



2nd International Symposium on Aquatic Products Processing and Health,
ISAPPROSH 2015

Extraction Process for Reducing Tannin of Mangrove Fruit [*Bruguiera gumnorrhiza* (Lamarck, 1798)] as a Raw Material for Food Flour

Subandriyo, Nanik Indah Setianingsih*

Center of Industrial Pollution Prevention Technology, Ki Mangunsarkoro Street, No. 6 Semarang, 50136, Indonesia

Abstract

Bruguiera gumnorrhiza (“*Tancang*”) is a mangrove species that their fruit can be utilized as an alternative flour rich of carbohydrate. Extraction reducing tannin conducted with two variable that were solvent temperature 50 °C, 60 °C, 70 °C, 80 °C and soaking time 15 min, 30 min, 45 min, 60 min. The optimal result extraction tannin of mangrove fruit obtained at 80 °C temperature with soaking time 60 min. The resulting mangrove fruit meets the criteria of consumption flour with content of HCN 0.26 mg · L⁻¹ and tannin 4.56 mg · L⁻¹. The maximum content of HCN according to quality requirements in Indonesian National Standards of tapioca is 40 mg · L⁻¹, whereas tannin according to acceptable daily intake is 560 mg · kg⁻¹ · d⁻¹.

© 2016 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of the science and editorial board of ISAPPROSH 2015

Keywords: *Bruguiera gumnorrhiza* (Lamarck, 1798); mangrove; multilevel extraction; tannin

1. Introduction

Indonesia is the largest archipelago country in the world, having 17 508 islands with 81 000 km of coastline and also has a lot of the potential of coastal and marine resources (Bengen, 2002). Natural resources are found in coastal areas and the sea is consist of many resources that can be recovered (renewable resources) such as fisheries, mangroves and coral reefs as well as resources that can not be recovered (non-renewable resources) such as oil, mineral gas and environmental services (Dahuri et al., 2001). Indonesia is having the largest of mangrove forest in

* Corresponding author. Tel.: +62 819 1968 6001; fax: +62 24 841 4811.
E-mail address: indahsnanik@yahoo.co.id

the world reaches to 8.60×10^6 ha, although this is currently reported that about of 5×10^6 ha forest had been in damaged number (Gunarto, 2004).

The mangrove ecosystem has economic benefits there are timber and non-timber. The product of mangrove forests commonly used is timber for firewood whereas the mangrove fruits have not been used widely especially as source of food. *Bruguiera gymnorhiza* (Lamarck, 1798) which commonly named “*Lindur*” or *Tancang*” in Central Java is one of the mangrove fruits that can be used as source of new food. This kind of mangrove fruit content of high carbohydrate. The results of research have been done showed that “*Tancang*” content of energy $371 \text{ cal} \cdot 100 \text{ g}^{-1}$ higher than rice ($360 \text{ cal} \cdot 100 \text{ g}^{-1}$) and corn ($307 \text{ cal} \cdot 100 \text{ g}^{-1}$) (Fortuna, 2005). Traditionally it is processed into cakes mixed with rice or eaten directly with coconut flavouring (Sadana, 2007)

In order can be used widely at once for increasing its economic value “*Tancang*” must be converted in to flour. Flour from “*Tancang*” fruit content of carbohydrate 80.376 3 %, fibre 0.757 5 %, water 12.176 1 %, fat 3.091 7 %, dan protein 1.427 % (Priyono et al., 2010). The problem of using mangrove fruit as food is tannin content that cause bitter taste. The bitter taste of mangrove fruit affects consumer valuation of the resulting food product. Besides that tannin is carcinogenic in case consumed in excess amount and continuously so must be reduced before processed. The acceptable daily intake for tannin is $560 \text{ mg} \cdot \text{kg}^{-1} \cdot \text{d}^{-1}$ (Fekadu, 2014). One way for reducing tannin of mangrove fruit “*Tancang*” is with extraction process. Use of mangrove fruit as material of food industry especially of mangrove areas in Central Java is expected to be mangrove conservation strategy through the use of mangrove fruit as raw material in making of flour.

2. Material and methods

2.1. Mangrove

Mangrove fruits (*Bruguiera gymnorhiza*) were obtained from Kartika Jaya Village, Patebon Sub-district, Kendal District Central Java. Fresh mangrove fruit, were chopped into chip forms with a thickness of 1 mm to 2 mm.

2.2. Experiments of extraction tannin

Tannin extraction experiments were done with water solvent in an extractor. The fixed variable is the comparison between solvent volume and mangrove fruit 5:1 w/w, while the changed variable are solvent temperatures 50 °C, 60 °C, 70 °C, 80 °C and soaking time 15 min, 30 min, 45 min, 60 min. The soaking process with temperature above 80 °C can damage the structure of the starch. The results of tannin reduction of mangrove fruits were obtained by analyzing tannin content of filtrate from extraction process.

2.3. Making of mangrove flour

Mangrove flour is made from the best result after reduction treatment of tannin. Mangrove fruit of the result of the extraction process are dried in oven of 70 °C, 48 h then milled and sieved in 80 mesh. The resulting mangrove flour stored in plastic packaging.

3. Result and discussions

3.1. Tannin parameter analysis

The result of tannin analysis of samples showed in Table 1.

Download English Version:

<https://daneshyari.com/en/article/4383614>

Download Persian Version:

<https://daneshyari.com/article/4383614>

[Daneshyari.com](https://daneshyari.com)