

The effect of different concentration of chicken leg skin gelatin on the chemical characteristics and the consumer acceptability of chicken meat sausage

by Meity Sompie 10

Submission date: 22-Jun-2023 11:03AM (UTC+0700)

Submission ID: 2120686604

File name: 0_The_effect_of_different_concentration_of_chicken_leg_skin.pdf (289.15K)

Word count: 2413

Character count: 12138

PAPER · OPEN ACCESS

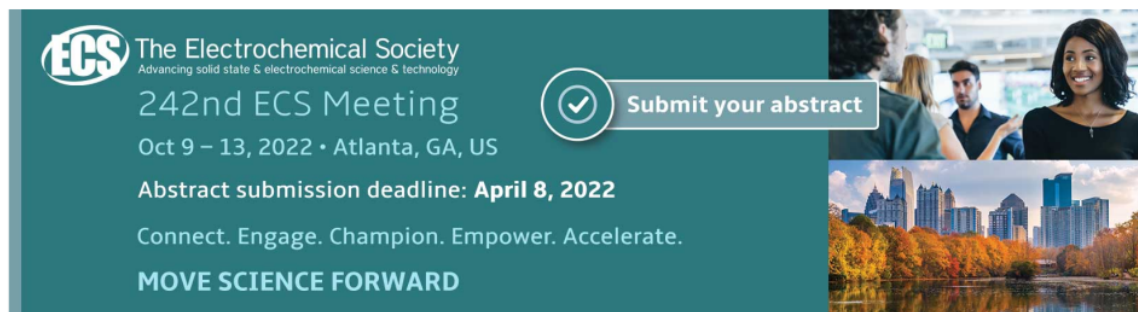
The effect of different concentration of chicken leg skin gelatin on the chemical characteristics and the consumer acceptability of chicken meat sausage

To cite this ²¹ article: M Sompie and S E Siswosubroto 2021 *IOP Conf. Ser.: Earth Environ. Sci.* **788** 012125

⁷ View the [article online](#) for updates and enhancements.

You may also like

- ³ - Occurrences of *Salmonella* spp. and *Shigella* spp. in chicken meat, intestinal contents and rinse water at slaughtering place from traditional market in Surabaya, Indonesia
R Yulistiani, D Praseptiangga, Supyani et al.
- ³ - Effect of long-time immersion in edible film solution from local chicken claw on the physical and chemical properties of chicken meat
M Sompie, R M Tinangon, S E Surtijono et al.
- Analysis of Household Demand for Chicken Meat in Yogyakarta
Susi Wuri Ani and Emoiz Antriyandarti



ECS The Electrochemical Society
Advancing solid state & electrochemical science & technology

242nd ECS Meeting
Oct 9 – 13, 2022 • Atlanta, GA, US

Abstract submission deadline: **April 8, 2022**

Connect. Engage. Champion. Empower. Accelerate.

MOVE SCIENCE FORWARD

Submit your abstract

The banner features a teal background with white text. On the right, there are two images: the top one shows a group of people in a professional setting, and the bottom one shows a city skyline with a river and trees in autumn.

The effect of different concentration of chicken leg skin gelatin on the chemical characteristics and the consumer acceptability of chicken meat sausage

M Sompie and S E Siswosubroto

Faculty of Animal Husbandry, Sam Ratulangi University, Manado, Indonesia

E-mail: meityisompie@yahoo.com

Abstract. This study was aimed to determine the effect of different concentrations of gelatin on the chemical characteristics of chicken meat sausage. This research materials were used chicken legskin gelatin, chicken meat and sausage ingredients. This study used Completely Randomized Design (CRD). The treatment factor is concentration of chicken legskin gelatin is added to sausage mixture (R0 = 0%, R1 = 10%, R2 = 20%, R3 = 30% and R4 = 40%) with four replications. Organoleptic test used 35 trained panelists. The results showed that the different concentration of chicken leg gelatin had significant effect ($P < 0.05$) on pH value, water content, collagen, protein and fat content of chicken meat sausage, but the elasticity had no effect. Organoleptic test with a hedonic scale indicated that the addition of gelatin concentration had an effect on the panelists acceptability that was color, taste and aroma and tenderness of chicken meat sausage. It was concluded that the chicken meat sausage with adding 20% chicken legskin gelatin had the best chemical characteristics and it can be accepted by panelists.

1. Introduction

Sausage is a food product obtained from a mixture of ground meat and flour with the adding of spices, food additives and put into sausage casing, then cooked [1]. Chicken sausages are minced meat product which has seen increase in consumption throughout the world. Sausages are crushed meat mixed with spices, then inserted into the casings shaped plastic and slightly. Previous research showed that the sausages mixed with edamame has significant effect on gel strength, water holding capacity (WHC), chemical and organoleptic properties of chicken sausages [1,2].

Gelatin is a hydrocolloid product obtained from partial hydrolysis of collagen fiber protein (skin, bone and animal connective tissue). Gelatin extracted from collagen by acidic or alkaline hydrolysis [3]. Gelatin production required a curing and extraction step to improve quality of gelatin [4]. The quality of the sausage is determined by the binding agent to maintain texture of sausage which remains compact and the ability to bind the meat particles and other ingredients added [5]. Sausages on the market were made from a mixture of meat, flour, and sodium tripolyphosphat as a binder [6]. Gelatin is a natural ingredient that can be used as a binder in sausages [7]. Gelatin is very important in food diversification because of the high nutritional value of gelatin, especially amino acids [8]. In meat products, gelatin can be applied to sausages to increase the consistency and stability of the sausage [9]. One of the properties of gelatin is the ability to form a gel when the temperature is below the melting point. Thus, gelatin can



Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

Published under licence by IOP Publishing Ltd

added to sausages. The study was conducted to examine the effect of different concentrations of gelatin on the chemical characteristics of chicken meat sausage.

2. Material and methods

2.1. Material

2500 g broiler chicken, 250 g chicken legskin gelatin, 100 g tapioca flour, sausages ingredients, binders, spices, seasonings, acetic acid (CH₃COOH) and still water.

2.2. Procedures

Extraction of collagen gelatin used the acid method. Acetic acid (CH₃COOH) 3% were used as a treatments. The chicken legskin were soaked on the acetic acid curing for 24 hours. Samples were neutralized to pH 6 and extracted on waterbath with temperature 55°C for 6 hours. The gelatin filtrate was separated from residual skin fragments by nylon filter, then concentrated at 70°C for 5 hours, then cooled in a refrigerator at 5°C for 30 minutes, then dried at temperature 60°C for 48 hours until the solution dried. Gelatin sheets were milled and packaged in vacuum plastic for the next process [10,11]. Sausage processing procedure was prepare fresh chicken meat, added salt and ice then grind, divided into 5 treatments, each 400 g, after that added the spices and gelatin according to the treatment, treatment. Then stirred until homogeneous. The dough is put into a plastic sleeve. Steamed in a water bath for ±30 minutes at a temperature of 70–80°C, then the sausages are cooled in the refrigerator for 30 minutes.

2.3. Statistic

The experiment were determined by analysis of Completely Randomized Design (CRD). The treatment factor is concentration of chicken legskin gelatin was added to sausage mixture (R₀ = 0%, R₁ = 10%, R₂ = 20%, R₃ = 30% and R₄ = 40%) with four replications. Organoleptic test used 35 trained panelists. The data were analyzed using ANOVA. Duncan's Multiple Range Test 5% is used for further testing if the difference is significant

2.4. Parameters

The parameters of this research were pH value, collagen content, protein content, water content and fat content, and organoleptic properties. pH determination obtain from 10 g of sample was homogenized with 50 ml distilled water and the pH value was measured using a digital pH-meter. The determination of collagen, protein, water and fat content by Foodscanner method. The Organoleptic used hedonic test includes aroma, color, taste, and tenderness with hedonic test used 40 panelists.

3. Results and discussion

3.1. pH

The results showed that the different concentration of gelatin had significant effect on the pH value of chicken meat sausage (P<0.05). The pH value of sausages with the addition of 40% gelatin increased significantly (5.75±0.02). For the treatment of 20 and 30% gelatin concentrations, the pH value tends to decrease. If a meat product processed which has basic ingredients and ingredients support, has a pH value the same or small or large variations will cause processed meat products have the same pH. This value was ranged 5.64 to 5.75%. It values was not different with pH from edamame chicken meat sausages [12,13].

3.2. Collagen content

Statistical analysis on table 1 showed that the collagen value in chicken meat sausages with adding gelatin had significant effect (P<0.05). Based on Duncan test 5% indicated that the collagen of meat sausages with the addition of 20 and 30% gelatin was higher than the control and the addition of 10 and 40% gelatin. Chicken meat sausages with collagen sleeves had the best hedonic sensory respon [14].

Table 1. Chemical properties of chicken meat sausages.

Parameter	Gelatin concentration (%) + SD				
	0	10	20	30	40
pH	5.64±0.02 ^a	5.66±0.02 ^a	5.76±0.17 ^b	5.69±0.03 ^{bc}	5.75±0.02 ^c
Collagen (%)	1.78±0.04 ^a	2.33±0.34 ^b	2.93±0.19 ^c	2.84±0.18 ^c	2.59±0.33 ^{ac}
Protein (%)	20.31±0.74 ^b	20.19±0.26 ^a	20.82±0.65 ^{ab}	20.74±0.66 ^{ab}	21.82±1.08 ^{ab}
Water Content (%)	70.25±1.42 ^a	67.15±1.2 ^a	67.84±2.34 ^b	68.07±1.22 ^b	67.79±1.8 ^b
Fat Content (%)	7.15±0.07 ^{ab}	6.9±0.11 ^a	8.22±0.7 ^{ab}	8.59±0.48 ^{ab}	8.96±0.49 ^{ab}

3.3. Protein content

Statistical analysis indicated that the gelatin concentration had significant effect ($P<0.05$) on chicken meat sausages. Based on Duncan test 5% showed that was the protein content of chicken sausage with addition 40% gelatin tended to increase than protein content of control. Gelatin is very important for food diversification, due to of the high levels of protein and low levels of fat. The protein content of sausages were determined by amino acids. Protein content from chicken sausages were ranged 20.19 to 21.82% [13,15].

3.4. Water content

Based on table 1 indicated that the concentration of gelatin had significant effect ($P<0.05$) on chicken meat sausage. The water content value of control chicken sausages was higher than of sausages with added gelatin 10, 20, 30 and 40%. Water content from chicken sausages were ranged 65.19 to 70.25%. This value is almost the same as the water content of skipjack tuna sausage with a collagen sleeves [14].

3.5. Fat content

Statistical analysis indicated that the concentration of gelatin had significant effect ($P<0.05$) on chicken meat sausages. Based on Duncan test 5% showed that the addition of 20, 30 and 40% chicken legskin gelatin into the sausage dough caused the fat content of chicken meat sausages to increase compared to the control. Fat content of chicken meat sausages on this research were ranged from 6.91 to 8.96%. Chicken sausages has a higher fat 7.41% [13].

Table 2. Sensory properties of chicken meat sausages.

Parameter	Gelatin concentration (%)				
	0	10	20	30	40
Aroma	6.31	6.38	6.73	6.78	6.79
Color	5.45	5.98	5.98	6.57	6.67
Taste	5.75	6.60	5.60	6.53	6.08
Tenderness	5.98	6.52	6.55	6.63	6.05

3.6. Organoleptic

Based on table 2 the hedonic test showed that the addition of 10, 20, 30 and 40% chicken legskin gelatin into dough of chicken meat sausage had a significant effect ($P<0.05$) on aroma, color, taste, and tenderness of sausages. The color of chicken sausage is determined by the chemical composition of the raw material [12,13]. The highest average score 6.79 (very like) on the aroma of chicken sausage was found in the treatment of using 40% chicken leg skin gelatin, and the lowest average score 6.31 (like) was in the 10% chicken legskin gelatin. the evaporation of the product is affected by temperature and the natural components [15]. The use of gelatin concentration in the chicken meat sausages had a significant effect ($P<0.05$) on the tenderness.

4. Conclusion

In conclusion, the chicken meat sausages with adding 20% chicken legskin gelatin had the best chemical characteristics and it can be accepted by panelists.

Acknowledgements

This research has been funded by the Ministry of Research and Technology, Research and Innovation Agency No.206/SP2H/AMD/LT/DRPM/2020.

References

- [1] Sallam K I, Ishioroshi M and Samejima K 2004 Antioxidant and antimicrobial effects of garlic in chicken sausage *LWT-Food Sci. Technol.* **37** 849–55
- [2] Liu D-C, Tsau R-T, Lin Y-C, Jan S-S and Tan F-J 2009 Effect of various levels of rosemary or Chinese mahogany on the quality of fresh chicken sausage during refrigerated storage *Food Chem.* **117** 106–13
- [3] Sompie M, Surtijono S E and Junus C 2018 The effect of native chicken legskin gelatin concentration on physical characteristics and molecular weight of edible film *IOP Conf Ser. Earth Environ. Sci.* **207** 12053
- [4] Sompie M and Triasih A 2018 Effect of extraction temperature on characteristics of chicken legskin gelatin *IOP Conf Ser. Earth Environ. Sci.* **102** 12089
- [5] Quality P, Yusuf M, Wihansah R R S, Arifin M, Oktaviana A Y, Negara J K and Sio A K 2016 Kualitas fisik, mikrobiologi dan organoleptik sosis ayam komersil yang beredar di tempat berbeda di Bogor *Jurnal Ilmu Produksi dan Teknologi Hasil Peternakan* **04** 296–9
- [6] Sofiana A 2012 Penambahan tepung protein kedelai sebagai pengikat pada sosis sapi *J. Ilmu Peternakan* **15** 1–7
- [7] Pantow I M, Sompie M, Mirah A D and Karisoh L C M 2015 Pengaruh perbedaan konsentrasi larutan asam asetat (CH_3COOH) terhadap karakteristik gelatin kulit kaki ayam *ZOOTEC* **36** 23–32
- [8] Chalapud M C, Baümler E R and Carelli A A 2020 Edible films based on aqueous emulsions of low-methoxyl pectin with recovered and purified sunflower waxes *J. Sci. Food Agric.* **100** 2675–87
- [9] Gómez-Estaca J, Montero P, Fernández-Martin F and Gómez-Guillén M C 2009 Physico-chemical and film-forming properties of bovine-hide and tuna-skin gelatin: A comparative study *J. Food Eng.* **90** 480–6
- [10] Sompie M, Siswosubroto S E, Rembet G D and Ponto J W 2019 Effect of different types of acid solvent on functional and microbiological properties of chicken leg skin gelatin *IOP Conf Ser. Earth Environ. Sci.* **387** 12128
- [11] Farahnaky A, Dadfar S M M and Shahbazi M 2014 Physical and mechanical properties of gelatin-clay nanocomposite *J. Food Eng.* **122** 78–83
- [12] Prastini A I and Widjanarko S B 2014 Pembuatan sosis ayam menggunakan gel porang (*Amorphophallus muelleri Blume*) sebagai bahan pengikat terhadap karakteristik sosis *J. Pangan dan Agroindustri* **3**
- [13] Suryaningsih W 2013 Karakterisasi sosis ayam dengan penambahan edamame sebagai bahan substitusi *J. Ilm. Inov.* **13**
- [14] Farida F and Amaliah N 2020 Pengaruh jenis selongsong terhadap karakteristik kimia, mikrobiologi dan sensoris sosis daging ikan cakalang (*Katsuwonus pelamis*) *J. Trop. Agri. Food* **1** 79–85
- [15] Khan M I, Arshad M S, Anjum F M, Sameen A and Gill W T 2011 Meat as a functional food with special reference to probiotic sausages *Food Res. Int.* **44** 3125–33

The effect of different concentration of chicken leg skin gelatin on the chemical characteristics and the consumer acceptability of chicken meat sausage

ORIGINALITY REPORT

20%
SIMILARITY INDEX

19%
INTERNET SOURCES

13%
PUBLICATIONS

9%
STUDENT PAPERS

PRIMARY SOURCES

1	umpir.ump.edu.my Internet Source	3%
2	eprints.unmer.ac.id Internet Source	2%
3	www.researchgate.net Internet Source	2%
4	fapet.ipb.ac.id Internet Source	2%
5	Submitted to Marmara University Student Paper	1%
6	interoperabilitas.perpusnas.go.id Internet Source	1%
7	www.karyailmiah.trisakti.ac.id Internet Source	1%
8	pinpdf.com Internet Source	1%

9	Internet Source	1 %
10	jurnalfkip.unram.ac.id Internet Source	1 %
11	V Amalia, F W Adipraja, A Supriadin, N N Khasanah, A Junitasari. "Effect of addition of white turmeric extract against antibacterial properties in edible film sweet potato starch and whey protein", Journal of Physics: Conference Series, 2021 Publication	1 %
12	yguamoringa.com Internet Source	1 %
13	zombiedoc.com Internet Source	1 %
14	garuda.kemdikbud.go.id Internet Source	1 %
15	ejournal3.undip.ac.id Internet Source	<1 %
16	itjfs.com Internet Source	<1 %
17	"Sustainable Polymer Composites and Nanocomposites", Springer Nature, 2019 Publication	<1 %

18 Fatimawali, Rizky Ramadhan Maulana, Axl
Laurens Lukas Windah, Irma Febrianti
Wahongan et al. "Data on the docking of
phytoconstituents of betel plant and matcha
green tea on SARS-CoV-2", Data in Brief, 2021
Publication <1 %

19 chimie-biologie.ubm.ro <1 %
Internet Source

20 publikasi.polije.ac.id <1 %
Internet Source

21 ejournal.unsrat.ac.id <1 %
Internet Source

Exclude quotes On

Exclude matches Off

Exclude bibliography On