Instant porridge from natural local resources (orange sweet potato, carrot, and red bean) with highly nutritious as an alternative food source

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Abstract. Instant porridge is one of the food product that does not require a long time to serve. Instant porridge is usually made from rice flour. Food diversification is needed to make instant porridge more nutritious, one of which is making instant porridge from natural local ingredients such as orange sweet potato, carrot, and red bean. We made the composite flour that use to make instant porridge from mixture of orange sweet potato, carrot and red bean (orange sweet potato flour : carrot flour : red bean flour), namely P1 = 80% : 15% : 5% ; P2 = 70% : 20% : 10% ; P3 = 60% : 25% : 15% ; P4 = 50% : 30% : 20% ; P5 = 40% : 35% : 25% ; P6 = 30% : 40% : 30% ; P7 = 20% : 45% : 35%. The final result showed that the formulation composite flour in P7 = 20% orange sweet potato flour : 45% carrot flour : 35% bean flour was the best formulation and produce a good instant porridge by de-Garmo method.

1. Introduction
Instant porridge is one of modern food from cereals that are widely consumed by people from various age groups ranging from child to old age. Current technological advances make people’s lifestyle fast and practical, make food needs also change according to demand from the community, this can be done through the development of technology in the food sector by food diversification. Development of instant porridge with high nutritional sources can be done by making instant porridge from fruit and vegetable-based[1]. Between types of vegetables and tubers, sweet potato is one of the vegetables that contains a lot of nutrients.

Utilization of sweet potato into flour can reduce import of wheat flour to Indonesia. In our department, the utilization of orange sweet potato as flour and starch has been widely used in the manufactured of food product, such as the manufacture of bread products[2], muffin products[3], cookie products[4].

2. Methodology
We did the research in December 2020 at the Laboratories of Faculty of Agriculture, USU, Medan. The raw materials used in this research is orange sweet potato and carrot from Pasar Raya Pancing, red bean and salt from Pasar Jamin Ginting. The chemical used to make flour is sodium metabisulfite. The chemicals used to analysis the products are ethanol, aquadest, hexan, sulfuric acid, sodium hydroxide, methyl blue and methyl red.
There were 7 samples that consists the mixture of orange sweet potato, carrot, and red bean, namely P1 = 80% : 15% : 5%; P2 = 70% : 20% : 10%; P3 = 60% : 25% : 15%; P4 = 50% : 30% : 20%; P5 = 40% : 35% : 25%; P6 = 30% : 40% : 30%; P7 = 20% : 45% : 35%. Each treatments was made in 3 replications. Analysis of water content [5], ash content [6], fat content (boiling flask method) [7], protein content using kjedhal method [8], crude fiber content [9], and carbohydrate content using by different method[10]. The best instant porridge was determine by de-Garmo method [11].

3. Result and Discussion

3.1. Water content
Water content of instant porridge ranged from 5.34%-5.70%. The analysis of variance showed water content of instant porridge has a different one each other. The water content contained in foodstuffs will affect to the durability of these foodstuffs against microbial attacks that can cause damage [12].

Figure 1. Comparison of composite flour (orange sweet potato, carrot, and red bean) to the value of water content

3.2. Ash content
The range of instant porridge from 2.13%-2.88%. The comparison of composite flour (orange sweet potato, carrot, red bean) showed the unequal ash content. Ash content determined from the mineral content contained in a food form organic salt and anorganic salt [13]. Ash content directly proportional to the mineral content contained in a material, so high ash content will case high mineral content.
3.3. Fat content
Fat content of instant porridge ranged from 2.15%-3.02%. The fat of food product is a consideration in the existing nutritional factors. Fat levels that are too high are less advantageous in the process of storing the product because it can cause rancidity due to oxidation if stored for a long time [14].

3.4. Protein content
Protein content of instant porridge ranged from 9.75%-11.60%. Figure 4 below shows that the more use of red bean flour will increase the protein content of instant porridge. The protein content of the raw material used will influence, the largest protein content is found in red bean flour, which is ±19.66%. We could see that among existing vegetable products, nuts have an important role in protein compliance[15].
Figure 4. Comparison of composite flour (orange sweet potato, carrot, and red bean) to the value of protein content

3.5. Crude fiber content
Crude fiber content of instant porridge ranged from 2.61%-3.27%. The composite flour (orange sweet potato, carrot, and red bean) determined the amount of crude fiber content in the instant porridge. Crude fiber is a residual component that cannot be hydrolyzed by strong acids and strong bases such as hemicelluloses, cellulose, and lignin [16]. Therefore the crude fiber content in instant porridge is largely determined by the raw materials used.

Figure 5. Comparison of composite flour (orange sweet potato, carrot, and red bean) to the value of crude fiber content

3.6. Carbohydrate content
Carbohydrate content of instant porridge ranged from 76.79%-80.63%. The ratio of composite flour has different carbohydrate content with treatment. An increase in the amount of carbohydrate in a product can occur. The carbohydrate of an ingredient can be determined from other nutrients in the form of content of water, ash, fat, and protein that contained in a material [17].
Figure 6. Comparison of composite flour (orange sweet potato, carrot, and red bean) to the value of carbohydrate content

4. Conclusion
The best formulation for instant porridge namely P7 = 20% : 45% : 35% (best composite flour of orange sweet potato, carrot, and red bean).

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