

Full Length Research

Development of laundry soap from jatropa, castor and palm oils

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Accepted 20 March 2019

The activity of the contribution arises out of the actual situation in the Ethiopia, where the Lower class of peoples didn't use soap because they hadn't money to buy soap from market. This led up to serious problems with sanitation and causes for different diseases. For this reason the experiment was conducted with the objective of developed and evaluated soap by substitute edible oil with nonedible (jatropa, castor and palm) oils. Jatropa, castor and palm oil is nonedible oil which has more benefits to soap making. It has also cosmetics and medicinal properties. Several parameters were considered for developed laundry soaps from jatropa, castor and palm oils. Values of pH for jatropa, castor and palm oil soap were 6.8, 7.4 and 7.2, for maximum moisture and volatile matter content at 105 °C were 29.18, 28.82 and 30, for minimum total fatty matter 62.3, 62.57 and 62.6, for maximum total free fat (unsaponified and unsaponifiable fatty matter) 0.18, 0.19 and 0.15, for maximum matter insoluble in water 0.2, 0.16 and 0.13, for maximum matter insoluble in ethanol 2.2, 1.9 and 1.86, for maximum chloride content as NaCl 0.15, 0.3 and 0.25, for maximum total free alkali as sodium hydroxide ND, 0.16 and 0.18, for maximum free caustic alkali as sodium hydroxide ND, 0.02 and 0.04 respectively. From the activity it can be conclude that the chemical properties of developed soap were within the limits set by standards of East African laundry soap and humans made easily in their homes.

Key Words: Jatropa, Castor, Palm, Soap making

Cite this article as: Seferu TW (2019). Development of laundry soap from jatropa, castor and palm oils. Acad. Res. J. Agri. Sci. Res. 7(5): 227-230

INTRODUCTION

Soaps are one of the major elements which we use in our everyday life. Basically soaps are the sodium and potassium salts of higher fatty acids, such as oleic, stearic, lauric, and palmitic acids (Sharma, 2000). These fatty acids are responsible for foaming and cleansing actions of soaps. Soaps are generally produced using edible oils, that is, palm oil, coconut oil, soybean oil, groundnut oil (Najjar et al., 2014). However, usages of nonedible oils have advantages; it can significantly reduce the consumption of edible oils and ultimately the dependence on edible oils for soap manufacturing.

Among the known non edible oils, Jatropa, castor and palm oil can be used for soap making. Mostly Jatropa, castor and palm oil soap are known for its medicinal properties and sensitivity. It is used for the remedy of various skin diseases. (Messemaker, 2008; Akbar et al., 2009). The 36% linoleic acid (C18:2) content in Jatropa oil makes it an interesting candidate for skincare.(Henning, 2000; Benge, 2009).The oil also has components in hair conditioners.(Brittaine et al., 2010).Jatropa, castor and palm grows in various parts of Ethiopia, as a hedge around homesteads and farmlands,

such as in Wolayita, Metekel, Southern Wollo, Northern and Eastern Shoa, Tigray, Gamo Gofa zones and Gambella region (Sadubthummarak et al., 2013; Najjar et al., 2014; Kassahun et al., 2016). This suggests that *Jatropha*, castor and palm can be cultivated either as large-scale plantations on marginal areas, as small-scale hedges, or intercropped to assist rural livelihoods. Although *Jatropha*, castor and palm already exist in many places of Ethiopia; its economic importance is far from being realized due to the absence of proper evaluation and promotion of the existing local *Jatropha*, castor and palm provenances for oil yield, oil quality for biodiesel utilization and further use of oils for soap making process. In Ethiopia especially rural part of peoples haven't use soap because they haven't money to buy it. Due to these most of rural part of Ethiopia people affect with typhus, common cold and other problems related to lack of sanitation. *Jatropha*, castor and palm are grown everywhere in Ethiopia and they are perennial crops (Kassahun et al., 2016). So this activity is designed to develop soaps from *Jatropha*, castor and palm and improve the sanitation problems of rural part of Ethiopia, whose population is very high (85%).

MATERIALS AND METHODOLOGY

Plant Material

The seeds of *Jatropha*, palm and castor were collected

from five regions of Ethiopia namely Southern Nation Nationalities Peoples Regional State (SNNPRS), Amhara region, Tigray region, Oromia region and Benishangul Gumuz Regions, where seeds are found abundantly.

Oil extraction

Oil is extracted by mechanical pressing method. For the operation, at first the *Jatropha*, palm and castor seeds are collected and dried at sun. Then, husks were removed to separate seeds from the seed. Then, seed kernels were opened by removing the black seed shells. These shelled seed kernels were used to press, and oil was extracted and collected. Then crude oil was filtered by using filter paper.

Formulation of soap from *Jatropha*, castor and palm oils

- 1) Mixed properly 24.04% water and 11.75% caustic soda
- 2) Heat 64.21% *Jatropha*, castor and palm oil until 65°C and mixed with the solution of caustic soda and stir with clean stick wood for 20 minutes then finally 2ml essential oil of lemongrass was added for flavor purpose.
- 3) Put in flat container and dry until the moisture was evaporating then cut in to needed sizes.
- 4) Finally determination of quality parameters of soap were done

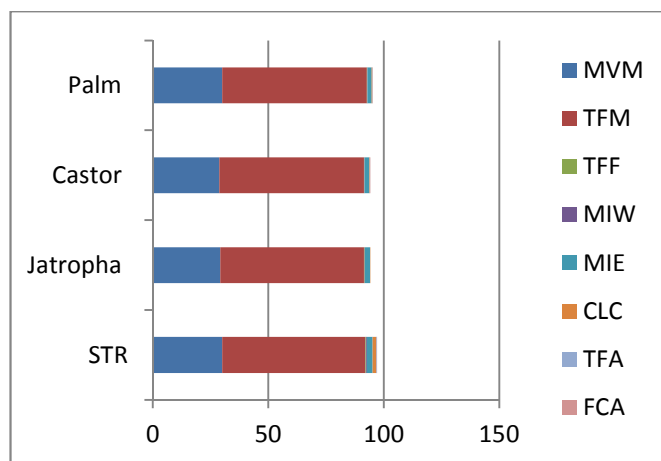


Figure 1: The comparison of chemical properties of soap with guide lines of East African standard

Whereas: MVM = moisture and volatile matter content by; TFM = Min. Total fatty matter; TFF = maximum total free fat; MIW = Matter insoluble in water, max; MIE = Matter insoluble in ethanol, max.; CLC = Max. chloride content; TFA = Max. total free alkaline content; FCA = Max. Free caustic alkali content.

Table 1. The mean chemical properties of jatropha, castor and Palm oil soaps as done in Wondgenet, natural product laboratory.

Parameters	EAS 31:2011%(m/m)	Jatropha oil soap %(m/m)	Castor oil soap%(m/m)	Palm oil soap%(m/m)	Methods of test
pH	6.5 – 8	6.8	7.4	7.2	pH meter
Moisture and volatile matter content at 105 °C, max	30	29.18	28.82	30	ISO 672
Total fatty matter, min	62	62.3	62.57	62.6	ISO 685
Total free fat (unsaponified and unsaponifiable fatty matter), max.	0.2	0.18	0.19	0.15	ISO 1067
Matter insoluble in water, max.	0.5	0.2	0.16	0.13	TZ to provide the test
Matter insoluble in ethanol, max.	2.5	2.2	1.9	1.86	ISO 673
Chloride content as NaCl, max.	1.5	0.15	0.3	0.25	ISO 457
Total free alkali as NaOH, max.	0.2	Not-detected	0.16	0.18	ISO 684
Free caustic alkali as NaOH, max.	0.2	Not-detected	0.02	0.04	ISO 456

RESULT AND DISCUSSION

According to the requirement of East African laundry soap standard parameter values the jatropha, castor and palm oil soap will safe for the users. According to the standard the maximum value of moisture and volatile matter content at 105 °C is 30. The results of jatropha, castor and palm oil soap were 29.18, 28.82 and 30 respectively which were good according to standard value. Even if all types of oil were within the limit of standard value castor oil was best as compared to jatropha and palm oil on parameters of maximum value of moisture and volatile matter content at 105 °C . According to the standard the maximum total free fat (unsaponified and unsaponifiable fatty matter) is 0.2. The results of jatropha, castor and palm oil soap were below 0.2 which means that the three formulated soap were within the range of the standard on the parameters of total free fat (unsaponified and unsaponifiable fatty matter). When compared to each other palm oil soap was best than jatropha and castor oil soaps which values were 0.15, 0.2 and 0.18 respectively. The East African standard value of minimum total fatty matter is 62. The results of jatropha, castor and palm oil soap were 62.3, 62.57 and 62.6 respectively. The standard says the minimum value so the results got were above 62 which satisfy the requirement of EAS of laundry soap. Based on comparison result palm oil soap was best than jatropha and castor oil soaps based on this specific parameter, because its value is somewhat large than the two formulated soaps. The results of maximum value of matter insoluble in water of jatropha, castor and palm oil soap were 0.2, 0.16 and 0.13 respectively, which were fit to the EAS laundry soap requirement. Based on this parameter palm oil soap was best than jatropha and

castor oil soaps. The maximum value of matter insoluble in ethanol of jatropha, castor and palm oil soap were 2.2, 1.9 and 1.86 respectively whereas the EAS laundry soap requirement for this parameter at maximum is 2.5. Based on this all types of formulated soap were satisfy the requirements of the standard. When compared to each other palm oil soap were best than jatropha and castor oil soaps for this specific parameter, because its results was 1.86 which is lowest than the two formulated soaps. The maximum chloride content of jatropha, castor and palm oil soap were 0.15, 0.3 and 0.25 respectively. EAS laundry soap standard value for maximum chloride content is 1.5. Based on the result all types of soap were good with chloride content especially jatropha oil soap was best than castor and palm oil soaps. The EAS laundry specification value for maximum free alkali as NaOH is 0.2. The formulated soap of jatropha, castor and palm were ND, 0.16 and 0.18 respectively. Based on this result the parameter of total free alkali for jatropha, castor and palm oil were within the range of standard. The comparable result in terms of maximum total free alkali as NaOH, jatropha oil soap was best than castor and palm oil soaps. The maximum free caustic alkali as NaOH value of jatropha, castor and palm oil soap were ND, 0.02 and 0.04 respectively and the EAS laundry soap maximum value of free caustic alkali as NaOH is 0.2. Based on the result all jatropha, castor and palm oil soap were satisfy the requirements of standard, even if jatropha oil soap was best than castor and palm oil soaps.

CONCLUSION

Based on the study, I drawn to a conclusion that to

reduce the consumption of edible oil, a soap can be produced by nonedible jatropha, castor and palm oil. Antimicrobial activity of Jatropha, palm and castor oil soap could be utilized to produce medicinal and cosmetic soap. All eight chemical parameters of jatropha, castor and palm oil were satisfying the EAS of Laundry soap. So I conclude that biofuel crops namely jatropha, castor and palm oil were used as a preparation of laundry soap beyond biodiesel development.

ACKNOWLEDGEMENT

The authors are thankful to Wondo Genet Agricultural Research Center and Aromatic and Medicinal Plants Research Project for providing all the necessary facilities and support during the entire experimentation.

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