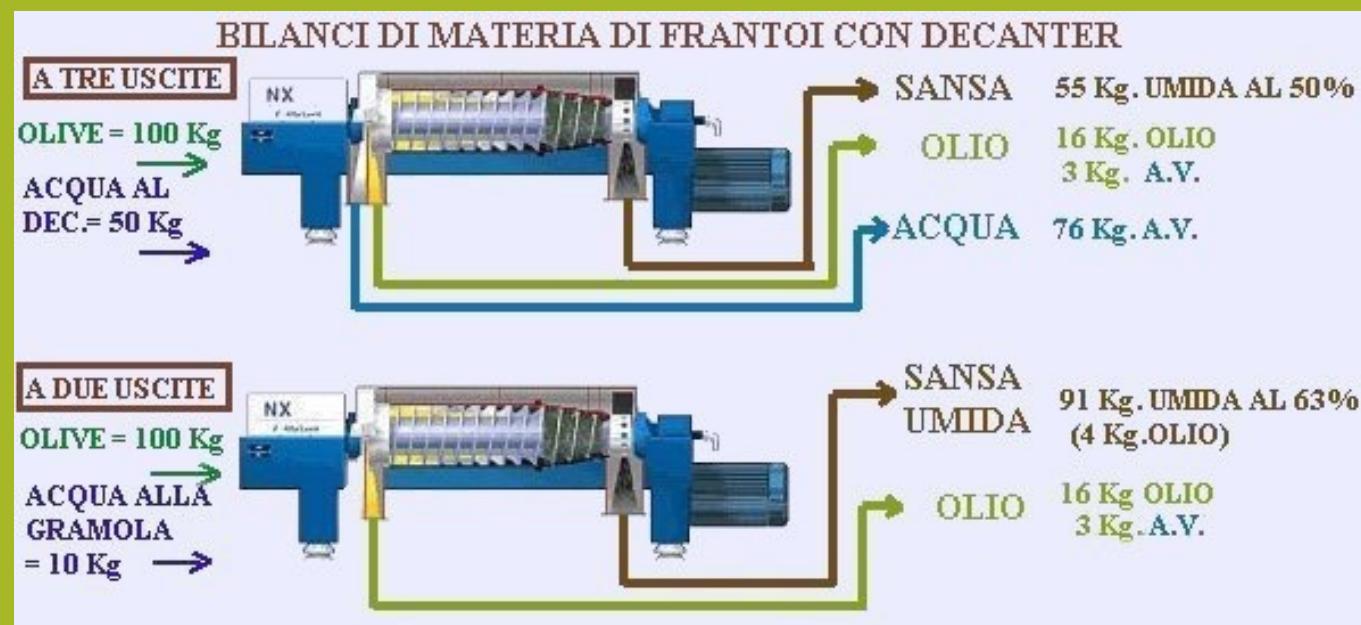
Acqua 1000 kg/m<sup>3</sup>

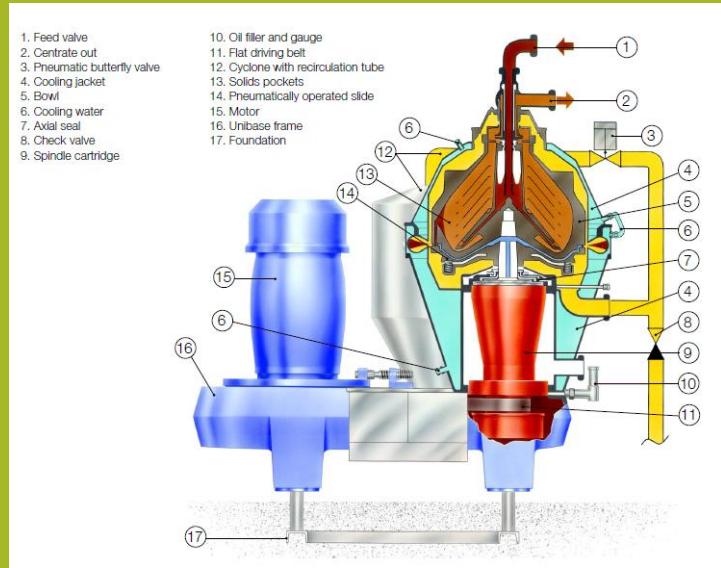
Olio 920 kg/m<sup>3</sup>



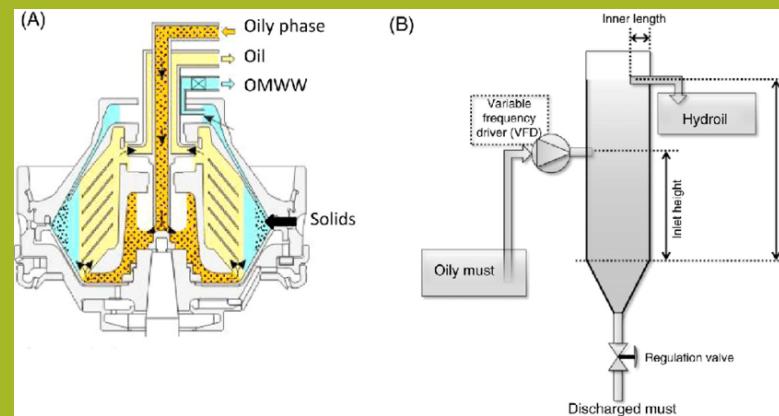
## Decanter

tre fasi (acqua olio sansa) - due fasi (olio sansa)





## Centrifuga verticale



## Sansa e sottoprodotti



Recupero del nocciolino come fonte di energia



**GRAZIE PER  
L'ATTENZIONE**