

The effect of sea-water and fresh-water soaking on the quality of *Eucheuma* sp. syrup and pudding

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Abstract. *Eucheuma alvarezii* is one of marine commodity with great opportunities to be developed in Indonesia. This seaweed can be used as an additional material in cosmetic and pharmaceutical products or for syrup and pudding. Post-harvest technique conducted by the seaweed farmers will affects the quality of dried and processed products. The purpose of this study was to observe the effect of post harvest technique on the quality of dried seaweed and hedonic test (favorable test) of processed product (syrup and pudding). This study was conducted using descriptive method. The study compared dried, syrup, and puddings from two different post-harvest technique, between salt and fresh-water draining products. The results showed that fresh-water draining technique obtained better quality results organoleptic test. The results showed that panelist preferred the fresh-water drained products of syrup and pudding. The hedonic scores were much higher for the fresh-water drained products in all three categories of color, taste, and smell.

1. Introduction

Eucheuma alvarezii is a seaweed species with a high economic value. This species of seaweed is an hydrocolloid type which produces carrageenan that has functional properties as a gel-forming, stabilizer, suspension, and emulsion texture builder [1]. Due to its function, this species of seaweed is used as an additional ingredient in the food, cosmetics and pharmaceuticals industries. In addition, it also contains vitamins and minerals needed by the human body. *Eucheuma* seaweed has moisture content (11-13.90 %); crude protein (2.69-9.20 %); fat (0.09-0.37 %); carbohydrates (4.94-13.38 %); crude fiber (0.95-2.50 %); ash (4.79-17.09 %); calcium (22.39-69.25 ppm); vitamin B1 (0.019-0.21 mg/100 g); vitamin B2 (2.26-8.45 mg/100 g); and vitamin C (12.00-43.00 mg/100 g) [2]. Seaweed nutrients contain carbohydrates (sugar or vegetable gum), protein, fat and ash. Most carbohydrates are cellulose and hemicellulose that cannot be digested entirely by the enzymes in the body so it can part of a less calorie – diet [3]. Therefore, this seaweed has a high added value because of its diverse functional substances that also has nutritional levels needed by humans. In addition, Indonesia has a huge potential of *Eucheuma alverizii* cultivation, because Indonesian waters possess characteristics that makes it suitable for the optimum growth of *Eucheuma alverizii*.

The program from the Ministry of Marine Affairs and Fisheries to increase the production of seaweed cultivation of Indonesia must be balanced with the processing of cultivated seaweed. A guaranteed quality of seaweed cultivation will affect the processed seaweed. Hence, the post-harvest techniques (after cultivation) of seaweed cultivation have an important role in ensuring the quality of seaweed. The existence of good post-harvest management will ensure the quality of seaweed products that will ultimately encourage the sustainability of the seaweed processing industry [4]. Studies of



seaweed post-harvest techniques have been carried out by Itung and Marthen [5] and Poncomulyo [2], by doing the same technique which was washing the seaweed with sea water and drying it under the sun. Meanwhile, the drying technique can be done by drying on the ground surface, drying with the method of para-drying and drying by the hanging method [4]. The most suitable post-harvest technique will determine the quality of the finished product [3]. The initial handling of seaweed (post-harvest) should be well carried out, because good quality raw materials will produce good products as well. This study will compare the effects of sea-water and fresh-water soaking to the hedonic test of syrup and pudding as seaweed processed products.

2. Methodology

The study was conducted in May 2016 using a descriptive study. This research began with the planting of seaweed for 45 days with the long-line method and then post-harvest techniques were done in two ways: sea-water and fresh-water soaking. The seaweed from both techniques was made into syrup and pudding. An organoleptic test was carried out on the syrup and pudding by 15 panelists. The water content test was done by PT. Saraswanti Indo Genetech, Bogor. The study was done by the following scheme of post-harvest process (figure 1).

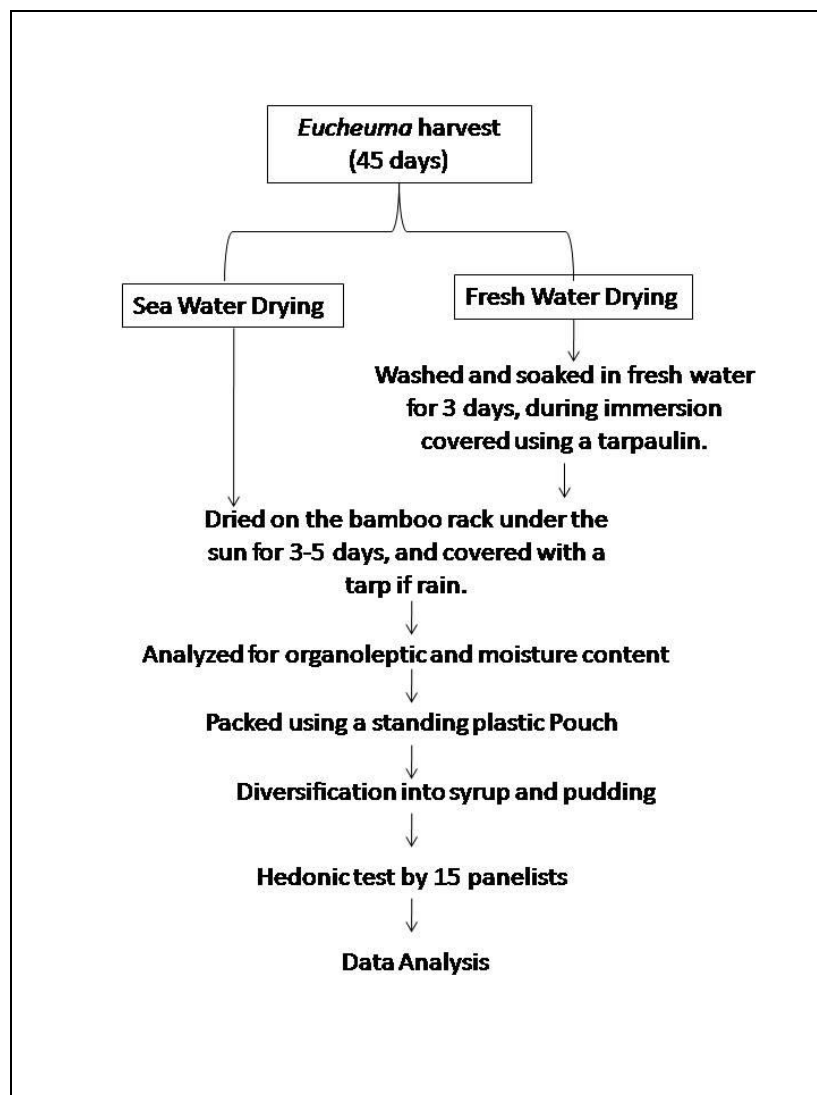


Figure 1. Seaweed post-harvest process

3. Result and Discussion

Economically, sea-water drying is less costly but fresh water drying was recorded to have resulted in better quality (figure. 2 and table 1). Fresh-water drying results in a white, clear, brighter appearance with less grains of salt attached to the dry thallus. On the other hand, the sea-water drying product has a darker appearance (brownish) with a considerable amount of dirt and sand granules attached to its thallus. Thus, physically, the post-harvest technique of the fresh-water drying system is better. The results of the moisture level test of the dried seaweed on both post-harvest treatment techniques showed (table 1) that the post-harvesting technique of fresh-water drying had a smaller moisture content of 14.36 % compared to sea-water drying which has a moisture content of 22.76 %. This is because in the sea-water post-harvest drying technique, the salt grains will remain attached to the thallus of the dried seaweed so that it will raise the weight of its water content. However, its water content still conforms to the dry seaweed SNI No.2690.1: 2009 [6].



Figure 2. Physical differences between sea water drying and fresh water drying seaweed.

Table 1. Qualitative data of *Eucheuma*.

No	Sample	Moisture content (%)	Organoleptic	
			Appearance	Odor
1	Fresh water drying	14,36	White, clear, less salt	Seaweed specific (not strong)
2	Sea water drying	22,76	Brown, lots of grains of sand and salt	Seaweed specific (strong)
SNI (2009)* : Dried seaweed <i>Eucheuma</i>		Maks. 32	-	Seaweed specific

*in [3]

The different treatments on seaweed post-harvest techniques were done to influence the quality of the processed products after harvest. As we can see from tables 2 and 3, table 2 shows the results of the hedonic test on the seaweed syrup beverage, while table 3 shows the results of the hedonic test on the seaweed pudding. The hedonic test is a test of preferences, in which the panelist (person who is tested) is asked for his/her personal response to preferences or dislikes using the hedonic scale [7]. The panelists who participated in this study were semi-trained panelists with a total of 15 people. A semi-trained panelist is a panelist who gets an explanation of hedonic testing and sensory traits with the number of panelists measuring from 15 to 25 people [7].

Tables 2 and 3 show that the seaweed syrup and seaweed pudding made from the fresh-water post-harvest technique had a greater hedonic value for all test categories (color, flavor and odor) compared to the products made using the sea-water drying technique. This indicates the panelists' preference for seaweed syrup and pudding products made using the fresh-water drying technique was preferred over the other. The specific odor of seaweed was stronger in the beverage and pudding product made by sea-water drying. This was not favored by the panelists. Table 1 also shows that dried seaweed made by the sea-water drying process resulted in a stronger specific seaweed odor compared to the other.

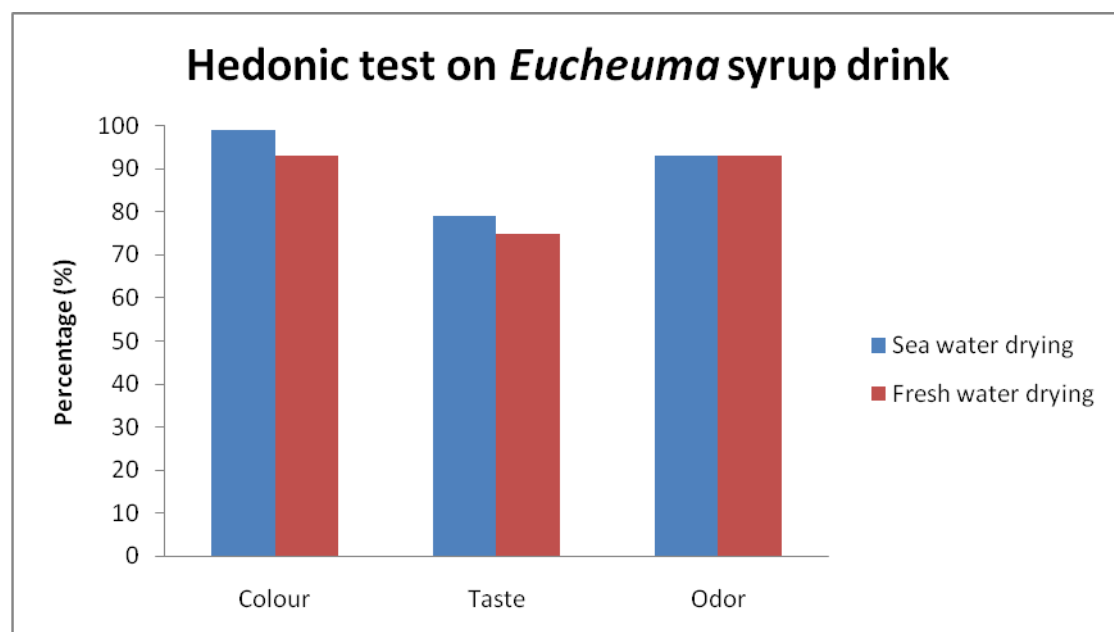


Figure 3. Hedonic test on *Eucheuma* syrup drink

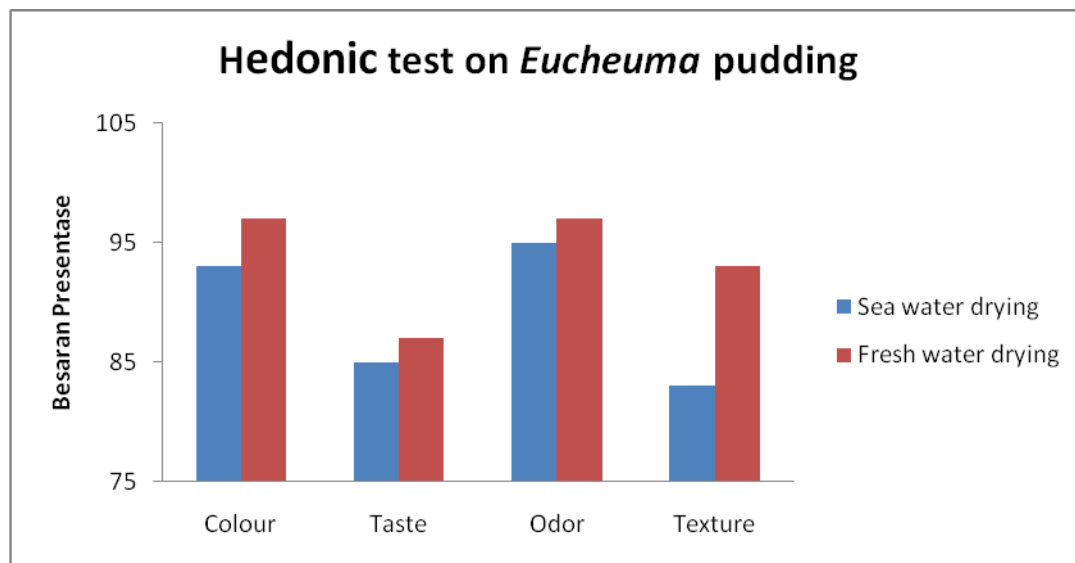


Figure 4. Hedonic test on *Eucheuma* pudding

4. Conclusion

There are differences in seaweed post-harvest techniques, namely fresh water drying and seawater drying. Freshwater drying is the leaching and soaking of harvested seaweed with fresh water; while in sea-water drying there is no washing and soaking treatment using fresh water. Both of these post harvesting techniques have influenced the results of the hedonic or preference test on the seaweed products of syrup and pudding, where the products made from fresh-water drying was more preferred.

5. References

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