

The Effect of Drying Methods and Slice Thickness on Physicochemical Properties of Dry Gelugur Slice (*Garcinia Atroviridis*)

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Abstract. *Garcinia Atroviridis* (local name “asam gelugur”) have been used in Indonesia for food like seasoning and tea. Another local foods that used asam gelugur were ‘asam padeh and manisan asam gelugur. The farmers in Indonesia always dry the slice of asam gelugur fruits under the sun. The papers deals about using drying methods and slice thickness for asam gelugur slices on characteristic of physicochemical on dry gelugur slice. The drying methods that used for this research were using oven and the sun. The slice thickness consist three level: 3 mm, 5 mm and 7 mm. The 3 mm slice thickness and oven method produced the best of dry gelugur slice..

Keywords: drying, slice thickness, physicochemical, gelugur, *Garcinia atroviridis*

1. Introduction

Garcinia atroviridis have been used for seasoning like asam padeh, manisan asam and gulai pindang in Indonesia. The kind of strain of *Garcinia* fruits that generally found in Indonesia is *Garcinia atroviridis*, *Garcinia combogia* is common strain that we can find in Southern India [1]. In Indonesia, drying of *Garcinia atroviridis* traditionally using sun. There were many researchers had investigated about the principal acid of *Garcinia atroviridis* and *Garcinia cambogia* (-)-hydroxycitric (HCA) [2-3]. Other reports shown *Garcinia atroviridis* had strong antimicrobial and antioxidant antitumour-promoting activities [4]. This research deals about effect of drying methods and slice thickness on physicochemical properties of dry gelugur slice (*Garcinia atroviridis*).

2. Method

The research was conducted at Analisa Kimia Bahan Pangan Laboratory, University of North Sumatera. The *Garcinia atroviridis* were purchased from farmer at Sembahae, Deli Serdang, Indonesia. Fresh *Garcinia atroviridis* were cut into flat of slabs consist 3, 5 and 7 mm in thickness. The slab were dried with 2 methods, consist dried under the sun and oven dried using cabinet drier at temperature 60°C. After drying, the dry slice of *Garcinia* fruits were analyzed. Analysis consist of moisture content analysis by using oven method [5], ash content analysis using dry ashing method [5], total soluble solid [6], and vitamin C content [7]. Data analysis using randomized design were analyzed using SPSS version 22 for windows. Difference among the ranges of the properties were determinate using the method of Least Significant Differences (LSD) tests at 95% confidence level ($P < 0.01$). De Garmo was used in determining the best treatment method.

3. Results and Discussion

3.1. Effect of the Slice Thickness on Physicochemical Properties of Dry Gelugur Slice

Figure 1 showed that the slice thickness of dry gelugur slice increased, the moisture increased too. When the slice thickness of dry gelugur slice increase, the moisture content will increase too. When we cut gelugur into slice that expand the surface of material, wide surface can be direct contact with the heating medium so that water diffuses more easily [8]. The thinner the dried material the faster the material dries.

Figure 2 showed that the slice thickness of dry gelugur slice had a very significant on ash content of dry gelugur slice. When the slice thickness of dry gelugur slice increase, the ash content will decrease, the higher of the slice thickness, the water need more time to evaporate and the temperature higher. The higher of moisture content, the lower ash content [9].

Figure 3 showed that the slice thickness of dry gelugur slice had a very significant effect on total soluble solid of dry gelugur slice. The lower of slice thickness the total soluble solid will increase. The lower of slice thickness so the water can evaporate easily. The increasing of °Brix was caused of evaporating water from material [10].

Figure 4 showed that the slice thickness of dry gelugur slice had a very significant on vitamin C content of dry gelugur slice. The bigger of the slice thickness the lower vitamin C content. The bigger of slice thickness need more time to evaporate the water from material, meanwhile vitamin C can broke when the material were heated. The longer of the time for heating, the more vitamin C broke. Duration time of drying can make the lower vitamin C content [11].

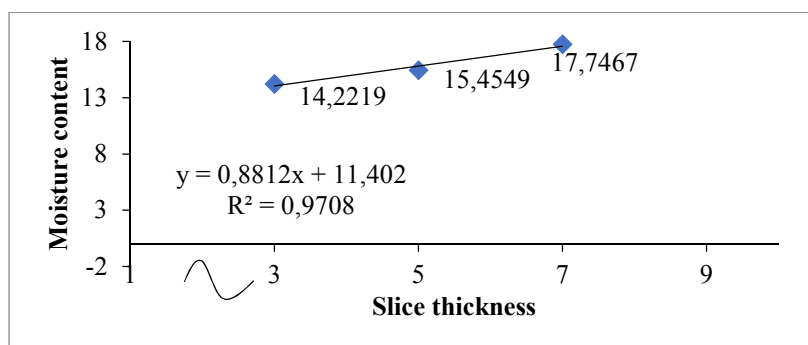


Fig 1. Effect of slice thickness on moisture content of dry gelugur slice

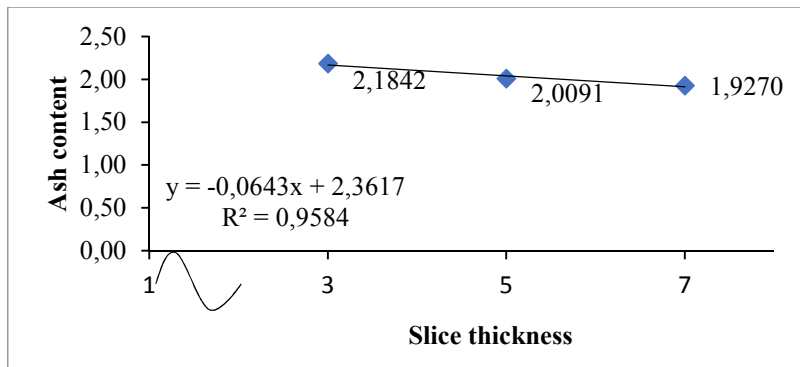


Fig 2. Effect of slice thickness on ash content of dry gelugur slice

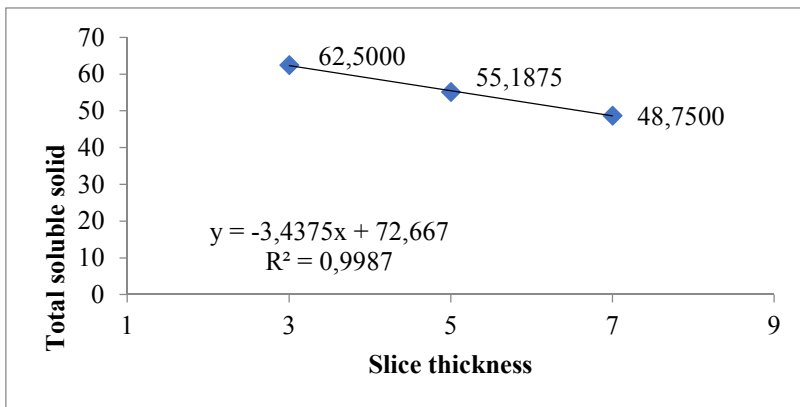


Fig 3. Effect of slice thickness on total soluble solid of gelugur slice

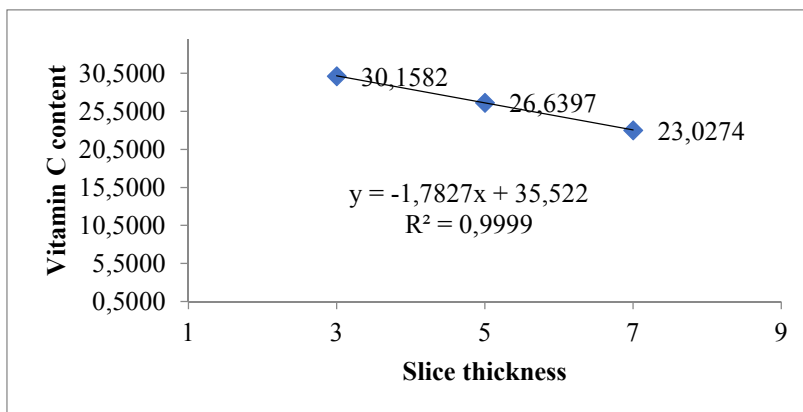


Fig 4. Effect of slice thickness on vitamin C content of gelugur slice

3.2. Effect of Drying Method on Physicochemical Properties of Dry Gelugur Slice

Figur 5 showed drying method using sun (P2) had the highest value on moisture content of dry gelugur slice. Moisture content on oven drying (P1) are lower than sun drying (P2). The temperature were used in oven drying was high and the heat is spread evenly and the less time needed to dry the water [12].

Figur 6 showed that the drying method using sun had the lower value than using oven on ash content of dry gelugur slice. The highest value of ash content was oven drying method. Drying using oven method had stabil and high temperature, and the heat is spread evenly. Ash content depend on kind of material, ash method, time and temperature that used on drying method. The higher of drying temperature, the percentage of ash content will increase that caused water that evaporated from material bigger [13].

Figur 7 showed that the drying method using sun had the lower value than using oven on vitamin C content of dry gelugur slice. Vitamin C content on oven method was the highest value on vitamin C. The heating on sun method showed that there was ultraviolate light. The decrease of vitamin C content was caused of temperature, salt, sugar, time of heating and enzyme [14].

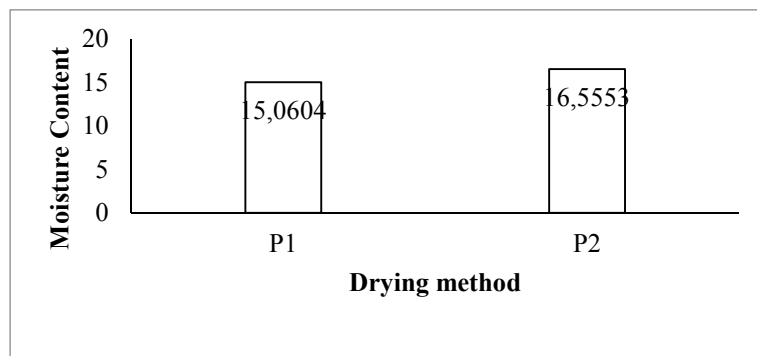


Fig 5. Effect of drying method on moisture content of dry gelugur slice

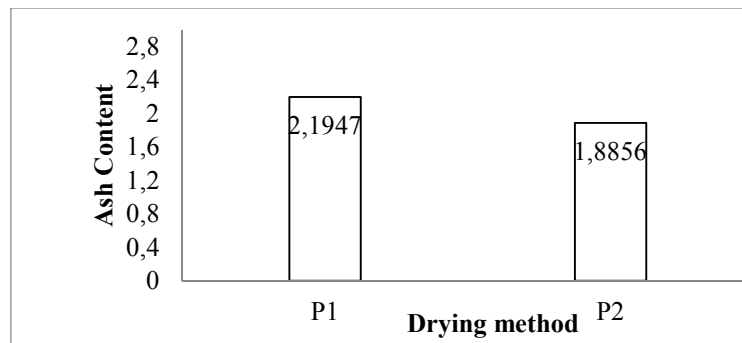


Fig 6. Effect of drying method on ash content of dry gelugur slice

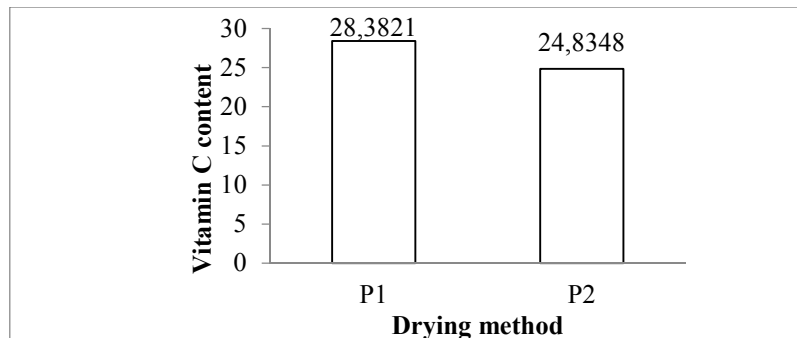


Fig 7. Effect of drying method on vitamin C content of dry gelugur slice

P1: oven drying

P2: sun drying

4. Conclusion

The 3 mm slice thickness and oven drying method produced the best of dry gelugur slice.

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