

USE OF FIXED OIL FROM SOURSOP AGROINDUSTRIAL WASTE TO PRODUCE ECO-FRIENDLY SOAP

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Abstract

Annona muricata L. (soursop) is a tropical fruit from Central America that can also be found in Brazil, Africa and Asia. When the fruits are processed, seeds are inevitably mixed in with the pulp fiber, and need to be separated as a byproduct, traditionally considered waste. Although this byproduct has significant quantities of fatty acids, fibrous matter and other compounds with functional properties, it is mostly discarded in landfills or dumps, without compliance with environmental regulations. So, this study describes the use of soursop seeds to make eco-friendly soap. In this context, the potential of the fixed oil extracted from the seeds was evaluated, to understand how it can be useful in pharmaceutical formulations. The oil was extracted by extrusion and the soap was made with 85% synthetic base, 1.5% soursop oil, 12% glycerin, 0.1% BHT, 0.12% methylparaben, 0.1% propylparaben and sufficient quantities of essences and coloring. Other parameters were investigated, such as increasing the oil concentration and decreasing the synthetic base, using respectively 3% and 6% oil concentration. The prototypes already have shown favorable preliminary physical, chemical and mechanical properties. Soap samples were placed in a water bath until the synthetic base melted at 60 °C. After that, the temperature was decreased to 40 °C and the base was mixed with the other ingredients smoothly. The soap's pH varied from 9.2 to 9.8, meaning it has good cleaning quality. The foam height was measured by shaking 1 g of the soap in 10 ml of water in a beaker for 1 minute, with the results being measured after the soap-water solution was left at rest for 15 minutes. The foam volume varied from 17 ml to 28 ml on average. The acidity index was measured using NaOH. First the soap was placed in a water bath until it melted, after which an alcohol-ether solution was added. The acidity index ranged from 1.3 KOH/g to 4.95 KOH/g. The melting point was measured also, and varied from 84 °C to 89 °C. The data were submitted to the F-test (ANOVA) and Tukey post hoc test ($p < 0.05$), showing that the averages did not vary significantly from each other. Our preliminary studies have shown that the synthetic base can be substituted by the soursop oil without affecting the functionalities. Therefore, systematic investigation needs to be carried out to discover new functionalities, given that soursop oil has many attractive features to produce sustainable products. Besides this, our results help the scientific community by providing new knowledge about the ecological appeal that is so necessary nowadays, to encourage the development of technologies that are friendly to the environment. Consumers' demand for eco-friendly products is growing, requiring efforts for replacement of synthetic bases and glycerin with the seed oil for making soap, mainly because the oil has cleaning and hydrating functionalities.

Keywords

Agroindustrial waste, Angiosperm, Reuse, Soursop, Sustainability.