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# The Fruit of The Pine Nut (Jatrophas Curcas) in The Production of Traditional Soap: Recovery of Ancestral Knowledge

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***Abstract*---*The study is a recovery of ancestral knowledge of the production of soap from the fruit of the pine nut (Jatrophas curcas) in the Manabita montubian community, the problem being the decrease in the production of soaps due to the scarcity of pine nut cultivation in rural areas. The objective of this work is to recover the ancestral knowledge using the fruit of the plant for the production of the traditional soap, giving it an added value in its handmade packaging. Experimental field research was used to physically and bromatological characterize the pine nut seed and determine factors such as humidity, seed, protein, fat, and pH; an interview was conducted with Montubio women to recover the ancestral knowledge of the elaboration of traditional soap using the pine nut seed; as a result, a characterization of the quality seed and the production process of the pine nut soap was obtained. In conclusion, it was possible to rescue the ancestral knowledge of the elaboration of the traditional Prieto soap as part of the richness and cultural identity of the Montubian community.*
***Keywords*---*ancestral knowledge, cultural identity, handicraft, pine nut, soap***

## Introduction

Ecuador is a country with a great diversity of cultures and ethnicities, traditions and customs that are part of the identity of its inhabitants, within that diversity also welcomes the natural richness of endemic plants that have scarcely been studied, one of which is the Jatropha curcas L, commonlyknown as pinion or tempate. According to the species Jatropha curcas is a shrub or evergreen tree, small and native to America, but widely cultivated in countries of Asia and Africa; it is recognized for being an excellent crop because it adapts easily to arid, semi-arid areas, and little affected by pests and diseases (Chica et al., 2021; Poveda & Erazo, 2017; Pabón, 2012). This deciduous leafy tree can live 30 to 50 years, and withstand times of drought, begins fruit production after one year of its establishment; of which, each fruit contains three seeds, commonly known as "pinion" (Echeverria et al., 2010; Ayala, 2011).

White sprocket provides many beneficial products, especially from its seeds, from which oil can be extracted, with a quality similar to that of oil palm. This oil can replace kerosene, oil and firewood/coal with relative success, so its use is promoted internationally to meet the demands of lighting, cooking and driving force. It is a nature-friendly plant and presents some medicinal goodness, it is also quite recognized for extracting oil from its seeds, for the production of biodiesel and soap, a positive impact on the environment is carbon capture, another benefit is the use of cake as fertilizer for different crops and animal feed (Toral et al., 2008; Zambrano et al., 2019; Rubio, 2005). It is considered as a potential alternative to biodiesel production in various parts of the world, but little is known

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about its production system, productivity, production costs, pest incidence, physiology, seed composition and oil extraction processes. The physicochemical characteristics of this oil such as viscosity, iodine index and saponification, allow to suggest its application in the manufacture of biodiesel, varnishes, betuns and soaps (De Arruda et al., 2004; Pabón, 2012).

Although pinion is sown in different parts of the world, very different productivity behaviors are marked in each region. In Ecuador, in the coastal or coastal area, it has traditionally been planted on rural farms as living fences and used in the oil industry, for the artisanal production of soaps (Villalta et al., 2009; Lopez, 2009). Although pinion seeds are not edible, due to the presence of forbol esters that confer a purging effect on them, other parts of the plant such as leaves and bark are used in traditional medicine and for veterinary purposes. The cooking of the leaves is used against coughing, and as an antiseptic after delivery, and sap flowing from the stem is used to counteract bleeding caused by wounds (Makkar et al., 1997: Heller, 1996). Thus, in the province of Manabí, the planting and harvesting of pinion for the production of derived products, was part of the Montubian identity in the different enclosures of rurality, as well as used as living barriers that served for the delimitation of land between neighbors; one of the main uses of the pinion tree was the production of the traditional prieto soap, a very laborious activity developed especially by the peasant woman (Zambrano et al., 2019). Today, pinion crops are disappearing, the same ones that have been replaced by wood trees, consequently the production of prieto soap has also been reduced, because the cultivation of pinion today is very scarce. The objective of this research work was to recover ancestral knowledge using the sprocket fruit for the production of the traditional prieto soap by providing it with added value in its presentation and artisanal packaging (Barnes, 1987; Gölge & Ova, 2008).

## Materials and Methods

The study was carried out in Abdón Calderón Parish, Bijahual community, in order to take advantage of the sprocket fruit to make the traditional prieto soap. The materials to be used for the production of prieto soap (these were peeled pinion, ash, bleach water, bait, stick spoon, dried banana leaves, saptan strips, wood, fresh basil, Bay boxes) (Kelly, 2019; Sussman, 2002). As a methodology experimental field research was used to determine physical – pinion seed chemicals such as weight, length, width and thickness; Moisture, ash, fiber, protein and fat; Ph of soap. Consequently, the interview was applied to peasant women of the place to recover the ancestral knowledge of the elaboration of the traditional prieto soap using the pinion and other necessary inputs that would allow to obtain the quality of the final product (Mishra, 2016; Sadguna et al., 2017).

## Results and Discussions

Pinion or Jatrofa curca is a plant that is grown in almost all of Latin America and tropical countries is grown as living fences, according to some authors it is a multipurpose species, with different attributes and considerable energy potential, in Ecuador its oil is used to produce biodiesel (Gámez et al., 2020). It is a plant of tropical origin, of the family Euphorbiaceous, which can grow in both high and low annual rainfall areas, resists drought and can be grown in marginal areas, making it exceptional for the recovery of degraded lands, without competing with crop production for food (Toral et al., 2008; Muentes et al., 2017). To carry out the study, the harvesting of the product and the separation of the seed began, in Figure 1, the product can be observed from the green fruit to the seeds.

Figure 1. The fruit of the pinion

After harvesting, interviews were conducted to create knowledge for the production of prieto soap. This requires 20 to 22 days, with the days of collection and prior use of the pinion fruit. In the collection of the pinion, a total of 7264 gr is obtained during the 3 days, then the fruit is peeled in a traditional way by taking a heavy object and hitting pepa with pinion pepa; this operation required the help of much of the family, until it achieved a white pepa and a total of

3,632 gr, which requires 4 days (Cox, 2004; Carrozzino et al., 2011). At the same time, 6 810 gr of ash is soaked in water to produce bleach water. Figures 2, 3, 4 and 5 show the steps to follow.


Figure 2. In (2) harvesting, obtaining bleach water (3), peeling the fruit (4), cooking the peeled seed (5)

The wood oven is lit and a heavy pot with 8 L of bleach water is placed, the 3632 g of pinion peeled into the water is added, the bait is melted and the other ingredients are incorporated and from that moment it will pass into the oven supplied with a lot of fire for a time between 8 to 12 days , constantly stirring the mixture with a wooden spoon to prevent soap from being on fire; fresh basil branches and 4 L of bleach water are added in the first few days. From the 6th day only 2 L of water is added, as the drying phase begins (He & Wang, 2015; Ting et al., 2000). At 8 days of cooking the mixture is completely dry and it is when it needs to be poured into 2 large containers so that it can cool down and spends at least 2 to 4 days in a cool environment obtaining a final weight of the pinion cake of 6 kilos with 300gr (13.2 pounds). Immediately the soap is cut, weighed and wrapd using pre-collected dried banana leaves. In Figure 6, the addition of bait, in (7) reseated from soap, in (8) prieto soap cake and in (9) final product is observed.


Figure 6. Added bait, in (7) soap reseated, in (8) prieto soap cake and in (9) final product.

Tables (1) and (2) describe the physical and bromatological characterization performed on pinion seeds with which it was experimented to make prieto soap, and table (3) shows the pH of the soap made from the rescue of ancestral knowledge.

Table 1
Physical characterization of Jatropha curcas seed

| Parameters | Ranges | unit |
|---|---|---|
| Peso | 0.75-0.80 | gr |
| Longitud | 1.50-2 | cm |
| Ancho | 0.43-0.55 | cm |
| Espesor | 0.86-0.90 | Cm |

Figure 11 shows the seed characterization Jatropha curcas

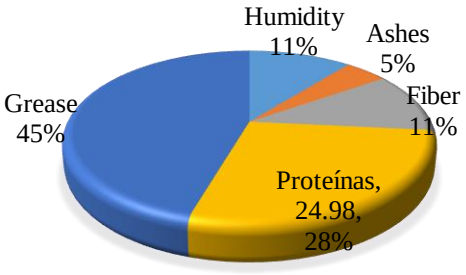


Figure 11. Bromatological characterization of Jatropha curcas seed
Source: INIAP EETP

Table 2
pH in Jatropha curcas soap samples

| Tests | Repetitions | | | Arithmetic mean |
|---|---|---|---|---|
| | 1 | 2 | 3 | |
| 1 | 10,09 | 10,08 | 10,09 | 10,087 |
| 2 | 10,01 | 10,00 | 10,04 | 10,017 |
| 3 | 9,98 | 10,01 | 9,97 | 9,987 |

Source: INIAP-EETP

According to the physical characterization of pinion seed in a study conducted by Jatropha curcas seed yielded a weight of 0.75-0.80 gr, the length of 1.50-2cm, the width of 0.75-1.00cm and a thickness of 0.50-0.75 cm. In this work the characterization of the pinion seed was carried out, obtaining as results a weight of 0.75-0.80gr, length 1.50-2cm, width of 0.43-0.55cm, and thickness 0.86-0.90cm (Saldarriega & Zambrano, 2014). Contrasted both results, similarities were obtained in the weight and length of the seed, having variation with the width and thickness; because both studies were carried out in Manabí, one in Calcuteta and the other in the parish Abdón Calderón. However, in another study conducted in Mexico, they obtained physical parameters of the seed, weight of 0.72-0.74gr, thickness of 0.71-0.74cm and length of 0.59-0.68cm. There is a big difference between the two physical characterizations due to the natural conditions of such countries (Zavala et al., 2015).

Thus also the bromatological parameters and pH obtained from the experimentation reveal a range between 9-10 that makes it slightly alkaline, which according to a natural bactericide, which prevents bacteria from accumulating in soap, but that mostly combats bacteria in the skin and anywhere in the body where it is used; reaffirming in this way the ancestral knowledge of the use and application of this soap for various skin conditions, since the artisanal soap obtained from Jatropha curcas is darker, in which influences bleach producing a change in the coloration of soap, in this case, bleach water as an alkaline element, is the key to producing a quality prieto soap (Castelles, 2018; Garcia, 2019).

Table 3
Raw material ratio - fruit yield

| Raw material (sprocket fruit) | Yield (seed) |
|---|---|
| 7264 gr | 3632 gr |

Table 4
Results of prieto soap production

| Need | Quantity | Production (100 gr) | Yield (%) | Loss (%) |
|---|---|---|---|---|
| Semilla | 3 632 gr | | | |
| Cebo | 1 816 gr | 63 jabones | 86,73 | 13,27 |
| Ceniza | 6 810 gr | | | |
| Agua de lejía | 8 L | | | |

According to table (4) and (5), the introduced raw material (pinion) yields 50%, i.e. 50% is used to produce soap and the remaining waste mass can be usable to produce bio fertilizer, which is quite convenient in the production process (Altugan, 2015; Moore & Barker,2012). Considering further that, when mixing the seed with the other ingredients, the yield of the cake produced exceeds 86%, significantly reducing the loss by preparation effect of the mixture to produce the prieto soap.

**Conclusion**

The production of prieto soap is an ancestral knowledge that has been present in the breeding of the Manabite montubio, traditionally made by peasant women and marketed by men when they sell agricultural production. This custom is part of the identity of the Montubio people and the Manabite cultural tradition. Although it has an unpleasant smell, its goodness is fabulous, so it is used for removing spots on the skin, combating dandruff, removing bruises and odors on the body and can even slow the appearance of gray hairs and skin diseases. The fruit of the pinion to make the prieto soap combines the physical and chemical characteristics to produce a quality prieto soap with a slightly alkaline pH, although half of the fruit is used due to the bulk of the shell it has, this soap gathers the necessary elements to manifest the benefits of its use and body application, as used by our montuvial ancestors.

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