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12th December 2022

Authors: Nurrahman., Yonata, D., Amaliah, D.N., Yashfin, S.F., Yusuf, M. and Suyanto, A.

Manuscript title: Chemical properties of instant pumpkin soup with the addition of porang flour

Manuscript ID: FR-2022-617

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Manuscript FR-2022-617 entitled " Chemical properties of instant pumpkin soup with the addition of porang flour " which you submitted to Food Research, has been reviewed. The comments of the reviewer(s) are included in the attached file.

The reviewer(s) have recommended publication, but also suggest some revisions to your manuscript. Therefore, I invite you to respond to the reviewer(s)' comments and revise your manuscript. Once the revised manuscript is prepared, please send it back to me for further processing.

Because we are trying to facilitate timely publication of manuscripts submitted to Food Research, your revised manuscript should be submitted before or by 20th February 2023. If it is not possible for you to submit your revision by this date, please let us know.

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The sections that required grammatical revision still require major revisions.
Please have the manuscript proofread by a native English speaker as the grammatical revisions cannot be done on our side to ensure the message does not differ largely from the original.
Certain areas such as minutes to mins and ml to mL etc must be standardized as well, ensuring that citation and chemical formula formats are revised accordingly.
Kindly revert to us within 2 weeks.

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2. Your review should consider the article's scholarly merit including originality of the research issue and/or methodology, adequacy and rigor of the research methodology and techniques used, quality and rigor of data analysis, comprehensiveness of literature review, and the readability and presentation of the article. Please provide detailed and specific comments to all items. Also, where appropriate please provide suggestions for revision.

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Chemical properties of instant pumpkin soup with the addition of porang flour

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Abstract

Pumpkin is a source of β-carotene, vitamins, flavonoids, saccharides, water-soluble vitamins, mineral salts, and phenolics which are beneficial for health. Porang flour acts as a thickener and stabilizer from glucomannan content. This study aimed to determine the effect of adding porang flour on antioxidant activity, levels of β-carotene, levels of vitamin C, total phenolic, and dietary fiber of instant pumpkin soup. The experimental research method uses a one-factorial, Completely Randomized Design (CRD) with five treatments and five replications. The research phase began with the preparation of instant pumpkin soup, with the addition of various variations of porang flour (0, 0.5, 1, 1.5 and 2%), then analysis was performed on antioxidant activity, levels of β-carotene, vitamin C, total phenolic and crude fiber. The results showed that increasing the concentration of porang flour caused an increase in antioxidant levels, total phenolic, crude fiber, also a decrease in β-carotene and vitamin C levels of instant pumpkin soup. It was concluded that adding 1.5% (w/w) porang flour produced instant pumpkin soup with the best chemical properties.

Keywords: Pumpkin, Porang flour, Instant soup, Chemical properties

1. Introduction

Pumpkin (*Cucurbita moschata*) is a functional vegetable which is also used as a fruit with a distinctive aroma and taste. Pumpkin is known to be rich in phenolics, flavonoids, vitamins (β-carotene, vitamin A, vitamin C, and α-tocopherol), carbohydrates, and amino acids (Różyło *et al*., 2014; Nurrahman and Astuti, 2022). The carotenoid component is the compound responsible for the yellow color of the pumpkin. Fresh pumpkins contain carotenoids around 234.21 to 404.98 µg/g, of which about 60% is β-carotene which is classified as a potent antioxidant (Carvalho *et al*., 2014).

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Pumpkin porridge has been developed into various products, one of which is instant soup (Setiawan *et al*., 2021). Instant soup is a dry food product processed with permitted thickening additives (Yulianti *et al*., 2020). Rif'an *et al*. (2017) have observed the effect of various types of dryers in making pumpkin instant soup and concluded that cabinet dryers could be used in making soup, taking into account the thickness of the pulp when dried. Apart from drying, thickening agents are one of the determining factors for the final product of instant soup (Fernández-López *et al*., 2020).

Generally, thickening agents often used in instant soups are gum, nutrient agar and maltodextrin. Recently, a study has developed porang as a thickening agent (Rosida *et al*., 2022). Porang (*Amorphophallus oncophyllus*) is a tuberous plant rich in glucomannan (Harmayani *et al*., 2014). Glucomannan from porang tubers has gelation properties and high viscosity (Yanuriati *et al*., 2017). Glucomannan has been confirmed to be able to increase viscoelasticity and improve noodle elasticity (Meng *et al*., 2021), this is due to its molecular structure which is rich in hydroxyl and carbonyl groups (Yan *et al*., 2012), showing a robust water absorption capacity (Wu and Zhong, 2016).

The addition of porang flour to the dough has been confirmed to improve the rheological and microstructural properties of the resulting product (Gong *et al*., 2019; Meng *et al*., 2021). In addition, the addition of porang flour is expected not to harm the product's functional properties. Therefore, this study investigates the effect of adding porang flour on antioxidant activity, levels of β-carotene, levels of vitamin C, phenolic total, and fiber content of instant pumpkin soup.

2. Materials and methods

2.1 Materials

The parang pumpkin variety was collected from farmers in Semarang, Indonesia. Porang flour was obtained from the pilot plant of Brawijaya University, Indonesia. Chemical reagents include ascorbic acid, gallic acid, ethanol, Na_2CO_3, Folin-Ciocalteu solution, H_2SO_4, NaOH, and K_2SO_4 pro analysis were from Sigma-Aldrich.

2.2 Making instant pumpkin soup

The preparation of instant pumpkin soup was based on the method described by Rif'an *et al*. (2017) with modifications. Pumpkin puree (500 g) with 6% skim milk (w/w) is mixed with chicken stock (1:1 w/v), and 40 g of seasoning was added. The mixture was then homogenized. Porang flour (0, 0.5, 1, 1.5 and 2%) was added to the mixture and cooked until boiling for 5 mins. Pumpkin soup that has been processed is then poured into a glass tin, the thickness of the soup is set to 1-2 cm, and then dried in a drying cabinet at 60-70°C for 6 hrs. After drying, the pumpkin soup was ground with a blender to form a fine powder measuring < 60 mesh. The instant pumpkin soup was stored in the freezer until analyzed.

2.3. Antioxidant activities

Antioxidant activity refers to the method described by Xu and Chang (2007). A 0.5 g instant soup was prepared into a test tube containing 10 ml of 96% ethanol, and was incubated for 24 hrs at room temperature. The sample was then vortexed, and the extract obtained was stored in a test tube in the dark. A total of 0.2 mL of sample extract was added to 3.9 mL of 1,1-diphenyl-2-pycrylhidrazil (DPPH),

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then vortexed for 1 min. Then the absorption was measured at a wavelength of 517 nm using a UV-Vis spectrophotometer. The antioxidant activity was calculated as below:

Antioxidant activity (%) = 100 - (Absorbance sample- absorbance blank/absorbance control)×100

2.4 ß-Caroten content

Determination of ß-carotene levels refers to the method described by Carvalho *et al.* (2012), with modifications. Sample of 50 mg was mixed with 50 mL of petroleum ether. Then 2 mL of the diluted sample was pipetted into a 10 mL volumetric flask and adjusted using petroleum ether. The absorption wavelength of the sample is read at 450 nm. The standard solution was prepared using pure ß-carotene reagent (6-14 ppm) with 96% ethanol solvent. The absorbance was measured at a wavelength of 450 nm to obtain the linear regression equation.

2.5 Vitamin C

The vitamin C levels were determined by soaking 200 mg of the sample in 100 mL of distilled water in a volumetric flask (Setiawan *et al.*, 2014). The standard serial solution uses ascorbic acid (2-10 ppm) with distilled water as a solvent. The absorbance was read using a UV-Vis spectrophotometer at 265 nm.

2.6 Total phenolics

Determination of the total phenolic content of instant soup refers to the Folin-Ciocalteu method (Pedro *et al.*, 2016). One gram of sample was mixed with 1 mL of 96% ethanol. The dissolved sample was taken 0.2 mL and put into a test tube; then add 1 mL of 10% (v/v) Folin-Ciocalteu and 0.8 mL of 7.5% Na2CO3, stirred for 5 minutes. The mixture was incubated at 25°C for 60 minutes. The absorbance is read at a wavelength of 765 nm. Gallic acid (10-50 ppm) was used as the standard curve to determine total phenolic content.

2.7 Fiber content

Fiber content was determined using the AOAC method (1995). Sample of 1 g was mixed with 50 mL of 1.25% H2SO4 and heated for 30 minutes using a condenser. Then add 50 ml of NaOH and heat for 20 minutes. The liquid is filtered using filter paper which has been weighed. The residue on the filter paper was cleaned using 50 mL of hot water, 25 mL of 10% K2SO4, and 25 mL of ethanol. Then the filter paper is dried and weighed, where the remaining dry residue is the fiber content.

2.8. Statistical analysis

The study design used single-factor CRD (Completely Randomized Design) with five treatments. The different treatment test was analyzed using One Way Anova, if there is an effect of p-value <0.05, continue with Duncan's test.

3. Results and discussion

3.1 Antioxidant activities

The antioxidant activity of instant pumpkin soup ranged from 28.80 – 30.30% RSA (Table 1). The higher addition of porang flour produced instant pumpkin soup with better antioxidant activity.

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Adding 2% porang flour to the formula produced instant pumpkin soup with the highest antioxidant activity, significantly different from all treatments. Antioxidants are compounds needed to prevent oxidative stress. Oxidative stress is a condition of an imbalance between antioxidants in the body and free radicals. Several factors, including pH influence the stability of antioxidants, porang is neutral, slightly alkaline with a pH of 6 - 7, while antioxidants are stable at pH 5 - 6, neutral, slightly acidic (Pasaribu *et al*., 2015; Yanuarti *et al*., 2017). Other factors that affect the stability of antioxidants are increased temperature, sun exposure, and oxidation. Drying time and using temperatures of 60-70°C allow the antioxidant activity to be damaged so that it decreases.

3.2 ß-Caroten content

ß-Carotene levels of instant pumpkin soup ranged from 46.29-50.41 ppm. The higher the addition of porang flour, the significantly reduced the ß-carotene content of a product. Adding 1% porang flour is recommended because, statistically, it is no different from instant pumpkin soup without porang. Pumpkin generally contains ß-Carotene levels around 141.95 to 244.22 ppm (Carvalho *et al*., 2012). There was a very high decrease in ß-Carotene when pumpkin was processed into instant soup. This is because ß-Carotene, commonly called pro-vitamin A, is a compound containing retinol easily damaged when heated to high temperatures (Agustina *et al*., 2019). However, even at low concentrations, the antioxidant activity contributed by ß-Carotene is quite effective.

3.3 Vitamin C

Vitamin C is a water-soluble vitamin that functions to repair tissues and body metabolism. The average levels of vitamin C in the instant pumpkin soup samples ranged from 160.58 to 189.71 mg/100 g. Vitamin C levels decreased by 29.13% with the addition of porang flour to the formula. The addition of 0.5% porang is recommended, this is because the levels of vitamin C produced are statistically no different from without the addition of porang flour. Porang flour is not a source of Vitamin C, so its addition will not contribute to instant soup's Vitamin C levels. Meanwhile, pumpkin is a food source of Vitamin C (Kulczyński and Gramza-Michałowska, 2019). Vitamin C is found in abundant quantities in many fruits and plays a role in preventing various diseases. This is associated with the ability to scavenge free radicals in biological systems (Block, 1991). It is just that the vitamin C content is sensitive to heat, generally decreasing significantly after drying and high-temperature processing (Ellong *et al*., 2015).

3.4 Total phenolics

The total phenol levels in the instant pumpkin soup samples ranged from 3.37 to 5.98 mg GAE/g. Total phenol levels increased by 2.61% with the addition of porang flour. Pumpkin and porang flour are good sources of phenolics. Pumpkin is known to contain a total phenolic of 24.27 mg GAE/g (Sari and Putri, 2018), while porang flour contains a total phenolic of 7.10 mg GAE/g (Kumar *et al*., 2017). The main phenolic content in pumpkin is the flavonoid group (Valenzuela *et al*., 2014). High temperatures during processing cause the formation of phenolic compounds (Que *et al*., 2008). This condition is quite favourable in the processing of pumpkin into instant soup using high temperatures. Total phenolic generally correlates with antioxidant activity, so the higher the entire phenolic content of a product, the higher the antioxidant activity (Wahyono *et al*., 2020).

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3.5 Crude fiber

The average fiber content of instant pumpkin soup ranged from 24.01 to 45.04%. The results in Table 1 explain that the fiber content of instant pumpkin soup increased significantly with the addition of porang flour in the formula. Fiber consumption benefits human health, especially intestinal function (Ismaiel *et al*., 2016). The fiber component in pumpkin is generally part of insoluble dietary fiber, the ratio of which reaches 60.03% of total fiber (Bemfeito *et al*., 2020). Meanwhile, the fiber in porang flour is a component of glucomannan (Nurlaela *et al*., 2021). Glucomannan is a part of soluble dietary fiber, which has hydrocolloid properties and high calorie content (Behera and Ray, 2016). The glucomannan content in porang flour reaches 67.5% (Bahlawan *et al*., 2021), this condition underlies the increase in the fiber content of instant pumpkin soup along with the addition of porang flour.

4. Conclusion

All treatments significantly affected antioxidant activity, beta-carotene, vitamin C, total phenolics, and fiber. The recommended concentration of porang flour is 1.5%, and it produces the best instant pumpkin soup based on chemical properties.

Conflict of interest - Disclose any potential conflict of interest appropriately.

The authors declare no conflict of interest.

Acknowledgments

The authors are thankful to the Research Institute of the Muhammadiyah University of Semarang which facilitated this research.

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Table 1. Chemical properties of instant pumpkin soup

Porang Flour (%)	Parameters				
	Antioxidant Activities % RSA	ß-Carotene (ppm)	Vitamin C (mg/100 g)	Total Phenolics (mg GAE/g)	Fiber Content (%)
0	28.80±0.57^{e}	50.41±2.05^{b}	189.71±0.72^{c}	3.37±0.51^{a}	24.01±1.92^{a}
0.5	29.10±0.51^{d}	48.29±2.04^{b}	184.88±0.99^{c}	4.09±0.18^{b}	29.70±1.99^{b}
1.0	29.40±0.31^{c}	47.81±1.69^{b}	176.13±0.48^{b}	4.24±0.23^{c}	32.12±0.98^{bc}
1.5	30.00±0.55^{b}	46.17±1.53^{ab}	170.25±0.64^{b}	5.23±0.94^{d}	35.72±1.64^{c}
2.0	30.30±0.46^{a}	46.29±1.44^{a}	160.68±0.18^{a}	5.98±0.37^{e}	45.04±1.54^{d}

Note: the data representations of the mean values±standard deviation. Different superscripts in the same column showed statistically significant differences ($p < 0.05$)

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Pumpkin porridge has been developed into various products, one of which is instant soup (Setiawan *et al*., 2021). Instant soup is a dry food product processed with permitted thickening additives (Yulianti *et al*., 2020). Rif'an *et al*. (2017) have observed the effect of various types of dryers in making pumpkin instant soup and concluded that cabinet dryers could be used in making soup, taking into account the thickness of the pulp when dried. Apart from drying, thickening agents are one of the determining factors for the final product of instant soup (Fernández-López *et al*., 2020).

Generally, thickening agents often used in instant soups are gum, nutrient agar and maltodextrin. Recently, a study has developed porang as a thickening agent (Rosida *et al*., 2022). Porang (*Amorphophallus oncophyllus*) is a tuberous plant rich in glucomannan (Harmayani *et al*., 2014). Glucomannan from porang tubers has gelation properties and high viscosity (Yanuriati *et al*., 2017). Glucomannan has been confirmed to be able to increase viscoelasticity and improve noodle elasticity (Meng *et al*., 2021), this is due to its molecular structure which is rich in hydroxyl and carbonyl groups (Yan *et al*., 2012), showing a robust water absorption capacity (Wu and Zhong, 2016).

The addition of porang flour to the dough has been confirmed to improve the rheological and microstructural properties of the resulting product (Gong *et al*., 2019; Meng *et al*., 2021). In addition, the addition of porang flour is expected not to harm the product's functional properties. Therefore, this study investigates the effect of adding porang flour on antioxidant activity, levels of β-carotene, levels of vitamin C, phenolic total, and fiber content of instant pumpkin soup.

2. Materials and methods

2.1 Materials

The parang pumpkin variety was collected from farmers in Semarang, Indonesia. Porang flour was obtained from the pilot plant of Brawijaya University, Indonesia. Chemical reagents include ascorbic acid, gallic acid, ethanol, Na_2CO_3, Folin-Ciocalteu solution, H_2SO_4, NaOH, and K_2SO_4 pro analysis were from Sigma-Aldrich.

2.2 Making instant pumpkin soup

The preparation of instant pumpkin soup was based on the method described by Rif'an *et al*. (2017) with modifications. Pumpkin puree (500 g) with 6% skim milk (w/w) is mixed with chicken stock (1:1 w/v), seasoning is added amount of 8% from the total pumpkin, then homogenized. Porang flour (0, 0.5, 1, 1.5 and 2%) was added to the mixture and cooked until boiling for 5 minutes. Pumpkin soup that has been processed is then poured into a glass tin, the thickness of the soup is set 1-2 cm, then dried in a drying cabinet at 60 - 70°C for 6 hours. After drying, the pumpkin soup was ground with a blender to form a fine powder measuring < 60 mesh. Instant pumpkin soup was stored in the freezer until analyzed.

2.3. Antioxidant activities

Antioxidant activity refers to the method described by Xu and Chang (2007). A 0.5 g instant soup was prepared into a test tube containing 10 ml of 96% ethanol, and was incubated for 24 hours at room temperature. The sample was then vortexed, and the extract obtained was stored in a test tube in the dark. A total of 0.2 ml of sample extract was added to 3.9 ml of 1,1-diphenyl-2-pycrylhidrazil (DPPH), then vortexed for 1 minute. Then the absorption was measured at a wavelength of 517 nm

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using a UV-Vis spectrophotometer. Antioxidant activity was obtained by calculating blank absorbance (96% ethanol) minus sample absorbance. The results of antioxidant activity are expressed in % RSA units.

2.4 ß-Caroten content

Determination of ß-carotene levels refers to the method described by Carvalho *et al.* (2012), with modifications. Instant soup amount of 50 mg diluted with 50 mL petroleum ether. Then 2 mL of the diluted sample was pipetted into a 10 mL volumetric flask and adjusted using petroleum ether. The absorption wavelength of the sample is read at 450 nm. The standard solution was prepared using pure ß-carotene reagent (6 – 14 ppm) with 96% ethanol solvent. The absorbance was measured at a wavelength of 450 nm to obtain the linear regression equation.

2.5 Vitamin C

The vitamin C levels in the unstant soup was determined based on the method described by Setiawan *et al*. (2014). The standard serial solution uses ascorbic acid (2-10 ppm) with distilled water as a solvent. The instant soup was weighed 5 grams and dissolved in a 100 mL volumetric flask by adding distilled water up to the mark. The dissolved sample was pipetted amount of 2 mL, transferred to a 50 mL volumetric flask, and adjusted with distilled water. The absorbance of the samples and standards was read using a UV-Vis spectrophotometer at 265 nm.

2.6 Total phenolics

Determination of the total phenolic content of instant soup refers to the Folin-Ciocalteu method (Pedro et al. 2016). Instant soup amount of 1 gram diluted in 1 ml of 96% ethanol. The dissolved sample was taken 0,2 mL and put into a test tube; then add 1 mL of 10% (v/v) Folin-Ciocalteu and 0.8 mL of 7.5% Na2CO3, stirred for 5 minutes. The mixture was incubated at 25°C for 60 minutes. The absorbance is read at a wavelength of 765 nm. Gallic acid (10-50 ppm) was used as the standard curve to determine total phenolic content.

2.7 Fiber content

Fiber content was determined using the AOAC method (1995). Instant soup amount of 1 g dissolved in 50 mL of 1.25% H2SO4 and heated for 30 minutes using a condenser. Then add 50 ml of NaOH and heat for 20 minutes. The liquid is filtered using filter paper which has been weighed. The residue on the filter paper was cleaned using 50 mL of hot water, 25 mL of 10% K2SO4, and 25 mL of ethanol. Then the filter paper is dried and weighed, where the remaining dry residue is the fiber content.

2.8. Statistical analysis

The study design used single-factor CRD (Completely Randomized Design) with five treatments. The different treatment test was analyzed using One Way Anova, if there is an effect of p-value <0.05, continue with Duncan's test.

3. Results and discussion

3.1 Antioxidant activities

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Deleted: An instant soup sample (1 g) was put into Erlenmeyer, added 50 mL of 1.25% H_2SO_4, and heated for 30 minutes using reverse cooling. Then 50 mL of NaOH was added and heated for 20 minutes using medium heat. The next step is the filter paper is weighed to filter the heated liquid, then cleaned with 50 mL of hot water, 25 mL of 10% K_2SO_4, and 25 mL of ethanol. The residue obtained is then dried. The dry residue weight is the fiber content expressed in percent.

The antioxidant activity of instant pumpkin soup ranged from 28.80 – 30.30% RSA (Table 1). The higher addition of porang flour produced instant pumpkin soup with better antioxidant activity. Adding 2% porang flour to the formula produced instant pumpkin soup with the highest antioxidant activity, significantly different from all treatments. Antioxidants are compounds needed to prevent oxidative stress. Oxidative stress is a condition of an imbalance between antioxidants in the body and free radicals. Several factors, including pH influence the stability of antioxidants, porang is neutral, slightly alkaline with a pH of 6 - 7, while antioxidants are stable at pH 5 - 6, neutral, slightly acidic (Pasaribu *et al*., 2015; Yanuarti *et al*., 2017). Other factors that affect the stability of antioxidants are increased temperature, sun exposure, and oxidation. Drying time and using temperatures of 60 - 70°C allow the antioxidant activity to be damaged so that it decreases.

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3.2 ß-Caroten content

ß-Carotene levels of instant pumpkin soup ranged from 46.29 – 50.41 ppm. The higher the addition of porang flour, the significantly reduced the ß-carotene content of a product. Adding 1% porang flour is recommended because, statistically, it is no different from instant pumpkin soup without porang. Pumpkin generally contain ß-Carotene levels around 141.95 to 244.22 ppm (Carvalho *et al*., 2012). There was a very high decrease in ß-Carotene when pumpkin was processed into instant soup. This is because ß-Carotene, commonly called pro-vitamin A, is a compound containing retinol easily damaged when heated to high temperatures (Agustina *et al*., 2019). However, even at low concentrations, the antioxidant activity contributed by ß-Carotene is quite effective.

3.3 Vitamin C

Vitamin C is a water-soluble vitamin that functions to repair tissues and body metabolism. The average levels of vitamin C in the instant pumpkin soup samples ranged from 160.58 to 189.71 mg/100 g. Vitamin C levels decreased by 29.13% with the addition of porang flour to the formula. The addition of 0.5% porang is recommended, this is because the levels of vitamin C produced are statistically no different from without the addition of porang flour. Porang flour is not a source of Vitamin C, so its addition will not contribute to instant soup's Vitamin C levels. Meanwhile, pumpkin is a food source of Vitamin C (Kulczyński and Gramza-Michalowska, 2019). Vitamin C is found in abundant quantities in many fruits and plays a role in preventing various diseases. This is associated with the ability to scavenge free radicals in biological systems (Block, 1991). It is just that the vitamin C content is sensitive to heat, generally decreasing significantly after drying and high-temperature processing (Ellong *et al*., 2015).

3.4 Total phenolics

The total phenol levels in the instant pumpkin soup samples ranged from 3.37 to 5.98 mg GAE/g. Total phenol levels increased by 2.61% with the addition of porang flour. Pumpkin and porang flour are good sources of phenolics. Pumpkin is known to contain a total phenolic of 24.27 mg GAE/g (Sari and Putri, 2018), while porang flour contains a total phenolic of 7.10 mg GAE/g (Kumar *et al*., 2017). The main phenolic content in pumpkin is the flavonoid group (Valenzuela *et al*., 2014). High temperatures during processing cause the formation of phenolic compounds (Que *et al*., 2008). This condition is quite favourable in the processing of pumpkin into instant soup using high temperatures.

Total phenolic generally correlates with antioxidant activity, so the higher the entire phenolic content of a product, the higher the antioxidant activity (Wahyono *et al*., 2020).

3.5 Crude fiber

The average fiber content of instant pumpkin soup ranged from 24.01 to 45.04%. The results in Table 1 explain that the fiber content of instant pumpkin soup increased significantly with the addition of porang flour in the formula. Fiber consumption benefits human health, especially intestinal function (Ismaiel *et al*., 2016). The fiber component in pumpkin is generally part of insoluble dietary fiber, the ratio of which reaches 60.03% of total fiber (Bemfeito *et al*., 2020). Meanwhile, the fiber in porang flour is a component of glucomannan (Nurlaela *et al*., 2021). Glucomannan is a part of soluble dietary fiber, which has hydrocolloid properties and high calorie content (Behera and Ray, 2016). The glucomannan content in porang flour reaches 67.5% (Bahlawan *et al*., 2021), this condition underlies the increase in the fiber content of instant pumpkin soup along with the addition of porang flour.

4. Conclusion

All treatments significantly affected antioxidant activity, beta-carotene, vitamin C, total phenolics, and fiber. The recommended concentration of porang flour is 1.5%, and it produces the best instant pumpkin soup based on chemical properties.

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Conflict of interest - Disclose any potential conflict of interest appropriately.

The authors declare no conflict of interest.

Acknowledgments

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Table 1. Chemical properties of instant pumpkin soup

Porang Flour (%)	Parameters				
	Antioxidant Activities % RSA	ß-Carotene (ppm)	Vitamin C (mg/100g)	Total Phenolics (mg GAE/g)	Fiber Content (%)
0	28.80 ± 0.57^{e}	50.41 ± 2.05^{b}	189.71 ± 0.72^{c}	3.37 ± 0.51^{a}	24.01 ± 1.92^{a}
0.5	29.10 ± 0.51^{d}	48.29 ± 2.04^{b}	184.88 ± 0.99^{c}	4.09 ± 0.18^{b}	29.70 ± 1.99^{b}
1.0	29.40 ± 0.31^{c}	47.81 ± 1.69^{b}	176.13 ± 0.48^{b}	4.24 ± 0.23^{c}	32.12 ± 0.98^{bc}
1.5	30.00 ± 0.55^{b}	46.17 ± 1.53^{ab}	170.25 ± 0.64^{b}	5.23 ± 0.94^{d}	35.72 ± 1.64^{c}
2.0	30.30 ± 0.46^{a}	46.29 ± 1.44^{a}	160.68 ± 0.18^{a}	5.98 ± 0.37^{e}	45.04 ± 1.54^{d}

Note: the data representations of the mean values ± standard deviation. Different superscripts in the same column showed statistically significant differences ($p < 0.05$)

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FOOD
RESEARCH

15th March 2024

Dear Nurrahman,

ACCEPTANCE LETTER

Food Research is pleased to inform you that the following manuscript has been accepted for publication in Food Research journal.

Manuscript Title	:	Chemical properties of instant pumpkin soup with the addition of porang flour
Authors	:	Nurrahman., Yonata, D., Amaliah, D.N., Yashfin, S.F., Yusuf, M. and Suyanto, A.

We thank you for your fine contribution to the Food Research journal and encourage you to submit other articles to the Journal.

Yours sincerely,

Professor Dr. Son Radu
Chief Editor
Food Research