Contents Lists Available at: https://journal2.unusa.ac.id/

Medical Technology and Public Health Journal

Journal Home Page: https://journal2.unusa.ac.id/index.php/MTPHJ

Research Article

Zinc Content, Suppleness and Favorability Test on Anchovy Flour Fortified Cob Meatballs

Yunita Satya Pratiwi[1] | *Farida Wahyu Ningtyias*[2*] | *Septi Nur Rachmawati*[2] | *Abdul Azis Akbar*[2] | *Lirista Dyah Ayu Oktafiani*[2] | *Ruli Bahyu Antika*[2] | *Septy Handayani*[2]

[1]*Faculty of Engineering, University of Pembangunan Nasional Veteran, Indonesia*
[2]*Faculty of Public Health, University of Jember, Indonesia*

Corresponding Author:
Ningtyias, Farida Wahyu. Faculty of Public Health, University of Jember, Indonesia
Email: farida.fkm@unej.ac.id

DOI: *10.33086/mtphj.v7i1.3436*

Article History:
Received, October 11th, 2022
Revised, January 12th, 2023
Accepted, January 26th, 2023
Available Online: March 1st, 2023

Please cite this article as:
Pratiwi, Y. S. et al., "Zinc Content, Suppleness and Favorability Test on Anchovy Flour Fortified Cob Meatballs" Register: Medical Technology and Public Health Journal, Vol. 7, No. 1, pp. 28-35, 2023

ABSTRACT

Stunting in Jember Regency is the eighth most common condition in East Java, affecting up to 30% of the 180,000 children under the age of five. The creation of meatballs made from tuna fortified anchovy, which are increasingly rich in nutrients like zinc, will help to overcome nutritional issues. The aim of this research was to look at zinc levels, elasticity, and organoleptic properties. The aim of this study was to look at the zinc levels, elasticity, and organoleptic consistency of tuna fish balls after fortification with anchovy flour and chewers, which could help stunted toddlers improve their nutritional status. This was a true experimental study with a pre and post control group configuration. The sample size was set at 27 (eight samples from the treatment group and one sample from the control group). Zinc levels, elasticity, and organoleptic consistency were all measured in the lab through observation. On zinc levels, ANOVA Two Way was used to analyze data presentation. Zinc levels of 0.001 mg/100 gr and elasticity of 707.38 4.13 gf were found in tuna fish balls until they were reinforced with anchovy flour and chewers. The interaction of zinc content, elasticity, and organoleptic quality of anchovy meal fortification (0, 18%, and 35%) and thickener (carrageenan and STTP) had a major effect on zinc content, elasticity, and organoleptic quality (physical and preferences include taste, aroma, color and texture). The best tuna meatballs in terms of general nutritional content and chewiness are tuna fish balls fortified by 35% anchovy and with carrageenan as thickener. The general favorite is tuna fish balls which are not fortified with anchovy flour and without chewing. Future research is expected to find alternatives to other highly nutritious fish with good acceptance.

Keywords: *Elasticity, organoleptic consistency, tuna fish balls, zinc levels*

INTRODUCTION

The prevalence of stunting in East Java is quite high (35.8), slightly higher than the national stunting rate (37.2). Based on the results of regional health research (Riskesda) in 2018, the

prevalence of stunting toddlers at the district / city level, Jember Regency ranks 8th highest in East Java after Sampang, Pamekasan, Bangkalan, Ngawi, Trenggalek, Probolinggo and Pasuruan. One of the efforts to overcome this nutritional problem is the diversification of local processed food, made from nutrient-rich fish that is favored by the community, especially toddlers.

Meatballs are a favorite and preferred food of the Indonesian people, which is made from a mixture of meat and tapioca flour containing high levels of macro and micronutrients (Putra, 2019). Fish balls have an advantage because they contain a higher and diverse nutritional content when compared to meatballs from beef (KKP, 2018). Sea fish is a source of high-quality protein (contains essential amino acids), which are important for the growth and development of the fetus in the womb and childhood, also contains fairly low cholesterol and healthy double unsaturated fats (polyunsaturated), as well as essential minerals such as calcium (Ca), zinc (Zn), selenium, iodine, iron, and other minerals needed by the body (EFSA, 2017).

In this case, considering that the cob fish has thick meat and red and white color, and the average Zn content is about 30.02±1.54 μg/g dry (Mulyaningsih 2009). The cob fish meatballs in this study were fortified with anchovy meal (Stolephorus indicus) which is a small pelagic fish that is cheap for domestic consumption so that the meatballs produced are economically valuable and have a high nutritional content such as zinc.

The quality of meatballs includes the quality of appearance (physical properties) and nutritional value (Falahudin, 2013). Some of the determining factors are its nutritional content and suppleness. The level of chewiness of good quality meatballs is the ability to break due to pressure force (Kusnadi et al., 2012). The meatballs that were preferred by the panelists were meatballs with a higher elasticity and smooth texture (Hidayati, 2002). The chewiness of fish balls is determined by the quality and quantity of raw materials and food grade additives that are safe to use to make meatballs. Some of the over-the-counter food grade additives used to make the meatballs chew are carrageenan and Sodium Tripoly-phosphate (STPP) (Saparinto&Hidayati, 2010).

Acceptability is one of the Organoleptic Tests by testing using the human senses as the main tool for measuring the acceptability of a product. By measuring the texture, appearance, aroma and flavor of food products (Ayustaningwarno&Muchtadi, 2010).

Based on the description above, this study aims to analyze zinc levels, chewiness and organoleptic quality of cob fish meatballs after fortified anchovy and chewing flour which has the potential to improve the nutritional status of stunting toddlers as product development from cob fish.

METHODS

Materials and Tools

The ingredients used in this study were cob fish from the sea waters of Jember, anchovy meal, food grade chewers (carrageenan and STPP) and kitchen spices. While the equipment used includes cooking utensils, meat grinders, ovens and scales.

Time and Place of Research

The research was carried out for 3 months, from October 2021 to December 2021. The research site were in two different locations, namely the Faculty of Public Health laboratory of Jember University and the Chemical Analysis laboratory of UNAIR. The Faculty of Public Health laboratory of Jember University used to cook meatballs made from cob fish, while UNAIR laboratory used for analysis of zinc levels and organoleptic quality.

Research Design

This research was true experimental by applying pre and post with control group design. The number of research groups was 9 treatment groups (8 treatment groups and 1 control group) with 3 repeats, making it 27 experimental samples. Data processing/analysis: Two-way Analysis (ANOVA) (for zinc and suppleness ratio data). In the event of an influence, the Duncan or LSD multiple distance test continued at a real level of 5%. Anava Kruskal Wallis test for ordinal data (organoleptic; favorability and physical). In the event of an effect, the independent t-test or the Mann whitney test continued at a real level of 5%.

Research Procedure

The meatball making procedure was: clean and separate the cob meat from the skin, then put 600 g of cob meat and anchovy meal (the percentage of anchovy meal calculated based on the weight of the cob fish meat) into the food processor along with 30 grams of garlic, 15 grams of granulated sugar, 90 grams of egg white, 25 grams of salt, 4 grams of pepper, 80 grams of shaved ice, chewing (without chewing, carrageenan, or STTP), then finely ground for three minutes using a Philips brand food processor type HR7627. After that, add 60 grams of tapioca flour added to the dough and grinded again until smooth for two minutes at the rate of two. Next, the dough formed into rounds (per round of meatballs 2 cm in diameter with a weight of 10 grams) to put in boiling water (1000C) for ten minutes. After that, remove it with a scrap and drained using a tub under which there were holes.

Zinc content analysis used an AA 30 spectra type Atonomic Absorption Spectrophotometer (AAS) tool, using 65% nitric acid (HNO3) chemicals and Zn2+ solution. Suppleness testing used a penetrometer. The number indicated by the scale needle recorded and the chewiness of the meatballs expressed in mm/g/s. Organoleptic test procedure by submited a questionnaire with taste, aroma, color and texture parameters to the subject.

RESULTS AND DISCUSSION

Analysis of the effect of anchovy meal on zinc (Zn) levels in Cob fish balls before and after in the fortification of anchovy meal

Zinc is an essential metal that humans need in small quantities (Ernawati, 2004). The Zn metal content in various foodstuffs is usually found in relatively small quantities, so for its analysis, a method that has good sensitivity and selectivity is needed. Based on Table 1, it is known that cob fish meatball products have a zinc content of 0.00 ± 0.00 before being fortified with anchovy meal. After fortification anchovy flour changed to 0.57 ± 0.00 (18% treatment) and 0.77 ± 0.01 (35% treatment).

The results of this study found that the addition of anchovy meal to cob fish balls can increase zinc content. It is not yet known the zinc content in anchovies or anchovy meal. However, from this study, it can be seen that there is a tendency to increase zinc content in all additions of anchovy flour levels of 18% and 35%. Based on these results, the zinc content in anchovy meal can increase the zinc content of cob fish balls to which anchovy flour is added (Faroj, 2019).

Analysis of the effect of chewers (No Chewers, Carrageenan, and STPP) on zinc levels, chewiness, and organoleptic quality in cob fish balls

The results of the study found that added anchovy meal had a significant influence on the suppleness of cob fish balls. Before fortification of anchovy flour the chewiness of 707.38 ± 4.13

and after fortification it was known that the chewiness of meatballs became 810.24 ± 0.93 in the addition of 18% anchovy meal and 908.71 ± 3.28 in the addition of 35% anchovy meal.

The results of this study found that the addition of chewing both carrageenan and STPP to cob fish meatballs can increase zinc content. From this study, it can be known that there is a tendency to increase zinc content in all the additions of meatball chewers. It is suspected that there is zinc content in the chewer even though it is at a small level so that it can increase the zinc content of cob fish balls to which the chewer is added (Candra et al., 2014).

From the results of the study, it is known that both types of chewers provide a significant difference in yield ($P<0.05$), the addition of carrageenan provides a higher level of suppleness than STTP. Carrageenan is to increase water content and has protein content because it comes from seaweed. Because it absorbs water, the addition of carrageenan produces a compact texture, and can increase the binding power of water. Carrageenan can also be applied to various products as a moisture content controller (Keeton, 2001).

There was a significant difference in the average level of panelists' liking for the texture / chewiness of cob fish meatballs with the addition of various types of chewers (without chewers, carrageenan and STPP) (p value < 0.00).

It is known that the texture of cob fish balls without chewing has the highest average level of difficulty by the panelists compared to cob meatballs with the addition of carrageenan chewers or STPP. This is because the cob fish balls added with carrageenan chewer have a more juicy texture so they tend to be less delicious to consume (Dewanti, 2009), while in the addition of STPP the texture is nicer such as solid and contains but harder if chewed (Ardiyanti et al., 2018) (Verawaty, 2008). With the various reasons above so that the panelists prefer cob fish balls without the addition of chewers.

Analysis of the effect of anchovy flour and chewing (No Chewing, Carrageenan, and STPP) on zinc levels, chewiness, and organoleptic quality in cob fish meatballs

The results of this study found that the addition of anchovy and chewing flour to cob fish balls can increase zinc content. Zn metal content in various foodstuffs is usually found in relatively small amounts (Ata, 2014), so that for the analysis, a method that has good sensitivity and selectivity is needed (AOAC, 2005). Based on table 2, it is known that the highest zinc content is found in the treatment of giving carrageenan and anchovy meal 35% which is 0.79 ± 0.00. This proves that anchovy meal is proven to add zinc levels to meatballs.

The highest chewiness of the final product of cob fish meatballs is in the fortification formulation of anchovy flour 35% with STTP chewing, which is a chewing level of 963.57 ± 3.74. In this formulation, an STTP chewer is also added so that the final product becomes chewy. STTP acts as a food grade food additive that can be added to food products to increase its suppleness (Hatta&Murpiningrum, 2012).

In table 3, there are significant differences in the texture of cob fish balls with the addition of fortification of anchovy meal (0%, 18%, 35%) and the addition of chewers (without chewers, carrageenan and STPP) (p value > 0.05). Cob fish balls that do not undergo anchovy meal fortification and without additional chewing ingredients have the highest average panelist favorability rate, while fish balls with formulations without fortification of anchovy meal but there is carrageenan addition have the lowest average panelist favorability level.

The best formula for zinc content, chewiness and organoleptic quality in cob fish meatballs

1) The highest Zinc content of 0.79 ± 0.00mg / 100 gr is cob fish balls fortified with 35% anchovy flour with carrageenan chewing
2) The highest chewiness of 975.31 ± 2.22 gf is cob fish balls fortified with 35% anchovy flour with carrageenan chewing
3) The taste with a score of 3.80 ± 0.81 (close to delicious) is cob fish balls without anchovy flour with STTP chewer
4) The aroma with a score of 3.60 ± 0.93(close to not fishy) is meatballs without fortification of anchovy flour and carrageenan chewer
5) Color with a score of 4.43 ± 0.82 (close to white) is meatballs without fortification of anchovy flour and carrageenan chewer
6) Texture with a score of 4.43 ± 0.82 (close to very chewy) is meatballs without fortification of anchovy flour and without chewing

Based on the results above, for cob fish balls that contain the highest nutritional content (zinc content and chewiness, the best is cob fish balls fortified with 35% anchovy flour and with carrageenan chewing. The more carrageenan is added, the more chewy the meatballs because carrageenan can bind ingredients to the meatballs. Carrageenan serves to give a good appearance to meatballs, as well as as a stabilizer and binder of additional ingredients so that chewy meatballs are processed (Aberle et al., 2001). The use of carrageenan can help gel formation (influenced by the type and concentration of carrageenan and the presence of ions) and improve the elasticity properties. Carrageenan can bind well between protein and water, so meatballs have the strength to withstand pressure from the outside (Suarti et al., 2016) (Akbar et al., 2019). But these results still require further research to improve their acceptability.

a. Analysis of zinc content and chewiness in cob fish balls before fortification of anchovy flour

Table 1. Zinc Content and Chewiness of Cob Fish Meatballs Before and After Fortified Anchovy and No Chewer

Sample (before fortification of Anchovy Flour)	Zinc (mg/100gr)	Chewiness (gf)
	0,00 ± 0,00	707,38 ± 4,13
Sample (after fortification of Anchovy Flour)		
18%	0,57 ± 0,00[b]	810,24 ± 0,93[b]
35%	0,77 ± 0,01[c]	908,71 ± 3,28[c]
	p value = 0,000	p value = 0,000

Notes:

- The data are the mean ± standard deviation
- Data followed by different lowercase letters indicate significant differences (P<0.05)

b. Analysis of the effect of anchovy flour and chewing (No Chewing, Carrageenan, and STPP) on zinc levels, chewiness, and organoleptic quality in cob fish meatballs

Table 2. Effect of Fortification of Anchovy Meal (0%, 18%, And 35%) Chewers (No Chewers, Carrageenan, And STPP) On Zinc Levels and Chewiness of Cob Fish Meatballs

Sample	Nutrition content	
	Zinc	Chewiness
ToO	0,00 ± 0,00[a]	707,38 ± 4,13[a]

TaO	0,57 ± 0,00 [b]	810,24 ± 0,93[b]
TbO	0,77 ± 0,01[c]	908,71 ± 3,28[c]
ToK	0,02 ± 0,00 [d]	768,58 ± 2,01[d]
TaK	0,39 ± 0,01[e]	857, 27 ± 2,61[e]
TbK	0,79 ± 0,00 [f]	975,31 ± 2,22[f]
ToS	0,00 ± 0,00 [f]	754,82 ± 3,52[g]
TaS	0,58 ± 0,00 [f]	852,14 ± 2,05[h]

Notes:
- The data are the mean ± standard deviation
- Data followed by different lowercase letters indicate significant differences (P<0.05)
- Sample type

ToO = non Chewiness - T.Teri 0%
TaO = non Chewiness - T.Teri 18%
TbO = non Chewiness - T.Teri 35%
ToK = carrageenan - T.Teri 0%
TaK = carrageenan - T.Teri 18%
TbK = carrageenan - T.Teri 35%
ToS = STTP - T.Teri 0%
TaS = STTP - T.Teri 18%
TbS = STTP - T.Teri 35%

Notes:
- The data are the mean ± standard deviation
- Data followed by different lowercase letters indicate significant differences (P<0.05)
- Sample type

ToO = non Chewiness - T.Teri 0%
TaO = non Chewiness - T.Teri 18%
TbO = non Chewiness - T.Teri 35%
ToK = carrageenan - T.Teri 0%
TaK = carrageenan - T.Teri 18%
TbK = carrageenan - T.Teri 35%
ToS = STTP - T.Teri 0%
TaS = STTP - T.Teri 18%
TbS = STTP - T.Teri 35%

Table 3. Effect of Fortification of Anchovy Meal (0%, 18%, and 35%) chewers (without chewers, carrageenan, and STPP) on the organoleptic quality of cob fish balls

Sample	Organoleptic			
	Taste	**Aroma**	**Color**	**Texture**
ToO	3,73 ± 0,98[a]	3,53 ± 1,17[a]	3,93 ± 0,79[a]	3,60 ± 1,10[a]
TaO	2,10 ± 0,85[b]	3,20 ± 1,19[a]	1,80 ± 0,66[b]	2,17 ± 1,09[b]
TbO	2,73 ± 1,17[b]	2,80 ± 1,22[a]	1,33 ± 0,61[c]	3,00 ± 1,05[b]
ToK	3,40 ± 0,86[b]	3,60 ± 0,93[a]	4,43 ± 0,82[c]	1,93 ± 1,02[c]
TaK	2,30 ± 0,88[c]	2,90 ± 1,21[a]	2,20 ± 0,89[d]	2,20 ± 1,24[d]
TbK	2,23 ± 1,10[d]	3,20 ± 1,38[a]	1,23 ± 0,50[e]	2,80 ± 1,27[d]
ToS	3,80 ± 0,81[d]	3,47 ± 0,94[a]	3,70 ± 0,88[e]	3,33 ± 0,80[d]
TaS	2,63 ± 0,85[e]	2,87 ± 1,25[a]	1,87 ± 0,86[f]	3,23 ± 1,01[d]

Notes:
- The data are the mean ± standard deviation
- Data followed by different lowercase letters indicate significant differences (P<0.05)
- Sample type

ToO = non Chewiness - T.Teri 0%
TaO = non Chewiness - T.Teri 18%
TbO = non Chewiness - T.Teri 35%
ToK = carrageenan - T.Teri 0%
TaK = carrageenan - T.Teri 18%
TbK = carrageenan - T.Teri 35%
ToS = STTP - T.Teri 0%
TaS = STTP - T.Teri 18%
TbS = STTP – T.Teri 35%

CONCLUSION AND SUGGESTION

The nutritional content of cob fish meatballs before fortifying anchovy flour and chewing includes zinc levels of 0.001 mg / 100 gr and chewiness is 707.38 ± 4.13 gr. Fortification Anchovy meal (0%, 18%, and 35%) has a significant effect on zinc content, chewiness, and physical acceptability and liking (taste, aroma, color and texture) of cob fish balls**.**

Chewy (carrageenan and STTP) have a noticeable effect on zinc levels, chewiness, and physical acceptability and liking (taste, aroma, color and texture) of cob fish balls. Fortification Anchovy meal (0%, 18%, and 35%) and chewing (carrageenan and STTP) have a noticeable effect on zinc content, chewiness, physical acceptability and liking (taste, aroma, color and texture) of cob fish balls.

The best cob fish meatballs in terms of nutritional content in general and chewiness are cob fish meatballs fortified by anchovies 35% and with carrageenan chewing. The best cob fish meatballs in terms of physical acceptability and general liking are cob fish balls that are not fortified anchovy meal and without chewing.

The suggestion based on the results of this study is to conduct further research to increase the acceptability of cob fish balls fortified with anchovy flour, namely by reducing the salty taste through the use of anchovies that are not salted before and the use of turmeric seasoning to make the color attractive.

REFERENCES

Antaranews Jatim. (2018). 30 Persen Balita di Jember "Stunting". https://jatim.antaranews.com/berita/262103/30-persen-balita-di-jember-stunting.

Putra, Affrizal Surya Utama. (2019). Analisis Sifat Fisika, Kima Dan Organoleptik Bakso Ikan Lele (Clarias Batrachus) Dengan Penambahan Kappa Karagenan Sebagai Sumber Serat Pangan. Malang: Fakultas Perikanan dan Ilmu Kelautan, Universitas Brawijaya.

Kementrian Kelautan dan Perikanan. (2018). Standar Mutu Bakso Ikan. Dapat diakses melalui :http://www.pusdik.kkp.go.id/elearning/index.php/modul/read/180704-014853b-c-standar-c-mutu-c-bakso-c-ikan.

European Food Safety Authority (EFSA). (2017). Dietary Reference Values for nutrients Summary report. Approved: 4 December 2017 doi: 10.2903/sp.efsa.2017.e15121

Mulyaningsih. (2009). Kandungan Unsur Fe Dan Zn Dalam Bahan Pangan Produk Pertanian, Peternakan dan Perikanan Dengan Metode K0-AANI. Pusat Teknologi Bahan Industri Nuklir- BATAN

Falahudin, A. (2013). Kajian Kekenyalan dan Kandungan Protein Bakso Menggunakan Campuran Daging Sapi Dengan Tepung Jamur Tiram Putih (Pleurotus ostreatus). Jurnal Ilmu Pertanian dan Peternakan, 1(2), 1-9.

Kusnadi, D. C., Bintoro, V. P., & Baarri, A. N. (2012). Daya Ikat Air, Tingkat Kekenyalan,dan Kadar Protein Pada Bakso Kombinasi Daging Sapi dan Daging Kelinci. Jurnal Aplikasi Teknologi Pangan ,1(2): 28-31.

Hidayati, L. (2002). Pengaruh Penggunaan Sodium Alginat dan Sodium Tripolifosfat terhadap Tekstur (Hardness dan Elastisitas) dan Sifat Organoleptik Bakso Daging Sapi.

Saparinto dan Hidayati, D. (2010). Bahan Tambahan Pangan. Yogyakarta : Penerbit Kanisius Sartono

Ayustaningwarno, F. dan Muchtadi, T.R. (2010). Teknologi Proses Pengolahan Pangan. Bandung: Alfabeta

Ernawati N, Efek suplementasi zinc dan besi pada pertumbuhan anak Available: http://digilib,usu,ac,id/index,php/compon ent/journals/index,php?option=com_jour nal_review&id=7759&task=view, diakses 15-1 2021

Faroj, M.N. (2019). Pengaruh Substitusi Tepung Ikan Teri (Stolephorus commersonii) Dan Tepung Kacang Merah (Vigna angularis) Terhadap Daya Terima Dan Kandungan Protein Pie Mini. Media Gizi Indonesia. 14 (1): 56-65.

Candra, F.N., Riyadi, P.H., dan Wijayanti, I. (2014). Pemanfaatan Karaginan (Euchema cottoni) Sebagai Emulsifier Terhadap Kesetabilan Bakso Ikan Nila (Oreochromis nilotichus) Pada Penyimpanan Suhu Dingin. Jurnal Pengolahan dan Bioteknologi Hasil Perikanan. 3(1): 167-176.

Keeton, J.T. (2001). Formed and Emulsion Product in: A. R. Shams (Ed).Poultry Meat Processing. CRC Press Boca Raton.

Dewanti, Tri. (2009). Sodium Tripoli Phosfat (STPP) Sebagai Pengganti Garam Bleng pada Krupuk Puli. Fakultas Teknologi Pertanian Universitas Brawijaya. Malang.

Ardiyanti et al. (2018). Pengaruh Penambahan Karagenan Terhadap Sifat Fisik Dan Organoleptik Bakso Ikan Tongkol (Euthynnus affinis). Agroteksos. 24(3): 159-166

Verawaty. (2008). Pemetaan Tekstur dan Karakteristik Gel Hasil Kombinasi Karagenan Dan Konjak. Fakultas Teknologi Pertanian. Institut Pertanian Bogor.

Ata, S. F. H. (2014). A method optimization study for atomatic absorption spectrophotometric determination of total zinc in insulin using direct aspiration technique. Alexandria Journal of Medicine, 2-6.

AOAC (Association of Official Analytical Chemist). (2005). Official Methods of Analysis. Association of Official Analytical Chemists. Benjamin Franklin Station, Washington.

Hatta M dan Murpiningrum E. (2012). Kualitas bakso daging sapi dengan penambahan garam (NaCl) dan fosfat (sodium tripolifosfat/STPP) pada level dan waktu yang bebeda. Makassar: Fakultas Peternakan. Universitas Hasanuddin

Aberle, E. D., J. C. Forrest, D. E. Gerrard and E. W. Mills. (2001). Principles of Meat Science. Fourth Ed. Kendal Hunt Publishing Company, America.

Suarti, B., Ramadhan, U., dan Fuadi, M. (2016). Pembuatan bakso dari biji lamtoro (Leucaena leucocephala) dengan penambahan putih telur dan lama perebusan. Agrium, 10(1), 308-313.

Akbar, Intan Dwi Novieta, Fitriani. (2019). Efektivitas Penambahan Bahan Pengenyal yang Berbeda Terhadap Nilai Organoleptik dan pH Bakso Daging Ayam Broiler. JiiP. 5(2): 87-96, Desember 2019