



REPORT SUPPORTING THE "WATER SAVING" CLAIM FOR THE PRODUCTS:

- **Powdered Soap – *Essence du Monde***
- **Technical Powdered Soap – Longlife**
- **Powdered Soap – Caravela**

**Longlife, Saboaria Artesanal Portuguesa Lda
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REPORT SUPPORTING THE CLAIM "WATER SAVING"



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REPORT SUPPORTING THE CLAIM "WATER SAVING"**1. INTRODUCTION**

The cosmetics, perfumery and personal care industry follows the trends dictated by consumers, having to meet their needs and expectations. Currently, there is a tendency to go back to the roots, search for natural, handcrafted products, and a great concern with the preservation of the environment, through the rational use of the natural resources of our planet, such as water.

To meet these expectations, marketing claims are often used in the labeling of cosmetics that have no scientific evidence to support them, misleading the consumer into buying that product.

1.1. OBJECTIVES

The aim of this report is to provide a robust and well-founded study, through the consultation of scientific articles and other reliable sources, that proves that Longlife - Saboaria Artesanal Portuguesa, LDA's powdered soaps (Powdered Soap - Caravela; Technical Powdered Soap - Longlife; and Powdered Soap - *Essence du Monde*) lead to water savings in their value chain. It is intended to support the claim "water saving" and prove that the use of these products is related to the spending of less water, especially in their production, compared to ordinary liquid soaps.

2. GENERAL PRODUCT CHARACTERIZATION**2.1 PRODUCT TYPOLOGY, MAIN INGREDIENTS AND MANUFACTURING PROCESS**

Solid soap is a chemically rather complex cosmetic product, from formulation to use. Depending on the proportions of vegetable oils that make up the soap base, and the amount of other substances added to improve the appearance, fragrance, and texture of the soaps, their properties change, which is why soap formulation is so complex.

Olive oil is one of the vegetable oils that can be added to a solid soap. A good quality olive oil offers many benefits to a cosmetic product because it nourishes and protects the skin and softens it (1). Additionally, olive oil improves the lathering of soap (2). Longlife - Saboaria Artesanal Portuguesa, LDA's solid powdered soaps (Powdered Soap - Caravela; Technical Powdered Soap - Longlife; and Powdered Soap - *Essence du Monde*) contain cold-pressed organic olive oil.

The saponification reaction consists of the alkaline hydrolysis of triglycerides in an oil phase, in which they react with a strong base in an aqueous medium, giving rise to the mixture of glycerol

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and soap (3,4). The strong base suitable for producing a solid soap is sodium hydroxide, also called caustic soda.

For Longlife - Saboaria Artesanal Portuguesa, LDA's solid powdered soaps (Powdered Soap - Caravela; Technical Powdered Soap - Longlife; and Powdered Soap - *Essence du Monde*), the study target of this report, the manufacturing process is hot saponification followed by pulverization of the soaps to obtain powdered soap, which contains about 5 to 8% water.

As a general rule, a solid soap contains 5 - 10% water, while a liquid soap contains about 50 - 80% water (5).

2.2 FUNCTION OF SOLID SOAP POWDERS

Solid soap is a product with low water content, which leads to less bacterial growth, and is therefore a cosmetic product of low microbiological risk, provided that Good Manufacturing Practices are followed (6).

Solid soap is an anionic surfactant, used for fat cleaning operations of fabrics, organic or synthetic such as skin and clothing, in the presence of water. During the cleaning process, the fats of the dirt are dissolved in the apolar chains of the soap molecules, which retain them inside micelles. The micelles, surrounded by water molecules, are then removed by rinsing (7).

The Longlife powdered soaps - Saboaria Artesanal Portuguesa, LDA (Powdered Soap - Caravela; Technical Powdered Soap - Longlife; and Powdered Soap - *Essence du Monde*) are sold in 600gr paper bags and are placed in refillable wall-mounted dispensers. The dose of soap powder to be used varies between 0,3g to 0,8g for Powdered Soap - Caravela and Powdered Soap - *Essence du Monde*; and 1g to 2g for Technical Powdered Soap - Longlife.

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2.3 PRODUCT DATASHEETS

2.3.1 POWDERED SOAP - CARAVELA



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Date: 12/11/2021

Data Sheet

PRODUCT NAME	<i>Powdered Soap - Caravela</i>	
PRODUCT DESCRIPTION	Caravela Powdered Soap is a soap with olive oil and a pleasant scent.	
ORGANOLEPTIC AND PHYSIOCHEMICAL PROPERTIES	ASPECT	Powdered soap
	COLOR	Green
	ODOR	Fresh - Erbal
	DYES	N.A.
	MASS (weight)	600 g
	pH	9,5 - 10,5
INGREDIENTS	Sodium Palmate, Sodium Palm Kernelate, Aqua, Glycerin, Parfum, Sodium Chloride, Olea Europaea Fruit Oil (azeite biológico prensado a frio), BHT, Cl 77288, Tetra Sodium EDTA, Tetra Sodium Etidronate.	
PACKAGING	Paper bag	
STORAGE AND CONSERVATION	In a cool and dry place, out of the reach of any heat source and away from direct sunlight.	
OBSERVATIONS	Do not ingest. Avoid contact with eyes. Keep out of reach of children.	

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2.3.2 TECHNICAL POWDERED SOAP - LONGLIFE



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PRODUCT NAME	<i>Technical Powdered Soap - Longlife</i>	
PRODUCT DESCRIPTION	Vegetable powder handwash for professional use, for cleaning the most difficult dirt, With olive oil and orange essential oil.	
ORGANOLEPTIC AND PHYSIOCHEMICAL PROPERTIES	ASPECTO	Powdered soap
	COLOR	Natural
	ODOR	Fresh - Erbal
	DYES	N.A.
	MASS (weight)	1 kg
	pH	10 - 11
INGREDIENTS	Sodium Palmate, Sodium Palm Kernelate, Aqua, Glycerin, Glyceryl stearate, Citrus Aurantium Dulcis Oil, Sodium Chloride, Sodium Carbonate, Olea Europaea Fruit Oil (azeite biológico prensado a frio), ☞ Olea Europaea Seed Powder, BHT, Tetra Sodium EDTA, Tetra Sodium Etidronate.	
PACKAGING	Paper bag	
STORAGE AND CONSERVATION	In a cool and dry place, out of the reach of any heat source and away from direct sunlight.	
OBSERVATIONS	Do not ingest. Avoid contact with eyes. Keep out of reach of children.	

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2.3.3 POWDERED SOAP – ESSENCE DU MONDE



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Data Sheet

PRODUCT NAME	<i>Powdered Soap - Essence du Monde</i>	
PRODUCT DESCRIPTION	Vegetable-based scented powdered soap with olive oil and mukua from Imbondeiro.	
ORGANOLEPTIC AND PHYSIOCHEMICAL PROPERTIES	ASPECT	Powdered soap
	COLOR	Natural
	ODOR	Floral
	DYES	N.A.
	MASS (weight)	600 g
	pH	9,5 - 10,5
INGREDIENTS	Sodium Palmate, Sodium Olivatate, Sodium Palm Kernelate, Sodium Cocoate, Aqua, Glycerin, Zea Mays Starch, Adansonia Digitata Fruit Extract, Parfum, Sodium Chloride, Olea Europaea Fruit Oil (azeite biológico prensado a frio), BHT, Tetra Sodium EDTA, Tetra Sodium Etidronate, Tetrasodium Glutamate Diacetate.	
PACKAGING	Paper bag	
STORAGE AND CONSERVATION	In a cool and dry place, out of the reach of any heat source and away from direct sunlight.	
OBSERVATIONS	Do not ingest. Avoid contact with eyes. Keep out of reach of children.	

3. SUSTAINABILITY AND RATIONAL CONSUMPTION OF WATER

More than 70% of the planet Earth is covered with water, however, only 3% of this water is fresh water and of this, only 0.5% is available for consumption. The remaining 2.5% is fresh water that is in icebergs, glaciers, atmosphere, soil, under the earth's surface, or polluted (8).

With population growth, and having such a small amount of water for consumption, concerns about the future arise and it becomes necessary to use water rationally.

3.1 WATER CONSUMPTION RELATED TO COSMETICS AND BODY HIGYENE PRODUCTS

Going through the entire value chain of a cosmetic product, it can be seen that the environmental impact is transversal, from the procurement of raw materials to the disposal of the packaging by the consumer (9).

Life Cycle Assessment Studies of cosmetics allow quantifying and managing the environmental impact, including water expenditure, throughout the value chain of a given cosmetic. These studies indicate that the greatest impacts related to water expenditure are in the use of the products, in the case of rinse-off products, such as soaps, and also at the level of the cultivation of the raw materials of plant origin, in obtaining the packaging materials and at the level of the production of the cosmetic, with the inclusion of water in the product formula (Figure 1) (11).

Generally speaking, water consumption can occur at two important stages in the life cycle of a soap: in its manufacture and in its use by the consumer.

Manufacturers cannot directly influence how the product is used and how much water is used by the consumer, but they can influence manufacturing by choosing formulations with lower water content without compromising quality and functionality.



Figure 1. Possible ways to reduce the environmental impact of a cosmetic, along the entire value chain (Adapted from Cosmetics Europe 2016) (11).

3.2 ANALYSIS OF WATER CONSUMPTION RELATED TO LONGLIFE SOLID POWDERED SOAP AND COMMON LIQUID SOAPS

At the production stage, the processes involved in the manufacture of liquid soaps generally involve the dissolution of raw materials in a large amount of water to obtain liquid soap with the desired viscosity. The final product is a liquid soap with 50-80% water content, which means that, to manufacture a batch of 100kg of liquid soap, the water consumption can reach 80L.

For the solid powdered soaps targeted in the study of this report, the manufacturing process is hot saponification, followed by pulverization of the soaps to obtain the soap powder, which contains about 5 to 8% water. In this case, for the manufacture of a 100kg batch, the water expenditure will be at most 8L.

Considering these values, it can be seen that the manufacture of solid soaps leads to water savings of up to 90%, since Longlife solid powdered soaps have in their constitution a much smaller amount of water than normal liquid soaps.

Consumer behavior studies and laboratory tests allow us to determine the amounts of product used with each use of the product. In addition, some products have the recommended usage dose indicated on the packaging (12).

Regarding the water savings related to the use of the products, it is known that one dose of soap powder for hand washing is approximately 0,8g, while for normal liquid soaps this dose is 2,5g, an amount three times bigger. This means that for each use, if liquid soap is used, about 2ml of water is used, while for Longlife solid powdered soaps, this figure is only 0.064ml, i.e. 31 times

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less. Thus, with each use of Longlife solid powdered soap, there is a formulation-related water saving of about 96.8% (Table 1).

Considering that each person washes their hands on average 10 times a day, using Longlife solid powdered soaps leads to a daily water saving of 31,25ml, which after one year translates into a saving of 11,4L, and after 10 years to 114,00L. If we consider a sample of 1000 individuals, we achieve savings of 114.000,00L after 10 years.

We can see that using Longlife powdered soaps leads to considerable water savings compared to ordinary liquid soaps

Table 1. Summary of the percentage (%) water savings associated with each Longlife product.

Products	% of water in product	Recommended dose per use	% of water savings per use, compared to regular liquid soap	Packaging
Powdered Soap - Caravela	5-8%	0,3-0,8gr	96,8 to 98,8%	Paper Bag
Technical Powdered Soap - Longlife	5-8%	1-2gr	92 to 96%	Paper Bag
Powdered Soap - Essence du Monde	5-8%	0,3-0,8gr	96,8 to 98,8%	Paper Bag
Regular liquid soap	50-80%	2,5gr	-	Plastic packaging and dispenser

3.3 ENVIRONMENTAL IMPACT OF TRANSPORTATION, USE AND DISPOSAL OF SOLID AND LIQUID SOAPS

The environmental impact of cosmetic and body care products goes far beyond their manufacture. Processes such as transporting the products from the factory to the retail store and from the retail store to the consumer's home are also important regarding the ecological footprint left by the products.

The consumer's choice of solid soaps or liquid soaps has different consequences on CO₂ emissions and expenditure of natural resources, as well as the type of disposal and treatment of wastewater resulting from the use of the two types of soaps.

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The environmental impact related to transportation of these products has already been analyzed. Studies indicate that the transport of solid soaps, for example from store to home, simulating distances of 6km, 10km and 15km, has a higher environmental impact for liquid soaps than for solid soaps (13). This fact can be explained by the presence of water in liquid soaps, which increases their weight, thus increasing the energy required to perform the transportation, per unit or weight of product. Thus, it can be seen that the transportation of Longlife solid powdered soaps is much more efficient than the transportation of ordinary liquid soaps.

Studies indicate that liquid soap usage has greater global warming potential than solid soap usage. Liquid soaps lead to 10 times more carbon emissions than solid soaps.

When it comes to wastewater treatment resulting from hand washing with the products, the impact of solid soap is much lower than liquid soap, largely due to its composition: solid soaps generally have natural oils, while liquid soaps have a higher percentage of chemically derived ingredients, the final treatment of which leads to higher energy consumption (13).

3.4 ENVIRONMENTAL IMPACT OF PACKAGING

Solid soaps are one of the few cosmetic and body hygiene products whose final packaging can only be the primary packaging and made of paper or cardboard. In the case of Longlife - Saboaria Artesanal Portuguesa, LDA's solid powdered soaps (Powdered Soap - Caravela; Technical Powdered Soap - Longlife; and Powdered Soap - *Essence du Monde*), the final packaging is a 600gr recyclable paper bag.

Liquid soaps require a package that is usually made of plastic (e.g. PET), with a suitable dispenser made of the same material. This type of material requires more energy to produce than paper or cardboard and is often difficult to recycle and reuse.

3.5 ABSENCE OF INGREDIENTS DERIVED FROM PETROLEUM

The choice of ingredients to be used in a soap formulation should take into account not only the effect they have on performance, cleaning effectiveness and sensory properties, but also their origin. Ingredients should be chosen from renewable sources, obtained by extraction methods with low environmental impact, and finally, that are biodegradable and do not accumulate in nature.

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From an environmental and sustainability perspective, the use of ingredients from renewable sources such as plants avoids the additional environmental impact resulting from oil extraction and the production of petrochemicals.

Table 2. Longlife - Saboaria Artesanal Portuguesa, LDA powdered soaps and respective list of ingredients.

NAME	LIST OF INGREDIENTS
Powdered Soap - Caravela	Sodium Palmate, Sodium Palm Kernelate, Aqua, Glycerin, Parfum, Sodium Chloride, Olea Europaea Fruit Oil (cold-pressed olive oil), BHT, CI 77288, Tetra Sodium EDTA, Tetra Sodium Etidronate.
Powdered Soap - <i>Essence du Monde</i>	Sodium Palmate, Sodium Oliviate, Sodium Palm Kernelate, Sodium Cocoate, Aqua, Glycerin, Zea Mays Starch, Adansonia Digitata Fruit Extract, Parfum, Sodium Chloride, Olea Europaea Fruit Oil (cold-pressed olive oil), BHT, Tetra Sodium EDTA, Tetra Sodium Etidronate, Tetrasodium Glutamate Diacetate.
Technical Powdered Soap - Longlife	Sodium Palmate, Sodium Palm Kernelate, Aqua, Glycerin, Glyceryl stearate, Citrus Aurantium Dulcis Oil, Sodium Chloride, Sodium Carbonate, Olea Europaea Fruit Oil (cold-pressed olive oil), Olea Europaea Seed Powder, BHT, Tetra Sodium EDTA, Tetra Sodium Etidronate.

The content of carbon molecules derived from renewable sources is one of the main criteria to be taken into account to formulate sustainable cosmetic products (14). The use of plant-derived ingredients, such as palm oil and olive oil, present in Longlife - Saboaria Artesanal Portuguesa, LDA's solid soap (Powdered Soap - Caravela; Technical Powdered Soap - Longlife; and Powdered Soap - *Essence du Monde*), instead of ingredients from non-renewable sources such as petroleum, allow a much lower ecological footprint compared to liquid soaps, which contain for example Sodium Lauryl Sulfate (SLS) and Sodium Laurileter Sulfate (SLES) derived from petroleum (14). SLS and SLES are surfactants used as emulsifiers and as surfactants, which unfortunately are also associated with allergic reactions on the skin due to their more aggressive nature (14).

SLS is an anionic surfactant widely used in cosmetics and detergents. The concentration of SLS in these products ranges from 0,01% to 50% in cosmetic products and from 1% to 30% in cleaning products. Synthetic SLS is obtained from lauryl alcohol, which is usually obtained from

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petroleum (14). Other ingredients originating from petroleum such as petroleum jelly, mineral oils or liquid paraffin are also absent in Longlife - Saboaria Artesanal Portuguesa, LDA solid soap powders (Powdered Soap - Caravela; Technical Powdered Soap - Longlife; and Powdered Soap - *Essence du Monde*).

The choice of SLS and SLES for liquid soaps is due to the fact that they lather a lot, which the consumer mistakenly associates with better cleanliness. Petroleum products are associated with climate change since, being a fossil fuel, combustion leads to the emission of environmental pollutants such as carbon dioxide and carbon monoxide, gases that contribute to the greenhouse effect. When comparing liquid soaps containing SLS and SLES, with solid soaps like Longlife's, which contain plant-based ingredients known to protect the skin, such as olive oil, we find that these are less aggressive, maintain their ability to clean hands and have a much lower environmental impact, as they do not contain any ingredients derived from petroleum.

4. CONCLUSION

As a result of globalization, the role of cosmetics is rapidly evolving and their use is increasingly considered an essential part of personal well-being. The cosmetics industry faces new challenges related to factors such as: the emergence of new types of markets and consumers, the need to diversify product types (features and textures, for example), price-quality ratio and the use of more sustainable raw materials, manufacturing processes and packaging. The average consumer is also more aware of the environmental impact of the cosmetics industry and demands solutions that maintain product quality but with a smaller ecological footprint.

It is urgent to contribute to a sustainable value chain of cosmetics and body hygiene products focused on the rational use of natural resources, such as water. To do so it is necessary to look critically at the various processes involved, acting for example at the level of choice of raw materials, selection of the most environmentally friendly manufacturing method, selection of the most sustainable formula, selection of packaging, type of transport, rational use by the consumer, and end-of-life disposal mode.

Using water-saving strategies can help save money, keep the environment healthier, and reduce wastewater treatment and the amount of energy used for this purpose. By decreasing the energy used, one also decreases environmental pollution.

Longlife - Saboaria Artesanal Portuguesa, LDA's solid powdered soaps (Powdered Soap - Caravela; Technical Powdered Soap - Longlife; and Powdered Soap - *Essence du Monde*) were

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designed and produced to lead to water savings by being formulated with only 5-8% water in the final product.

In this report, the "water saving" claim was solidly substantiated, and it was concluded that the use of Longlife solid powdered soaps, can lead to water savings of up to 96,8% with each use, compared to ordinary liquid soaps.

The advantages of using Longlife powdered soaps, in addition to the water savings clearly shown throughout this report, also relate to environmental benefits in terms of decreased carbon emissions related to the manufacturing process, treatment of wastewater resulting from the use of the product by the consumer, and finally in terms of production and disposal of packaging, compared to a common liquid soap.

It is concluded that the claim "water saving" can be associated with Longlife - Saboaria Artesanal Portuguesa, LDA's powdered soaps (Powdered Soap - Caravela; Technical Powdered Soap - Longlife; and Powdered Soap - *Essence du Monde*) in the labeling and advertising materials, in a legitimate way and showing full transparency to the consumer.

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