

# PROCEEDING

## The 4th Bogor International Conference For Applied Science



*"Facing the World Challenges through Exploring  
the Beneficial Science and Technology for the Future"*

December 2,  
2020

Virtual  
Conference  
Djuanda University

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**PROCEEDING**  
**4<sup>th</sup> BOGOR INTERNATIONAL CONFERENCE**  
**FOR APPLIED SCIENCE 2020 (4<sup>TH</sup> BICAS 2020)**

Theme:

“Facing the World Challenges through Exploring the Beneficial of Science  
and Technology for the Future”

VIRTUAL CONFERENCE

DECEMBER 2<sup>nd</sup> 2020

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# The Making of Instant Porridge of Pumpkin (*Cucurbita moschata D.*) for the Elderly

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## Abstract

As someone gets older, the health condition of an elderly person becomes susceptible to various diseases, both degenerative diseases with a deterioration of a tissue/organ and a decrease in physiological function in the form of taste disturbances, tooth loss making it difficult to chew, and disorders of the digestive system. In general, it is difficult for the elderly to chew hard foods, while soft foods generally lack Vitamin A, Vitamin C, and fiber, resulting in constipation in the elderly. The application of pumpkin flour as instant porridge is perfect for elderly people who need foods that are soft-textured, rich in fiber and vitamins, and easy to cook and pack. Therefore we need a food formulation that can meet the needs of the elderly under the nutritional adequacy standards of the elderly.

The aim of this research is to develop food diversification in terms of making pumpkin flour by increasing local food defenses, especially to get the right formulation for instant pumpkin porridge for the elderly that meets the food standards of the elderly and is liked by the elderly.

This research was conducted in three stages, namely: making pumpkin flour, making instant pumpkin porridge, and continued with testing its physical properties and organoleptic tests. The making of pumpkin flour begins with soaking the pumpkin flesh with ammonium bisulfite. After washing, it is dried with a tray drier and then made into flour. Instant porridge is made by mixing the ingredients with 3 types of formulations and then cooking them until they thicken. The slurry obtained is then dried with a drum drier and followed by sieving and filtering. The resulting instant porridge was then subjected to a physical test to calculate the brewing time, density of the cakes, and rehydration power. An organoleptic test was also carried out by semi-trained panelists to assess the color, taste, smell, texture, and general assessment of this instant porridge product.

This research obtained: 1) Pumpkin pulp formulation following food standards for the elderly, 2) The effect of differences in the composition of instant pumpkin pulp on the physicochemical and organoleptic properties of instant porridge, and 3) Acceptance rate of instant pumpkin porridge by the elderly

After finding a suitable formulation for pumpkin instant porridge for the elderly, it is necessary to test its shelf life and complement it by researching other micronutrient formulations, namely vitamins and minerals in pumpkin instant porridge for the elderly.

By this research, it was found that the instant pumpkin porridge product formulation took into account the macronutrient composition of each ingredient used which refers to the fulfillment of the RDA standard for the elderly issued by the Ministry of Health in 2019 both from fulfilling energy, protein, fat, and carbohydrates.

**Keywords:** Instant Porridge, Pumpkin, Elderly

## I. BACKGROUND

Elderly according to Law Number 13 the year 1998 is someone who has reached the age of 60 (sixty) years and over. In 2019, the percentage of elderly reached 9.60% or around 25.64 million people, of which approximately one percent more elderly women than male seniors (10.10% vs 9.10%). Of all the elderly in Indonesia, young elderly (60-69 years) dominate with a magnitude of 63.82 percent, followed by middle elderly (70- 79 years) and elderly (80+ years) with their respective magnitudes. 27.68% and 8.50% respectively (BPS, 2019).

As you get older, the health condition of an elderly person becomes susceptible to various diseases, both degenerative diseases with the deterioration of a tissue/organ and a decrease in physiological function in the form of taste disturbances, tooth loss making it difficult to chew, and disorders of the digestive system. In general, it is difficult for the elderly to chew hard foods, while soft foods generally lack Vitamin A, Vitamin C, and fiber, resulting in constipation in the elderly.

Yellow pumpkin (*Cucurbita moschata D.*) is a local food ingredient that contains high levels of antioxidants, namely beta carotene 1569 mcg / 100g (Ministry of Health, 2020) which is very useful in preventing degenerative diseases. Yellow squash also contains high amounts of food fiber, ranging from 44.6 g / 100 g (Pla et al., 2006). Dietary fiber can prevent constipation or constipation (difficulty defecating) and the formation of lumps in the intestines which is a problem that many elderly people suffer (Trisnawati et al, 2014).

The application of pumpkin flour as instant porridge is perfect for elderly people who need foods that are soft-textured, rich in fiber and vitamins, and easy to cook and pack. Therefore we need a food formulation that can meet the needs of the elderly by the nutritional adequacy standards of the elderly.

## II. LITERATURE REVIEW

The pumpkin plant (*Cucurbita moschata*) is a type of vegetable that propagates from the Cucurbitaceae family, which is classified as a seasonal plant which after fruiting will immediately die. The nutritional content of pumpkin consists of protein, carbohydrates, several minerals such as calcium, phosphorus, iron, and vitamins, namely Vitamins B and C. Pumpkin fruit contains active compounds such as saponins, tannins, and flavonoids (Hakimah, 2010). Pumpkin pulp is rich in fiber. Vitamin C, Vitamin E, Magnesium, Potassium, and various carotenoids make it a great source of phytonutrients.

The bright yellow color of the fruit flesh indicates that pumpkin contains one of the carotenoid pigments, including beta-carotene, which is a carotenoid compound that has very high vitamin A activity compared to other carotenoids. Gonzalez et al (2002) conducted a study on the carotenoid composition in pumpkin and found that the main carotenoids that could be identified were  $\beta$ -carotene,  $\alpha$ -carotene, and lutein. Meanwhile, the minor carotenoids are phytofluene,  $\beta$ -carotene, neurosporene, violaxanthin, and neoxanthin. In some samples, 5,6,5', 6'-carotene diepoxide, and flavoxanthin were detected. The total content of  $\beta$ -carotene in pumpkin is influenced by the level of fruit maturity where the riper the fruit, the higher the content (Majid, 2010).

Besides containing  $\beta$ -Carotene, pumpkin is also high in fiber. Based on the research of Trisnawati et al (2014), Foschia et al (2013) state that pumpkin flour can be categorized as high fiber food because it meets the requirements for fiber-rich food categories, namely a minimum of 6 g / 100 g of foodstuffs.

Pumpkin flour is flour with fine grains, passing a 60 mesh sieve, yellowish-white, typical pumpkin smell,  $\pm$  13% moisture content. The physical condition of this pumpkin flour is greatly influenced by the conditions of the basic ingredients and the drying temperature used. The older the pumpkin, the higher the sugar content. Because of the high sugar content of pumpkin, if the temperature used in the drying process is too high, the resulting flour will be lumpy and smell like caramel (Hendrasty, 2003). The quality of pumpkin flour is determined by its constituent components which determine the functional properties of the dough and the resulting flour products and its suspension in water. Pumpkin flour has good quality flour because it has good gelatinization properties, so it will be able to form a dough with good consistency, chewiness, viscosity and elasticity (Hendrasty, 2003).

Porridge is also known as puree which comes from the English word pure which means thick soup. Porridge has a soft texture so it's easy to digest. Instant porridge is slurry which in its presentation does



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not require a cooking process because it has undergone previous processing (Hartomo and Widiatmoko, 1993). The raw materials for instant porridge generally use rice flour, tubers, and cereals. However, to meet the nutritional adequacy rate, other ingredients are substituted or fortified with other ingredients.

The process of instant slurry processing is carried out by cooking a mixture of the ingredients of the pulp so that it undergoes a pre-gelatinization process. Pregelatinization is the simplest physical starch modification technique which is done by cooking the starch in water so that it is perfectly gelatinized, then drying the resulting starch paste using a spray dryer or drum dryer, then mashing it to form fine flour measuring 80 mesh. The flour obtained is then packaged into instant pulp (Perdana, 2003). Serving instant porridge can be done by simply adding hot water or milk according to taste.

The instant product must be easy to disperse in water even without heating treatment or carried out with minimum heating. The solubility of instant slurry is influenced by the starch content contained in the constituent flour. Starch will experience denaturation if given heat treatment, starch granules do not dissolve in cold water but will expand in warm water. The development of starch granules is reversible if the heating applied to the starch has not passed the gelatinization temperature.

According to Hartomo and Widiatmoko (1992), the criteria that food ingredients must have to form instant food products include a) having hydrophilic properties, which are easy to bind water, b) not having a gel layer that is not permeable before use which can inhibit the wetting rate, and c) rehydration of the final product does not result in a clumping and settling product.

### **III. METHODOLOGY**

The research was conducted in three stages, namely: making pumpkin flour, making instant pumpkin porridge, and continued with testing its physical properties and organoleptic tests. Making pumpkin flour begins with soaking pumpkin flesh with 0.3% ammonium bisulfite for 15 minutes, then after washing it is dried with a tray dryer at 60°C for 8 hours and then made into flour. Instant porridge is made by mixing the ingredients with 3 types of formulations and then cooking them until they thicken. Through the results of calculations and preliminary trials of the resulting taste, 3 ingredients formulas were selected whose composition meets the RDA standard for elderly food. The slurry obtained was then dried with a drum dryer (temperature 120°C, 2 rpm) and continued with sieving and filtering. The resulting instant slurry was then subjected to a physical test to calculate the brewing time, density of the cages, and rehydration power. Also, an organoleptic test was carried out by semi-trained panelists to assess the color, taste, smell, texture, and general assessment of this instant porridge product. This organoleptic test was carried out by 30 semi-trained panelists whose test results were stated as the chosen formula, while the hedonic test was carried out on the hedonic test of the elderly panelists.

### **IV. RESULTS AND DISCUSSION**

The results of the proximate analysis of pumpkin flour as seen in Table 1 show that the main content is carbohydrates, while other macronutrients, namely protein and low fat so that other ingredients must be added as a source of protein and fat to produce a product with complete nutrition for the needs of the elderly. The crude fiber content of 7.83% indicates that pumpkin flour can be used as a high-fiber food regarding the BPOM (2018) where the minimum content of high-fiber food is at least 6%.

The formulation is made to meet the food standards for the elderly based on the daily RDA for elderly aged 65-80 years of 1,675 kcal, with an energy composition of 60-65% carbohydrates, 10-15% protein, and 20-25% fat (Ministry of Health, 2019). The total calorific value is obtained from the number of macronutrients of the ingredients used multiplied by the respective caloric value. Protein has an energy value of 4 kcal/gram, fat 9 kcal/gram, and carbohydrates contain energy of 4 kcal/gram (Almatsier, 2001). The formulation is calculated based on energy-producing macronutrients, namely carbohydrates, proteins, and fats. The micro nutrient measured was crude fiber content with an adequacy rate of 20-25 g / day and the content of beta carotene as proVitamin A of 600-650 RE/day.

Table 1. Results of the proximate analysis of pumpkin flour

PARAMETERS	NUMBER	UNITS
Water content	8.03	%
Ashes	5.47	%
Protein levels	5.64	%
Fat levels	4.0	%
Gross fiber content	7.83	%
Carbohydrate levels	69.03	%
Beta carotene	2260	µg/g

Table 2. Macronutrient content of ingredients for instant slurry

Materials	Macronutrient content (g/100 g)		
	Carbohydrate	Fat	Protein
Pumpkin flour *	69.03	4	5.64
Soy flour **	24.9	16.7	40.4
Skim milk **	52	1	35.6
Coconut oil***	-	100	-

Note: \* based on proximate analysis

\*\* based on DKPI Ministry of Health 2020

\*\*\* based on the packaging label

The formulation was obtained by modifying the composition of pumpkin flour, soy flour, and skim milk with other additives in the form of vegetable oil, sucralose, vanilla, and salt. The addition of additional ingredients is intended so that the instant porridge has an interesting taste and flavor. The desired taste target is sweetness, so sucralose is chosen which can provide a sweet taste without increasing calories. Vanilla is added as a flavoring that matches the smell of pumpkin, while salt is added to enhance the sweetness of sucralose. The material formulation used and the calculation of the energy content prediction based on the number of nutrients per 100 grams in this study can be seen in Tables 3 and 4 below.

Table 3. Material formulations

Amount of ingredients (g)	F1	F2	F3
Pumpkin flour	70	65	65
Soy flour	10	10	15
Skim milk	15	20	15
Coconut oil	4.5	4.5	4.5
Sucralose	0.2	0.2	0.2
Vanilla	0.1	0.1	0.1
Salt	0.1	0.1	0.1
Total	100	100	100

Table 4. Calculation of energy content prediction based on the number of nutrients per 100 grams

Macro Nutrition	Energy Content (kkal)		
	Formula 1	Formula 2	Formula 3
Carbohydrate	234.44	231.04	225.62
Protein	53.31	59.30	60.26
Fat	82.08	80.73	87.79
Total	369.84	371.07	373.68

The process of instant slurry processing is carried out by cooking a mixture of the ingredients of the slurry so that it undergoes a gelatinization process and then dries it with a drum dryer. Before cooking, the dry ingredients that make up the slurry are mixed with water in a ratio of 1: 5 to form a slurry which is then cooked at 70 °C for  $\pm$  10 minutes until fully gelatinized and the viscosity increases (thick). After going through the cooking process, the slurry was dried using a double drum dryer.

#### 4.1 Physical Analysis of Instant Porridge

Before the organoleptic test was carried out, an analysis was carried out on several physical properties of instant slurry which included yield, bulk density, brewing test, and rehydration power. The results of the physical analysis of instant slurry can be seen in Table 5 below.

Table 5. The results of the physical analysis of instant slurry

Formula	Rendement	Bulk Density	Brewing test	Rehydration time
F1	85 %	0.6193 g/mL	1 g/3 mL	57.15 det
F2	87.6 %	0.6435 g/mL	1 g/3 mL	55.14 det
F3	86.7 %	0.6244 g/mL	1 g/3 mL	56.23 det

The yield measurement aims to determine the efficiency of the instant slurry-making process. From 1 Kg dry weight of the ingredients of the slurry, the instant slurry weight after drying the drum dryer is 850 g (F1), 876.5 g (F2), and F3 is 867.5 g. It can be concluded that the drying process with a drum dryer can evaporate about 15% of the water in dry raw materials. This yield is influenced by the moisture content in the ingredients of the slurry. The higher the water content in the slurry, the more water needs to be evaporated so that the yield will increase. From the calculation results, the lowest yield was obtained by Formula 1, namely 85%, where the content in Formula 1 contained the highest pumpkin flour content compared to the other two formulas.

Bulk density measurement results yielded values 0.6193–0.6435 g / mL. This value is still in the range of bulk density for powdered food in general, which is between 0.3-0.8 g / ml. The difference in the density value of the bulk is strongly influenced by the size and shape of the particles. The high density of the cage indicates that there is less air space between the product particles so that the product occupies a relatively small space. Food products with high bulk density tend to be desirable because they can occupy less space in the digestive tract so that more nutrients can be received. At the time of packaging, products with high bulk density can also save packaging volume.

The reference used in this rehydration test is the suggestion for serving baby porridge brand A which is served using a 3: 1 ratio of water and pulp. The brewing of instant porridge is carried out until it gets a pulp texture that is relatively the same as that of brand A. The brewing is done according to one serving according to the suggestion for serving porridge with brand A, namely 20 grams of porridge in 60 grams of the warm cooking water. The difference in basic ingredients causes the texture and appearance of brewing the slurry with different references. However, it is determined that the volume of water that has a relatively similar texture to the texture of brand A slurry is 3 mL / 1 gram of slurry or 60 mL of water / 20 grams for one serving of slurry. The ratio of water and pulp in this amount results in a slurry texture that is neither too thick nor too runny.

To get ready-to-eat instant slurry, it takes time to rehydrate the instant slurry which is still dry powder. The slurry rehydration time relates to the ability of the slurry particles to absorb the added water. The absorption time of instant slurry water is strongly influenced by the size and distribution of powder particles, the process of mixing the ingredients, and the composition of the constituent materials. The rehydration time required to produce one serving of slurry is 55-57 seconds.

The product produced after drying will experience changes on its surface, namely open porous, allowing the rehydration process to occur very quickly. The diffusion of water increases as the porosity increases and opens. The rehydration time is short for instant products, making the serving process easier. Rehydration time can be increased by stirring.

#### 4.2 Organoleptic Test

The organoleptic test consists of the hedonic quality test and the hedonic test. The purpose of this organoleptic test was to determine the formula of selected instant pumpkin porridge that will be used in

further research, namely elderly consumer panelists (elderly). The rating scale ranges from 1 to 9. Panelists who were involved in the organoleptic test were 30 moderately trained panelists.

#### a. Hedonic Quality Test

The hedonic quality test uses a scale of 1-9. The attributes assessed were color (brightness), aroma (pumpkin aroma, vanilla aroma, and unpleasant aroma), taste (sweetness), and texture (thickness and tenderness). The results of the hedonic quality test can be seen in Table 6 below.

Table 6. Hedonic Quality Test Results

FORMULA	ATTRIBUTE RATE						
	BRIGHTNESS	PUMPKIN AROMA	VANILLA AROMA	OFF FLAVOR	SWEET TASTE	THICKNESS	SOFTNESS
F1	6.60±1.69	7.00±1.51	3.83±2.53	3.80±2.51	6.23±1.41	4.80±1.88	5.87±1.43
F2	5.97±1.45	6.20±1.62	4.43±2.64	4.30±2.50	6.17±1.39	4.83±1.88	5.93±1.53
F3	5.80±1.80	6.17±1.74	3.87±2.31	3.93±2.36	5.80±1.24	5.33±1.75	5.57±1.35
Average	6.12±1.67	6.46±1.66	4.04±2.49	4.01±2.44	6.07±1.35	4.99±1.83	5.79±1.43

The average product brightness values are in the range of 5.80-6.60 (medium-light). The results of the analysis of variance on the brightness value showed that there was no significant difference in the brightness value of each formula ( $p > 0.05$ ). The formula with the highest brightness value is F1 which has the highest pumpkin starch content. The hedonic quality test on brightness needs to be done because when heating with a drum dryer, the instant slurry will be exposed to high temperatures which can affect the appearance of beta carotene which causes a yellow color in the product.

The average value of pumpkin aroma ranged from 6.17 to 7.00 (slightly smelling). The results of the analysis of variance on the value of the aroma of the pumpkin showed that there was no significant difference between the three formulas ( $p > 0.05$ ). The formula with the highest pumpkin aroma value was F1, with the highest pumpkin content among the three formulas (70 g).

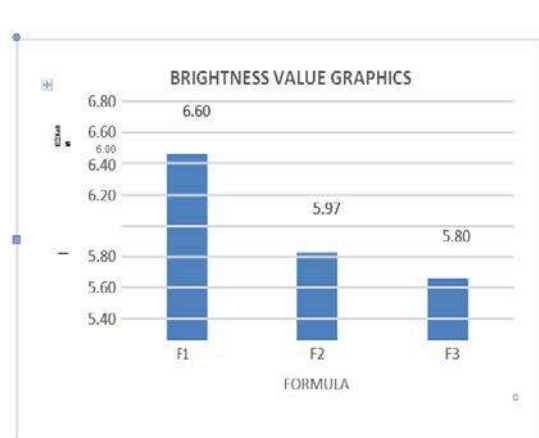


Figure 1. Brightness Value Graphics

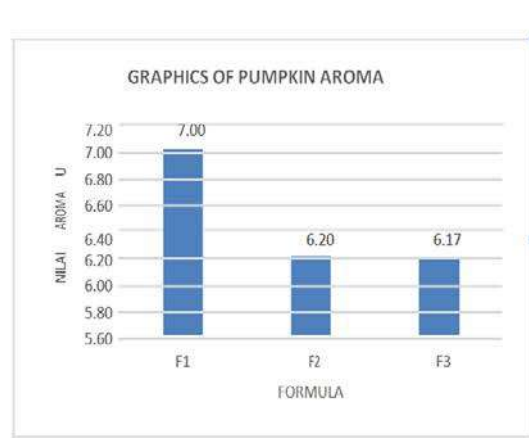


Figure 2. Graphic of Pumpkin Aroma

The average value of vanilla aroma ranged from 3.83-4.43 (odorless). The results of the analysis of variance on the vanilla aroma showed that there was no significant difference between the three formulas ( $p > 0.05$ ). The formula with the highest vanilla aroma value is F2. The vanilla aroma is added to cover the unpleasant aroma that usually appears in products that use flour derived from beans, in this case, soybeans are added as a source of protein. The aroma of vanilla was chosen because it is considered very compatible with the aroma of pumpkin as the main ingredient.

The average value of unpleasant aroma ranges from 3.80-4.30 (not smelled-slightly smelled). The results of the analysis of variance showed that there was no significant difference between the odor value of the three formulas ( $p > 0.05$ ). The formula with the highest odor value was F2 with an average value of

4.30 or slightly smelled. The higher the value given, the stronger the unpleasant aroma. The unpleasant taste is caused by the enzyme lypoxidase which hydrolyzes or breaks down soybean fat into compounds that cause off flavor, which are classified as hexanal and hexanol groups.

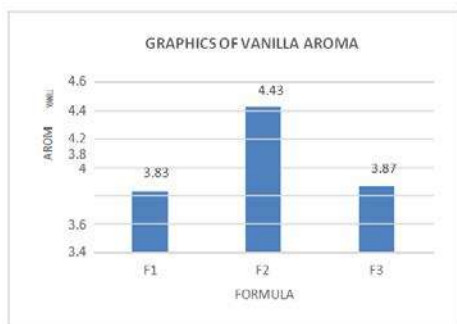


Figure 3. Graph of vanilla aroma.

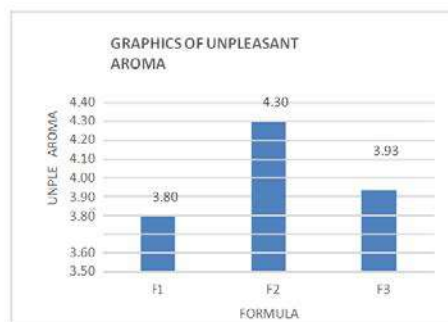


Figure 4. Graph of Off flavor

Average sweetness values ranged from 5.80-6.23 (medium-slightly sweet). The results of the analysis of variance on the sweetness value showed that there was no significant difference between the three formulas. The formula with the highest sweetness value is the F1 formula with a value of 6.23 or slightly sweet. Sweetness is caused by the addition of 0.2% sucralose sugar per formula. Sucralose was chosen because it does not increase additional calories so it is safe for elderly people with diabetes, has a high sweetness level (600 times sucrose), and has been declared safe for use by the BPOM.

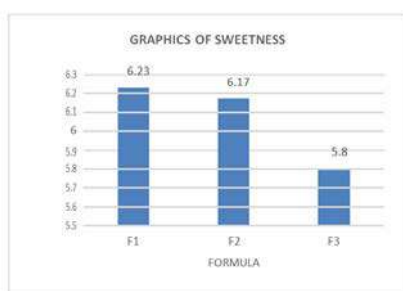


Figure 5. Graph of sweetness value

The average viscosity values ranged from 4.80-5.33 (slightly thick-medium). The results of the analysis of variance on the viscosity value showed that there was no significant difference between the three formulas ( $p > 0.05$ ). The highest viscosity value is formula F3 with a value of 5.33 or in the medium range. Thickness is important for elderly porridge products. If the porridge is too thick, it will make it difficult for the elderly to swallow food, but if it is too runny the product will resemble milk. The viscosity is also closely related to the volume of water added at the time of brewing. Based on the results of the brewing test of instant flask pulp, a ratio of 1: 3 was obtained to obtain the desired consistency of instant pumpkin pulp.

The average values for tenderness were 5.57-5.93 (moderate). The results of the analysis of variance on the softness value showed that there was no significant difference between the three formulas ( $p > 0.05$ ). The highest average softness value is formula F2 with a value of 5.93 or in the moderate range. Soft food texture is very important for the elderly's diet, considering that many elderly people don't have teeth so it's difficult to chew.

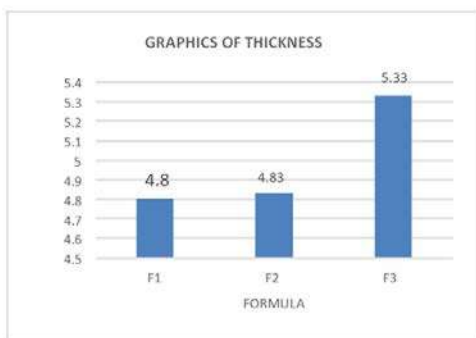


Figure 6. Graph of Thickness value

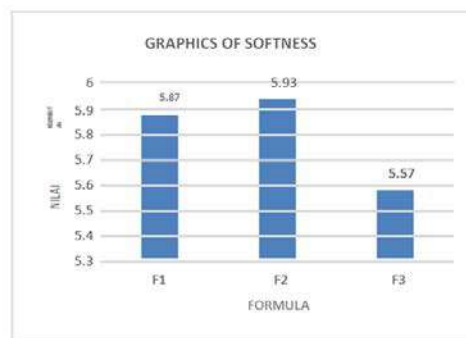


Figure 7. Graph of softness value

#### b. Hedonic Test

Organoleptic tests were carried out using a scale of 1-9. In the hedonic test the higher the value, the more favorable the panelists are to the product. Panelists are considered to receive porridge if the given preference value is greater than 5. The hedonic test results can be seen in Table 7 below.

Table 7. Hedonic test results

FORMULA	AVERAGE ATTRIBUTES				
	Color	Aroma	Taste	Texture	ALL
F1	6.27±1.46	7.30±1.29	6.50±2.17	6.80±1.47	7.27±1.17
F2	5.97±1.60	6.73±1.50	6.70±1.60	6.47±1.43	7.13±1.55
F3	6.07±1.87	6.70±1.49	6.47±1.81	6.27±1.25	6.97±1.47
Averages	6.10±1.64	6.91±1.44	6.56±1.86	6.51±1.39	7.12±1.39

The hedonic mean values of the colors ranged from 5.97-6.27 (moderate-somewhat likable). The results of the analysis of variance on the hedonic value of color showed no significant difference in the hedonic value of color between the three formulas ( $p > 0.05$ ). The formula with the highest hedonic value is F1 with a value of 6.27 or somewhat like it. The appearance of the instant pulp is a yellow-orange color, which is caused by the beta carotene content of pumpkin flour.

Color is the main attribute that quickly and easily gives an impression in determining consumer rejection or acceptance of Soekarto's (1985) products. Before other factors are considered, visually the color factor will appear first (Winarno 2008). The color factor will be the first consideration when the food ingredients are selected. A food that is considered nutritious and has a very good texture will not be eaten if it has an unsightly color or gives the impression that it has deviated from the color it should have (Soekarto 1985).

The hedonic average values of aroma ranged from 6.70 to 7.30 (somewhat likable). The results of the analysis of variance on the hedonic value of aroma showed that there was no significant difference between the three formulas ( $p > 0.05$ ). The formula with the highest aroma hedonic value was F1 with an average score of 7.30 or within the like range. Formula F1 is an instant porridge formula with the highest pumpkin flour content.

The parameter that gives the second-biggest contribution after color is the aroma. The good taste of food is determined by the smell of the food. Aroma has its charm in determining the good taste of the food product itself. The human smell can recognize whether or not a food that has not been seen can only smell the food from a distance.

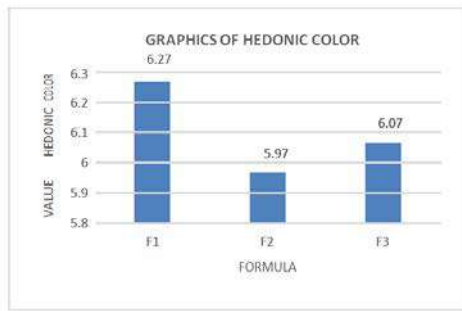


Figure 8. Graph of color hedonic.

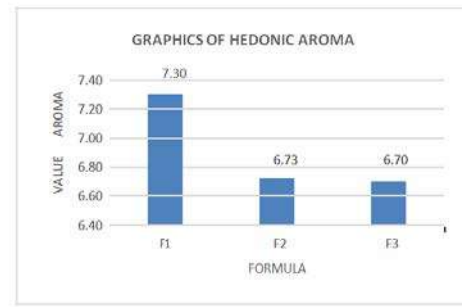


Figure 9. Graph of hedonic aroma

The mean hedonic values of taste ranged from 6.47 to 6.70 (rather like). The results of the analysis of variance on the hedonic value of taste showed no significant difference between the three formulas ( $p > 0.05$ ). The highest hedonic value is formula F2 with an average value of 6.70 or in the somewhat favorable range.

The parameter that gives the third largest contribution is taste. This is because the taste is a very determining factor in a consumer's final decision to accept or reject a food, even though the other parameters are good, but if it tastes bad or dislikes the food will be rejected (Soekarto 1985). The consumer's preference for the taste of a product is also supported by an interest in the color and aroma of the product. According to Winarno (2008), the color captured by sight and smell captured by nasal olfactory cells can stimulate the taste buds and taste of the tongue.

The hedonic mean values for texture ranged from 6.27 to 6.80 (rather like). The results of the analysis of variance on the hedonic value of taste between the three formulas did not show a significant difference ( $p > 0.05$ ). The formula with the highest tasting hedonic value is F1 with an average value of 6.80 or in the somewhat like range.

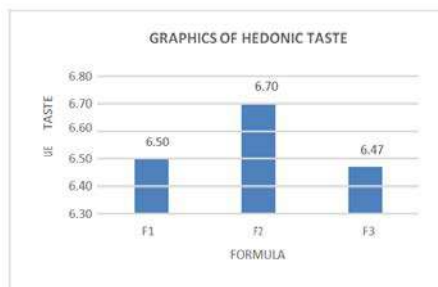


Figure 10. Graph of Hedonic taste

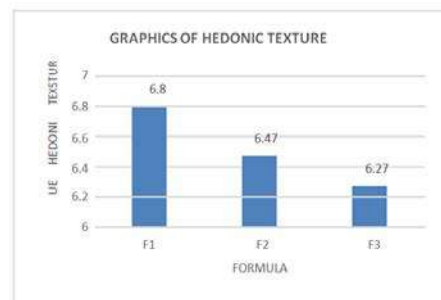


Figure 11. Graph of Hedonic Texture

The overall hedonic mean scores ranged from 6.97 to 7.27 (likes). The results of the analysis of variance on the overall hedonic value showed no significant difference between the overall hedonic values between the 3 formulas ( $p > 0.05$ ). The formula with the highest overall hedonic value is F1 with a value of 7.27 or is in the like range, so it is determined that the preferred formula is the F1 formula.

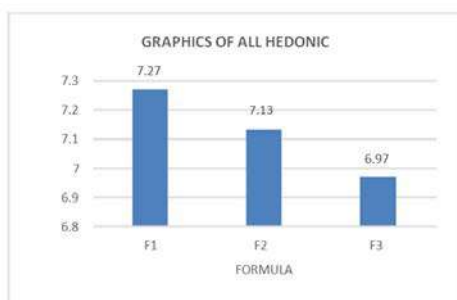


Figure 12. Graph of the overall hedonic value

#### 4.3 Chemical Analysis

The nutritional content analyzed consisted of carbohydrates, fat, protein, water, ash, crude fiber content, and beta carotene content. The data from the analysis were then tested for a variance to determine

the effect of differences in the composition of each formulation on its nutritional content. The results of the chemical analysis of instant slurry are presented in Table 8 below.

Table 8. Results of instant slurry chemical analysis

Nutrient Content	Formula		
	F1	F2	F3
Water (%)	4.64 <sup>a</sup>	4.60 <sup>a</sup>	4.81 <sup>a</sup>
Ash (%)	5.78 <sup>a</sup>	5.88 <sup>a</sup>	5.87 <sup>a</sup>
Protein (%)	11.79 <sup>a</sup>	13.86 <sup>b</sup>	13.89 <sup>b</sup>
Fat (%)	15.25 <sup>a</sup>	14.87 <sup>a</sup>	16.78 <sup>a</sup>
Carbohydrate (%)	62.52 <sup>a</sup>	60.78 <sup>ab</sup>	58.63 <sup>b</sup>
Crude fiber (%)	7.72 <sup>a</sup>	7.44 <sup>a</sup>	7.83 <sup>a</sup>
Beta carotene µg / g	1723	1435	1492

The results of the water content analysis showed that the moisture content of the product ranged from 4.60-4.81%. The results of the analysis of variance show that there is no significant difference between the three formulas. This is because the drying process is carried out with the same method and tool, namely the drum dryer. Hariyadi (2015) revealed that by using a drum dryer, to get a product moisture content of less than 5% a box takes 2-20 seconds on the drum surface. Water content affects the product shelf life. The lower the water content, the longer the product's shelf life (Astawan, 2009). The moisture content of the product is already close to the water content requirement of SNI instant powder, which is not more than 4%.

The protein content in instant porridge products ranged from 11.79-13.89%, there was a significant difference between the protein content in F1 and the protein content in F2 and F3. The protein content in F1 is the lowest compared to the other two formulas because formula 1 is the formula with the highest pumpkin flour content and the low protein content.

Fat content in instant porridge products ranges from 14.87-16.78%. From the results of variance, there is no significant difference between the three formulas. The fat content in the product is still in an amount according to the SNI standard for instant powder 6-15%.

The carbohydrate content of instant porridge is determined by the method by difference. The carbohydrate content in the product ranges from 58.63-62.52%. There is a real difference between the F1 formula and the F2 and F3 formulas. Formula F1 has the highest carbohydrate content because in Formula F1 the content of pumpkin flour is the highest.

Crude fiber content ranges from 7.44-7.83%. The results of the analysis of variance showed that there was no significant difference between the three formulas. Crude fiber content indicates that instant porridge products can be categorized as high-fiber food according to BPOM standards of at least 6%. Crude fiber is very important for the elderly because it can prevent constipation which is very often experienced by the elderly as a result of lack of fiber intake in their diet. Lack of fiber intake is also related to the condition of the oral organs of the elderly who are unable to chew fibrous food because many teeth have fallen out.

#### 4.4 Contribution of Nutrients to the RDA for the elderly

The serving size of this pumpkin-based instant porridge is determined according to the habits of the elderly in consuming food, where according to Rahman's research (2013) the average elderly can consume 50 g of instant porridge so that in this pumpkin-based instant milk porridge product uses a serving size equal to 50 g.

If it is assumed that the selected instant porridge (F1) as a food (porridge) interlude that contributes 10-20% to the RDA of the elderly by 1675 kcal, then one serving size (50 grams) of instant porridge contains 201.82 kcal. The contribution of energy content to the RDA for elderly aged 65-80 years is presented in Table 9 below.



Table 9. Contribution of energy content to the RDA for elderly aged 65-80 years

Energy and nutrients	Nutritional content per dose serving (50 g)	Energy contribution to the RDA (%)
Calories	201.82 kkal	12.04
Protein	7.63 g	12.5
Fat	5.9 g	12.42
Carbohydrate	27.4 g	10.85
Crude fiber	3.9 g	16.59
Beta carotene	1723	

## V. CONCLUSION

From this research on making instant pumpkin porridge for the elderly, we can conclude:

- Instant porridge for the elderly which is rich in fiber and beta carotene can be made from pumpkin flour as the main ingredient plus soy flour and skim milk as additional ingredients.
- The results of the hedonic quality test concluded that the instant porridge tested had organoleptic characters, a slightly bright color, pumpkin flavor, slightly vanilla and unpleasant odor, rather sweet, medium thickness, and slightly soft texture.
- The results of the chemical and physical analysis showed that the selected slurry formula had a density of 0.6193 g / mL, 57.15 seconds of rehydration time, 4.64% moisture content, 5.78% ash content, 11.79% protein content, 15.25% fat content, 62.52% carbohydrate content, crude fiber 7.72%, and beta carotene 1646 µg / g.
- One serving of pumpkin-based instant porridge of 50 g can contribute 12.04% of energy from the RDA for elderly aged 65-80 years.

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