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Formulation of Yellow Pumpkin Powder as an Instant Drink to Enhance Body Health

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Abstract

The instant drink is processed products in powder form, easily soluble in water, practical in serving, and long shelf life due to their low water content and large surface area. In the current situation, a vitamin or drink that can improve the health of the body is needed. One of the compounds that can neutralize free radicals in the body as a trigger for a disease is β-carotene which has good antioxidant properties. One of the plants that contain high β-carotene is Yellow Pumpkin. It has a high nutritional content and fine fibre; thus, it is easy to digest. The method of making the instant drink is an oven drying method. This study aims to analyze β-carotene in yellow pumpkin, which is useful as an antioxidant using the UV-VIS spectrophotometry method. The absorbance of the β-carotene standard at a wavelength of 450 nm with distilled water as a blank. β-carotene standard is prepared by dissolving 0.2 g of potassium chromate in water to a volume of 100 ml.

Keywords
yellow pumpkin; instant drink; β-carotene; UV-VIS spectrophotometry

I. Introduction

During the Covid-19 pandemic, it is required to comply with and implement health protocols such as maintaining cleanliness, maintaining distance when socializing, wearing masks, and maintaining fitness and body health. Maintaining fitness and body health could be done by consuming nutritious food and food products such as instant drinks to increase the body's immunity (Adi, 2021). Sihombing (2020) state that Covid-19 pandemic caused everyone to behave beyond normal limits as usual. The outbreak of this virus has an impact especially on the economy of a nation and Globally (Ningrum, 2020). The problems posed by the Covid-19 pandemic which have become a global problem have the potential to trigger a new social order or reconstruction (Bara, 2021). The problem is applying gas and brake policy with stricter social restrictions when the Covid19 pandemic increases. Consequently, it narrows down the business movement to become more complicated and limited, increasing the risk (Wijaya, 2021). COVID-19 pandemic has changed all aspects of human life (Dharmawati, 2019). Food or drink is needed to increase endurance and function as a good antioxidant. The instant drink is processed food products in powder form, easily soluble in water, practical in serving, and long shelf life due to their low water content and large surface area. Indonesia itself is a country with an abundance of yellow pumpkins. Some efforts are made to increase the usability and utilization of this pumpkin and consider its nutritional potential. one of the efforts is developing processed products from practical, functional, and nutritious raw materials of pumpkin, namely instant drink from yellow pumpkin (Usmiati et al. 2005).

Pumpkin plants belong to the Cucurbitaceae family and are related to melons (Cucumis melo) and cucumbers (Cucumis sativum). "Labu" commonly refers to Waluh or Pumpkin. Pumpkin (Cucurbita moschata) is a food source with high nutritional content and fine fibre, easily digested. It has high adaptability because it can grow both in the lowlands and highlands. This plant species can grow well in dry areas with moderate rainfall and at an altitude of 1000-3000 meters above sea level (Purba, 2008).

Cucurbita moschata is a type of shrub and vine that is easy to grow. It has woody, soft, quadrangular, hairy, and knotty steam. It has a stem length of approximately 25 m and is light green. Yellow pumpkin is one of the local food ingredients with high nutritional value. It is good for the human body, containing much beta-carotene, vitamin A, fibre, vitamin C, vitamin K, and niacin or B3. It also contains minerals such as potassium, iron, phosphorus, and magnesium.

Beta-carotene is a type of pigment found in plants, especially carrots and colourful vegetables. Beta-carotene is also used as a colouring agent for foods such as margarine. Beta-carotene is an antioxidant that has the function of protecting the body from damaging molecules called free radicals. Free radicals cause cell damage through the oxidation process.

Beta-carotene is a type of carotenoid hydrocarbon compound which is a tetraterpenoid compound. The presence of double bonds causes beta-carotene to be sensitive to oxidation. Beta-carotene oxidation is faster in the presence of light, metal catalysts, especially copper, iron, and manganese. Oxidation will occur randomly in the carbon chain containing double bonds. Yellow pumpkin is considered the king of β-carotene. It can improve the immune system, as well as prevent heart disease and cancer. It is called the king of β-carotene because it has a very high carotene content, such as lutein, zeaxanthin, and carotene, which give pumpkin its yellow colour. It helps protect the body by neutralizing harmful oxygen molecules called free radicals.

II. Research Methods

The tools used in this study were Blender, Knife, Oven, Evaporative Cup, Vortex, Separator Flask, Sieve, Analytical Scale, Furnace, Porcelain Cup, UV-VIS Spectrophotometer, Measuring Cup, and Measuring Flask. The materials used were Yellow Pumpkin, Aquades, 96% Ethanol, Petroleum ether, Potassium chromate, Citric Acid, Maltodextrin and Sucrose.

2.1 Making of Yellow Pumpkin Powder

Peeled the pumpkin skin, separated the pumpkin from the seeds, washed it thoroughly, and drained. Cut the pumpkin with a size of 3 cm, put it in a blender, then, added aquades and blend until it becomes pumpkin puree. Added 96% ethanol, stirred and left the pumpkin puree for 2 x 24 hours. When a precipitate had formed, separated it from the solvent and set it aside. Put it on a baking sheet in the oven, dried at 50ºC for 3 hours, until the powder was completely dry. Sifted the pumpkin powder; thus, particle size was the same as the sieve. Yellow Pumpkin powder was ready to use.

2.2 Powder Moisture Test

Weighed the evaporating dish, then simmered at 500C for 30 minutes, then weighed again. 2 g of sample weighed into an evaporating dish (W). Heated the ovaporating dish (W) and sample in the oven at (130 ± 3) °C for one hour (one hour after the oven temperature is 130 °C). Transferred to a desiccator, then it was cooled for 30 minutes and weighed.

2.3 Determination of Ash Content

The crucible was in an electric furnace at a temperature of (550 ± 10) °C. It was preheated in an electric bath/Bunsen on a small flame for 1 hour. It was cooled in a desiccator for 1 hour, then weighed (W1). Weigh 3 g to 5 g sample (W). Charcoal over an electric bath/Bunsen on a small flame. Ash in a furnace at (550 ± 10) °C to white or grey for 4 hours. It was cooled in a desiccator for 30 minutes and weighed. Put it back into the furnace at the same temperature for 1 hour. Then it is cooled in the desiccator at the same time and weighed again. The process was repeated until the weight was constant.

2.4 Determination of Acid Insoluble Ash Content

The ash obtained by determining the total ash content was boiled with 25 mL of dilute sulfuric acid for 5 minutes. Then, the acid-insoluble part was collected. The flask was filtered with ash-free filter paper, and the residue was rinsed with hot water. The filtered ash and the filter paper were put back into the same crucible. After that, the powder was incandescent slowly until the weight remained at a temperature of 5500C and weighed.

2.5 Analysis of β-Carotene in Yellow Pumpkin Powder

Weighed 3 g of pumpkin powder, then added 5 mL of 95% ethanol. Vortexed the mixture for 1 minute. Next, added 10 mL of petroleum ether, closed the tube and vortexed again for 10 minutes. The clear layer was separated, washed with distilled water with a separator flask. Pipetted 1 ml of the yellow layer, added 3-4 ml of petroleum ether and vortexed. It was measured with a spectrophotometer at a wavelength of 450 nm and petroleum ether as a blank. The standard β-carotene absorbance was adjusted at a wavelength of 450 nm with distilled water as the blank. Then, standard β-carotene was prepared by dissolving 0.2 g of potassium chromate in water to a volume of 100 ml.

2.6 Yellow Pumpkin Instant Drink Formulation

Table 1. Yellow Pumpkin Instant Drink Formulation

Material	F1 (%)	FII (%)	FII (%)
Pumpkin Powder	15	15	15
Citric Acid	2,5	3,75	5
Sucrose	20	20	20
Maltodextrin	ad 100	ad 100	ad 100

2.7 The Procedure of Making Yellow Pumpkin Instant Drink

All materials were prepared and weighed according to the formula listed. Mixed pumpkin powder, citric acid, sucrose and maltodextrin, then ground ad homogeneously. Weighed the powder as much as 20 grams, put it in the package.

III. Discussion

3.1 Moisture Content

The result of the moisture content test of yellow pumpkin powder is 13.76%. Based on SNI 3751:2009, the maximum limit of moisture content in pumpkin flour powder is 14.5%. It means the results obtained are in a good range. The moisture content test is carried out to determine the minimum limit or degree of moisture content in the powder. The higher the moisture content, the moulds and fungi can grow easily, thereby reducing biological activity during storage (Depkes RI 2000).

3.2 Ash Content

Determination of ash content aims to describe the internal and external mineral content from the initial process to powder formation. The principle is that the powder is heated at a temperature where organic compounds and their derivatives are destroyed and evaporated so that only mineral and organic elements remain (Depkes RI, 2000). The result of determining the ash content of yellow pumpkin powder is 3.7%. The results meet the standard, no more than 10.2% (Depkes RI, 2008).

3.3 Acid Insoluble Ash Content

The acid-insoluble ash content test aims to determine the amount of ash obtained from external factors sourced from impurities originating from sand or silicate grit (Indriyanti et al., 2018). The result of the determination of acid-insoluble ash content is 0.3%. According to Herbal Pharmacopoeia, the acid insoluble ash content should not be more than 0.7%. The results obtained indicate that the acid insoluble ash content of yellow pumpkin powder meets the general standard requirements of the Indonesian Herbal Pharmacopoeia (2008).

3.4 Analysis of β-Carotene in Yellow Pumpkin Powder

The β-carotene test uses UV-VIS Spectrophotometer because β-carotene can be measured in the visible light region. It is because the structure of β-carotene has a conjugated double bond. Conjugated double bonds can cause the electronic energy level of the chromophore to be lower, so it will absorb radiation at a maximum wavelength related to the polarity of the solvent (Nururrahma et al., 2013). The results showed that yellow pumpkin contains β-carotene is 0.944 ppm. It indicates that yellow pumpkin has β-carotene.

IV. Conclusion

Yellow pumpkin powder (Cucurbitae moshata) can be formulated in the form of instant drink powder. Yellow pumpkin powder (Cucurbitae moshata) contains a moisture content of 13.76%, an ash content of 3.7% and an acid insoluble ash content of 0.35%. The level of beta-carotene in yellow pumpkin is 0.944 ppm, which indicates that yellow pumpkin contains beta-carotene compounds that can be useful as antioxidants in the body.

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