

CHARACTERISTICS OF THREE-PHASE CONTINUOUS CENTRIFUGATION PROCESS FOR OLIVE OIL EXTRACTION

- This process yields three phases:
 - o Oily phase (20%)
 - o Solid residue (30%):
 - olive pulp
 - stones
 - o Aqueous phase (50%):
 - Water content of fruits + process water
 - Water used to wash olives
- } → Olive cake
- } OMWW
- Process steps:
 1. Olive washing
 2. Milling and beating
 3. Horizontal centrifugation: In this step is used a significantly amount of hot water to wash the oil. Separation of solid residue (olive cake) from the other two liquid phases in the *decanter*. These liquid phases are submitted to the next step:
 4. Vertical centrifugation: Separation of olive oil from OMWW
 - Advantages compared with the traditional press olive oil extraction.
 - o It requires less human labour
 - o It has higher olive oil production rates.
 - Disadvantages
 - o Increased water utilization (1.25 to 1.75 times more water)
 - o Higher energy requirements
 - o Loss of valuable components of oil (natural antioxidants)
 - o Problems of disposal of the wastewater.

CHARACTERISTICS OF TWO-PHASE CONTINUOUS CENTRIFUGATION PROCESS FOR OLIVE OIL EXTRACTION

- This process yields two phases:
 - Oil as liquid phase
 - Very wet olive cake (TPOMW) as solid phase.
- Process steps
 - Olive washing
 - Milling and beating
 - Horizontal centrifugation without addition of water:
 1. Solid phase (TPOMW-wet olive cake)
 2. Liquid phase
 - Oil washing/Vertical centrifugation:
 1. Waste water
 2. Olive oil
- Advantages compared with the three-phase continuous centrifugation process
 - o The construction of two-phase centrifuges is less complicated
 - o More reliable and less expensive than the three-phase decanter.
 - o Less use of water
 - o Less use of energy
 - o Higher quality of oil produced: higher oxidation stability and better organoleptic characteristics.
- Disadvantages
 - o Production of a semi-solid waste requiring disposal.
 - o The composting of this semi-solid waste (TPOMW-"alpeorujo") is difficult.
 - o TPOMW has a high moisture content (55-70%), sugars, and fine solids which give this waste a doughy consistency and make transport, storage and handling difficult Accumulated in large evaporation ponds.
 - o More concentrated in fats, dry residues, phenols and *o*-diphenols than OMWW
 - o COD and turbidity are also higher.