

REUSING USED COOKING OIL

INTRODUCTION

It is well known that in the consumer society of today we generate a vast quantity of waste such as plastics, cardboard, organic waste, etc. The great majority of this waste has to be processed far from our homes in treatment plants thanks to complex processes that are, for the most part, both economically and environmentally very costly. However, there are a few forms of waste generated everyday that can be reused and transformed so as to give them a new use. Specifically, we are talking about used cooking oil. Most specifically, we are referring to the olive oil that we frequently use to deep-fry food.

Once used, olive oil loses its usefulness for cooking but can be put to other uses. One of these is for obtaining soap. This has been quite common household practice and is beneficial both for the environment and for our pockets. Yet this practice has lately been falling into disuse, and it is the duty of all of us to preserve and maintain it within our cultural tradition.

OBJECTIVES

- Understand the importance of recycling for the good of the environment.
- Learn new strategies and behaviours in line with the philosophy of sustainable development.
- Value and relearn popular customs that are respectful of the environment.
- Understand that re-use ultimately brings about energy savings.

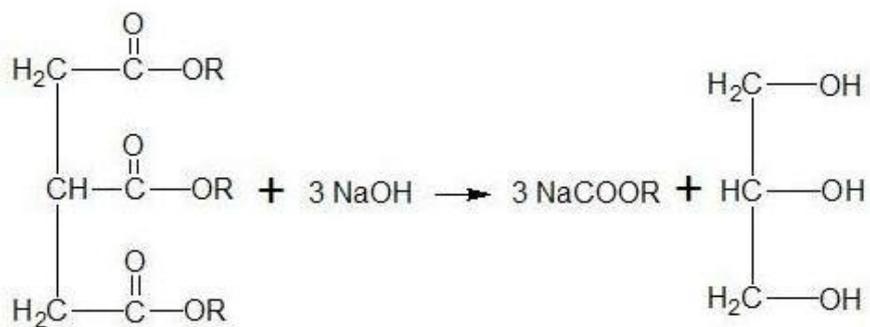
PRELIMINARY CONCEPTS

Re-Use

The second of the rules known as the “3 Rs” – reduce, reuse and recycle – consists of reusing an object so as to give it a worthwhile second life. All materials or goods can have more than one useful life, whether by being repaired for the same usage as before or by being put to a different use with imagination.

Chemical Reaction: Saponification

Saponification is understood as the chemical reaction that produces soap. It is produced as a result of mixing fatty acids (principal components of animal fats and vegetable oils) with an alkaline solution (from a mix of water and a base, such as caustic soda or lye, which is Sodium Hydroxide), producing a salt (the soap) and glycerine.



Aceite
(ester de glicerina y ácido graso)

Sosa
(hidróxido sódico)

Jabón
(Sal de ácido graso)

Glicerina

Oil
(ester of glycerine and fatty acid)

Caustic Soda
(sodium hydroxide)

Soap
(Salt from fatty acid)

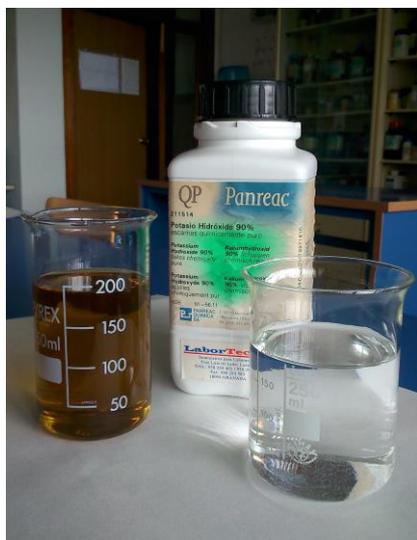
Glycerine

OBJECTIVES

- Obtain soap through the reaction of vegetable oil with caustic soda (sodium hydroxide).
- Develop skills in the handling of laboratory equipment.
- Get to know the basic rules of how a laboratory works.

MATERIAL NEEDED

- o Basic ingredients: used oil, water and caustic soda (sodium hydroxide).
- o Plastic container with sufficient capacity (can be resistant glass or stainless steel, but never aluminium as it reacts strongly with caustic soda).
- o Wooden spoon or stick for stirring the mix.
- o Gloves, safety goggles and laboratory coat (to protect against the caustic soda).
- o Commercial detergent, softener (to make liquid soap).
- o Optional: natural essential oils (lavender, rosemary, etc.) to add aromas.



PROTECTIVE MEASURES

- Use safety gloves and goggles. Caustic soda is a highly aggressive irritant of the skin and one must therefore be protected against possible spillages.
- The place must be ventilated if it is not in the open air. The vapours given off in the reaction of caustic soda with water are toxic and must not be breathed in. You should move away as soon as the caustic soda has been added and wait several minutes before continuing.
- First put the water in place and then add the caustic soda to it – never the other way around. Due to the violent reaction of caustic soda with water, drops could be sprayed out that would burn the skin.
- Mixing will increase the temperature, as befits this type of reaction (exothermic), but this is not of concern. In fact, it will help the process.

PROCEDURE

Solid Soap

- 1) Dissolve $\frac{1}{2}$ kg of caustic soda in 4 litres of water (careful, exothermic reaction).
- 2) Add 4 litres of used oil, filtered beforehand to remove possible solids. It is recommended that the oil is added little by little, constantly stirring the mixture in the same direction until it becomes thicker. This can take approximately 30 minutes. Stop stirring when, on lifting up the spoon, it leaves a trace on the surface.
- 3) Leave 24 to 48 hours to harden.
- 4) Cut into cakes and leave to dry for a month, turning the cakes over every now and again to make sure that they dry equally, in a cool, dry place, away from direct sunlight. This process is highly important. It is called “curing”, in which possible remnants of caustic soda are eliminated.



Liquid Soap

- 1) Proceed in the same way as for solid soap.
- 2) When the solution is cold, add 2 litres used oil, already filtered, stir for about 15 minutes, and when the mixture begins to thicken, add 3 litres of commercial detergent. Continue stirring until all of it has been added and mixed homogeneously.
- 3) The next day, add 4 litres of water, preferably lukewarm, stirring until the mixture is creamy.
- 4) Repeat step 3 for 5 days, always stirring until all of the water has been incorporated into the mixture.
- 5) Over the days that follow, stir the mixture for between 5 and 10 minutes every day until the mixture acquires the consistency desired for the liquid soap. This will not happen immediately, because the reaction continues and lasts for between 5 and 15 days, depending on factors such as the quantity of mixture, temperature, stirring method, etc.