

# Drying of Longan Fruit (*Dimocarpus longan lour*) at Low Temperature

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**Abstract**—Longan fruit comes from a subtropical climate, and it can grow well in Indonesia. With the drying process of longan can also be beneficial as a tonic for the maintenance of insomnia and neurosis. Once the longan fruit separated from the skin and seeds, longan fruit put in plastic containers and then placed in the refrigerator with temperatures 8°C. The drying process at low temperature was applied. Variables are, which is drying time. The rate of drying is calculated based on the surface of the fruit. The drying rate will decrease at a specific moisture content.

**Keywords**—longan fruit, drying, low temperature, refrigerator

## I. INTRODUCTION

Longan fruit which has the Latin name *Dimocarpus longan-Lour* comes from a subtropical region that produces well in Indonesia. Kelengkeng has thin fruit skin, relatively thick and sweet fruit flesh, and shiny round seeds. This study aims to determine the effect of drying time of longan fruit with the low-temperature drying method. Nowadays, there are many variations in serving, ranging from processing as canned fruit, dried, or processed in cooking as dessert or soup. The dried fruit can be used as a tonic for the treatment of insomnia and neurosis. The content of adenosine in longan fruit is believed to produce anticonflict effects, as well as contribute to the analgesic effect, which is to relieve pain [1].

Many agricultural products are not resistant or will be damaged if exposed to high heat. Therefore drying must be carried out at low temperatures, below 100 °C [2]. Given that tropical air, humidities are very high, and drying operations take a long time, are inefficient and have high operating costs. Air contains water vapor which can be expressed with relative humidity (RH) or absolute humidity. Absolute humidity is the weight of water per unit of dry air weight (kg of water/kg of dry air), while RH is saturation relative to the saturation state [3].

The drying rate (drying kinetics) of material will determine the size of the tool used on an industrial scale, which can directly affect the price of the tool and its operating costs. The drying rate will also affect the quality of the product that has been dried, because there are various phenomena accompany it, including heat transfer and reduced size due to reduced water content [4]. The drying kinetics of lemon [5] and banana [6] also had been studied by other researchers. this research aims to evaluate the drying rate of longan fruit.

## II. METHODOLOGY

### A. Materials

Longan fruit was purchased at local supermarket in Yogyakarta, Indonesia.

The tools used are plastic containers, scissors, analytical balance, and refrigerator



Fig. 1. Procedure of drying process of longan fruit

After the longan fruit is separated from the skin and seeds, it is put into a plastic container and then placed in the refrigerator at 8 °C. The drying process is stopped if the weight remains constant. The variables studied were drying time.

### B. Methods

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## III. RESULTS AND DISCUSSION

The research was conducted at the Ahmad Dahlan University Chemical Engineering laboratory. Five samples of longan fruit weighing about 3 grams each were dried in the refrigerator. The experiment was carried out until the weight remained, which is for seven days. The weight of the wet material and the plastic container are first recorded, then each interval of 1 day the weight of the material and plastic container is recorded. Water content is defined as the difference in weight from wet material with a dry matter. From this study, the weight of the driest longan fruit is 0.634 grams, from the total wet weight of 3 grams in the 1 cup obtained on the seventh day. If the water content is calculated (wet base), the water content will be obtained, which can be seen in Figure 2.

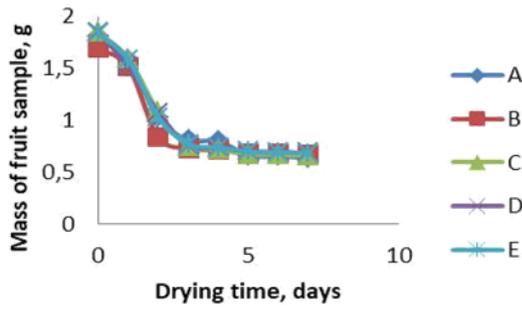


Fig. 2. Mass profile of longan fruit during the drying process at low temperature

On the first day of drying, the liquid content is grams of liquid divided by grams of dry matter. Similarly, for the second day to the seventh day. The average liquid content for one day is the gram of liquid the first day plus grams of liquid the second day divided by two. Then, the drying speed can be calculated with the following equation:

$$N = \text{Drying time, day} \times (\text{Missing liquid, g}) / (\text{Surface area, } [cm]^2) \quad (1)$$

From the water content, data can be processed to get the drying speed. Results can be seen in graphical form in figure 3.

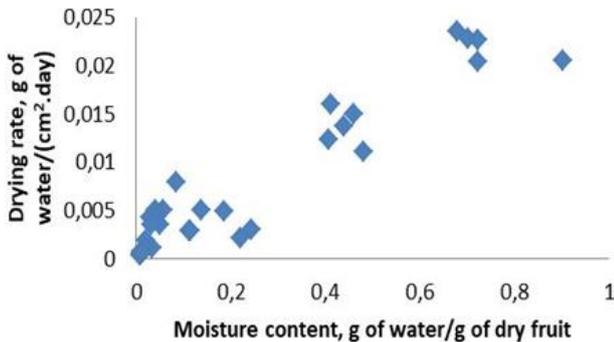


Fig. 3. Rate of drying

Because the drying speed is calculated based on the fixed face area, the drying speed will decrease [5]. The minus results obtained in the graph are because the sample material has reached equilibrium, where there is no liquid which is evaporated so that it causes fixed weight

#### IV. CONCLUSION

From the results of the study, it was found that the longer the drying time, the more liquid content evaporated, but the drying speed decreased. The lowest balance water content value of 0.15% can be achieved on the sixth day of the second sample.

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