

PRODUCTION OF SOAP FROM USED COOKING OIL

theor & tehcnique

The theory behind the soap

SOAP = water soluble sodium or potassium salts of fatty acids

Made from Fats and oils or their fatty acids through chemical treatment using strong alkali (saponification)

In simple terms, we can think of soap as the salt of a fatty acid. The fatty acid part comes from the oil, while the sodium part comes from the lye. This new molecule has two ends: one end loves water and the other end loves oil. This dual nature is what allows soap to remove dirt and grease from surfaces



THREE FORMS OF SOAPS IN MARKET



Liquid soap



Bar soap



Powdered/flake soap

The Saponification Index: A factor for complete saponification

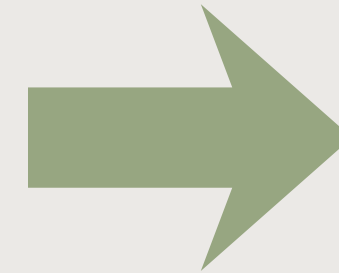
For used cooking oil, the chemistry is the same, although **we must consider that UCO has more free fatty acids** due to repeated heating. These FFAs react faster with lye, so **correct calculation becomes even more important to avoid soap being too harsh or too soft**

SAP Index & How to Calculate

Saponification Index

The saponification index, or saponification value = is the milligrams of sodium/potassium hydroxide needed to saponify one gram of a fat or oil (convert to soap).

How much sodium hydroxide is required to completely react with 1 gram of a particular oil.



- $\text{Lye (g)} = \text{OIL MASS} \times \text{SAP INDEX}$
- SAP Index for palm oil usually are = 0.141
- Superfat 3–5%.

Ensures the final soap is safe for skin—not too caustic, and not too oily.

Too much lye, the soap becomes harsh and irritating.

Too little lye, the soap becomes oily and soft.

For UCO, we usually reduce the calculated lye slightly, known as superfatting, to make the soap gentler



CHEMICALS & MATERIALS

CHEMICALS

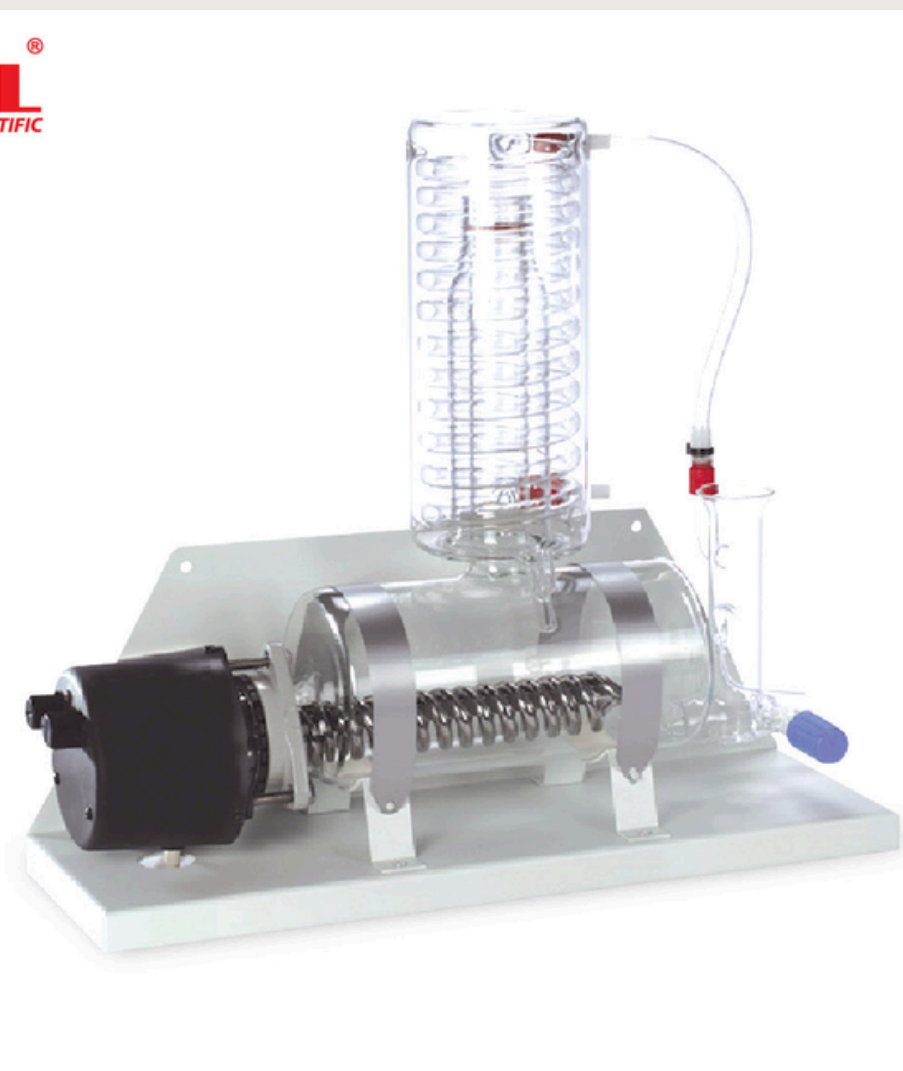
1. USED COOKING OIL
2. LYE (NaOH, KOH)
3. DISTILLED WATER

EQUIPMENT

- DIGITAL SCALE
- MIXING BOWL
- THERMOMETER
- SPATULA
- HAND BLENDER
- MOULDS

SAFETY

- GLOVES
- GOGGLES
- APRON



TECHNIQUE & PROCEDURE



1. Filter & weight the UCO
2. Wear an apron, face mask, and gloves.
3. Weigh the used cooking oil, potassium hydroxide, and water.
4. Prepare the alkaline solution by adding the potassium hydroxide into the water and stir until fully dissolved.
5. Pour the alkaline solution into the heated used cooking oil while stirring.
6. Use a hand blender to mix until the mixture becomes uniform.
The soap paste is now ready
7. Add colouring and fragrance as desired.
8. Stir gently, pour into mould and you are all done.



THANK YOU!