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Evaluation of the Efficiency and Acceptance of Biosoap in Different Domestic Applications

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Abstract

This study investigates the integration of effective microorganisms (EM) into soap production, aiming to enhance the biodegradation of organic compounds in effluents while adhering to global sustainability and regulatory standards. Originating from the historical evolution of soap making, which has seen transitions from ancient practices to modern chemical processes, this research highlights the environmental impact of synthetic surfactants and explores biosurfactants as sustainable alternatives. We conducted a methodological evaluation involving eleven volunteers who tested different types of Biosoap, including Coconut bar, Liquid Coconut, and Reused Oil variants. The results showed positive feedback on the soap's effectiveness in cleaning and skin care, with notable benefits in hydration and potential wound healing. Additionally, improvements were observed in the functioning of household grease traps and septic systems, suggesting that the use of EM-enhanced Biosoap could lead to significant environmental benefits. The findings support the potential of Biosoap not only as a cleaning agent but also as a therapeutic skin care product, encouraging further research with a larger sample size to substantiate these preliminary results and fully explore the ecological and dermatological benefits.

Keywords: Biosoap; Effective Microorganisms; Microencapsulation; Biodegradability; Wastewater Treatment; Environmental sustainability; Saponification; Eco-friendly Detergents

Abbreviations: EM: Effective Microorganisms; UFC: Colony Forming Unit; BOD: Biochemical oxygen demand; COD: Chemical Oxygen Demand

Introduction

The historical development of soap can be traced back to accidental discoveries and ancient formulations. Initially observed by Roman washerwomen around 1000 BC, the beneficial properties of mixing animal fats with wood ash were later refined by the Phoenicians around 600 BC into a basic form of soap. Despite the evolution of soap ingredients and manufacturing processes, the core concept of saponification has remained relatively constant. The global increase in soap consumption brought about by lifestyle changes and industrial advances led to environmental concerns, especially with synthetic surfactants derived from petroleum. These concerns have spurred developments in green chemistry and the exploration of biosurfactants as sustainable alternatives due to their environmental benefits. The present study explores the innovative use of effective microorganisms (EM) in soap production, aiming to enhance the biodegradation of organic compounds in effluents and align with global sustainability and regulatory standards. This approach not only improves the ecological profile of soaps but also enhances their functional benefits in various applications [1-4].

Methodology

The study involved distributing four types of Biosoap to eleven volunteers, subsequently asking for their impressions and observations regarding the product's effectiveness. The types of Biosoap tested included: Coconut Bar (white), Liquid Coconut (white), Liquid reused oil and Reused oil in bar (blue).

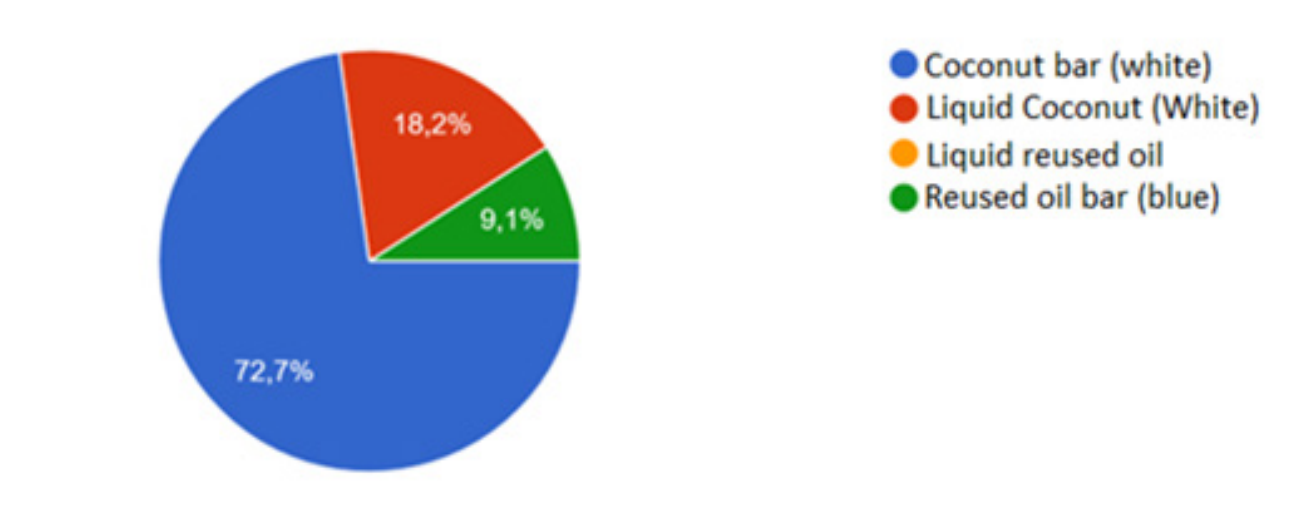
Results

A new test was carried out with a microencapsulated product, the result was satisfactory in visual appearance (Figure 1). In analysis, Biosoap presented good quality in terms of cleaning agent parameters and mainly the concentration of viable cells (Table 1) for inoculation of the treatment system of a single-family residence. The satisfaction survey with eleven volunteers, had the following usage percentages: Coconut bar (white) with 75%, Liquid coconut (white) with 16.7% and Reused oil in bar (blue) with 8.3%, Graph 1. The general perception of users was positive, highlighting its effectiveness in cleaning dishes and clothes, as well as benefits for the skin. Specific observations included improved skin hydration and appearance when using coconut bar soap, greater effectiveness in removing food residue from dishes, and the perception of softer, hypoallergenic clothing. [11,12]. Furthermore, some participants reported improvements in the functioning of the grease trap, with reduced odors and less frequency of fat accumulation. Others mentioned improvements to septic tank and sink systems, including reducing odors and clogging [13].

Table 1: Result of the Biosoap efficiency analysis.

Index	Experiments		
	1	2	3
pH before drying	14	12.4	12.5
Iodine	192	186	179
Conditioning - %	46	46	51
Cleaning - %	59	58	50
Bubbles - %	59	59	53
Persistence - %	49	49	42
Toughness - %	45	45	47
Solubility - %	55	55	53
Drying - %	54	53	46
Microorganisms - UFC /g	>1x10^2	>1x10^2	4.0x10^5
Temperature when applying microorganisms - °C	85	25.5	34
Bleach (Sodium Hydroxide) - % purity	50	99	99
pH after drying	14	8	8

Source: Authors



Graphic 1: Satisfaction survey of Biosabão types.

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Figure 1: Photo of Biosoap with Microencapsulated microorganisms (75mm and 100g).

Discussion

The results indicate a strong acceptance of Biosoap in different forms, mainly in the coconut bar and reused oil versions [14-19]. Particularly notable was the reported benefits for the skin, including improved hydration, radiance and even wound healing. This observation is crucial as it suggests that Biosoap may have beneficial properties not only as a cleansing agent, but also as a potential adjuvant treatment for the skin, especially in cases of dry or damaged skin [20-24]. Furthermore, participants reported improvements in the functioning of the grease trap, with reduced odors and less frequency of fat accumulation [25-27]. Others mentioned improvements to septic tank and sink systems, including reducing odors and clogging [28].

Acknowledgment

This preliminary study demonstrates the effectiveness and acceptance of Biosoap by users in multiple domestic applications, justifying future investigations with a larger sample to validate these results on a broader scale. The perceived efficacy in improving skin condition and wound healing potential particularly highlights Biosoap as a product of interest for future dermatological studies.

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