JSAT
Journal of Science and Agricultural Technology
Research Article
https://doi.org/10.14456/jsat.2025.7
e-ISSN 2730-1532, ISSN 2730-1524

The quality characteristics of chicken essence from KU chicken breeds (KU Betong, Tapaotong Kasetsart, and KU-Phuparn)

Sauwanit Wutthikrairat [1], Phawinee Jampakam[2], Pathama Thannark[3], Patcharaporn Tinchan[2], Arsooth Sanguankiat[4], Yi-Chen Chen[5], and Sasitorn Nakthong[2*]

[1] Research and Development Program, Faculty of Agriculture at Kamphaeng Saen Kasetsart University, Kamphaeng Saen campus, Nakhon Pathom Province 73140, Thailand

[2] Establishment of Food Safety Innovation Department project, Faculty of Agriculture at Kamphaeng Saen, Kasetsart University, Kamphaeng Saen campus, Nakhon Pathom Province 73140, Thailand.

[3]Research and Service Center, Faculty of Agriculture at Kamphaeng Saen, Kasetsart University, Kamphaeng Saen campus, Nakhon Pathom Province 73140, Thailand.

[4]Department of Veterinary Public Health, Faculty of Veterinary Medicine, Kasetsart University, Bangkok, Thailand.

[5]Department of Animal Science and Technology, National Taiwan University, Taipei City 8 106, Taiwan.

***Corresponding author**: agrsas@ku.ac.th*

Received: June 10, 2025. Revised: August 29, 2025. Accepted: September 20, 2025.

ABSTRACT

Currently, people get more disease due to lifestyle. Chicken essence could be a health supplement since it contains a variety of bioactive compounds. Thai native chicken breeds could be good sources for chicken essence commercial production since they withstand Thailand environments and have advantage characteristics. In this study, KU Betong, Tapaotong Kasetsart, and KU-Phuparn breeds were improved by Kasetsart University. The extraction conditions were 100 °C with 1, 1.50, and 2.0 hrs; then chicken essence was sterilized and was kept for 30, 90, and 180 days The experimental design is Completely Randomized Design (CRD). This study of Proximate composition, pH value, Color value, Innosine 5'monophospate content, Molecular weight (Dalton) and measured proximate composition. The results show that moisture content, protein, fat, carbohydrate, ash, and calories were 92.98-93.35 g/100g, 5.73-6.39, 0.07 – 0.11 g/100g, < 0.01 g/100g, 1.17 – 1.34 g/100 g, and 23.55 – 26.55 kcal/100g, respectively. The pH value of chicken essence range to 6.02-6.18. When increasing extraction time. Chicken essence will have a darker color. L*, a* and b* in the range of 58.57-68.02, 21.67-30.51, and 96.42-99.41, respectively. Inosine 5 ′-monophosphate contents amounts were approximately 36.96 – 59.62 mg/100 g, while the peptides molecular weight of chicken essence ranged between 951.90 – 991.50 Dalton. In general, the pH value of all chicken essence either increased or decreased when increased storage time. While the Color value (L* a* and b*) values of chicken extract essence found that the darker color with increasing storage time. Finally, microorganism amounts matches with the Ministry of Public Health' s regulations.

Keywords: quality characteristics, KU chicken breeds, chicken essence (golden soup)

INTRODUCTION

Nowadays, stress, fatigue, and various anxieties originated from work and study result more diseases and a decrease in immunity. Chicken essence is recognized as functional food and is a popular drink, especially in South East Asia. Also, it is known as a health supplement since it contains useful bioactive compound. Based on Chinese traditional medicine literature, chicken essence nourishes bones and muscles, speeds metabolism, relieves fatigue, and repairs the internal system of the body, recoveries from fatigue after exercise (Li et al., 2012) and alleviate stress, improves memory performance nourishes the brain (Nopchinda, 2015). Therefore, chicken essence can be a non-medical and food supplement (Parletta et al., 2013) . Chicken essence is extracted from chicken carcasses under hot temperature and high pressure. Next, fat is removed; chicken essence is concentrated by evaporation and is filled in bottles. As a result, chicken essence is rich in various active ingredients such as peptides, protein, anserine, carnosine, free amino acids, vitamins, and minerals. These compounds function synergy exercise (Li et al., 2012).

Currently, poultry meat production and consumption have trended increasingly since chicken meat is the cheapest protein source and healthy. According to Food and Agriculture Organization of the United Nations (FAO), poultry meat consumption increased 0.8% or 145 million metric tons in June 2024. Compared to commercial chicken breeds, native chicken breeds have lower fat and cholesterol. They have soft, fragrant, and chewy meat and are good taste since it consists of nucleotides, sugars, amino acids, peptides, organic acids and various fatty acids (Lin et al., 2007). In addition to people preference to native chicken meat, the advantages of native chicken are their strong muscle and resist various environmental conditions (Jaturasitha et al., 2008).

Among KU chicken breeds, Betong, Tapaotong, and Phuparn breeds are originated from China. Betong breed is popularly raised in the lower southern region of Thailand, withstands Thailand environments, like to live outside cages, and has a good growth rate. Betong breed meat is soft, has good taste and low fat. The market demand is 2-kilogram weight (Sangsawang et al., 2012). Kasetsart University, Bang Khen campus improved Betong breed called KU Betong breed. Unlike Betong breed, KU Betong breed has better growth rate and slower hair growth (Sopannarath and Bunchasak, 2015). Based on the study of Makchumpon *et al*., (2015), KU Betong breed meat is better than broiler meat since broilers' breast fillet has more percentages of water loss during cooking ($p < 0.01$). Also, KU Betong breed's thighs have the highest cutting force ($p < 0.01$). Kasetsart University, Kamphaeng Saen Campus, improved Tapaotong Kasetsart breed by breeding between Tapaotong breed and Sanhuang breed, so their bodies are big with brownish-yellow hair. Tapaotong Kasetsart breed also tolerates Thailand conditions, has tender and chewy meat, crispy skin, and less fat. KU-Phuparn breed was developed by Kasetsart University, Chalermphrakiat campus. Its meat, skin, hair, and bones are black. It also easily raises and confronts Thailand environments. The market demand size is 1.2 - 1.5 kilogram. Compared to native chicken breeds originated from China, these three improved chicken breeds grow faster, can withstand Thailand weather, have higher protein sources, and match with local market requirements.

Inosine 5 ′-monophosphate, a nucleotide, is recognized as one of the flavor enhancing compounds and is found in chicken meat (Jung et al., 2013). Therefore, the amount of inosine 5 ′-monophosphate imparts flavor to the cooked meat and an important umami taste indicator since inosine 5 ′-monophosphate plays a critical role in the umami taste of the muscle (Huang et al., 2022).

Peptide analysis is the method to identify peptide profile using Mass Spectrometer with ESI ion source. Human intestines can absorb 2 to 3 amino acid peptides (Keller, 2013). If chicken essence contains a lot of less than 3 amino acid peptides, bodies can take in these peptides well.

According to notification of the Ministry of Public Health in 2013, ready-to-eat products with pH ≥ 4.3 and sterilization should not find *Salmonella* spp. and *Listeria monocytogenes* in 25 ml. In addition to these bacterial criteria, the amounts of *Staphylococcus aureus*, *Bacillus cereus*, and *Clostridium perfringens* in these products should less than 100 CFU/ml.

The objectives of this study were to the quality characteristics of chicken essence from KU Chicken Breeds (KU Betong, Tapaotong Kasetsart, and KU-Phuparn). Chicken essence prepared from 3 KU breed carcasses; to measure proximate composition, pH value, color value, inosine 5 ′-monophosphate and peptide profiles. To study on quality properties of sterilized chicken essence kept for 180 day. Human bodies might absorb some small peptides in this chicken essence, especially peptides were less than 3 amino acids. Finally, microbial contents of chicken essence matched with notification of the Ministry of Public Health in 2013.

MATERIALS AND METHODS

Sources of samples

The selected chicken breeds in this study were as follows: KU Betong, Tapaotong Kasetsart, and KU-Phuparn. KU Betong carcasses were obtained from Luang Suwan Wachakasikit Poultry Farm, Department of Animal Science, Faculty of Agriculture, Kasetsart University, Bang Khen campus, Bangkok, Thailand, while Tapaotong Farm, Song Phi Nong District, Suphan Buri Province, Thailand, supported Tapaotong Kasetsart chicken carcasses. Khun Tam Farm, Bangkok, Thailand, provided KU-Phuparn chicken carcasses. The weight of all chicken carcasses was between 1.0 and 1.5 kilogram. The prices of KU Betong, Tapaotong Kasetsart, and KU-Phuparn chicken carcasses are 190, 130, and 210 Baht per kilogram, respectively.

Chicken essence preparation and experimental design

The method was published by Wutthikrairat et al., (2023). The whole carcasses were thawed at 4 ºC in a refrigerator for 24 hrs, were washed with water and cut into pieces, and bone parts were smashed. Then, carcasses were weighed and steamed. The outer pot contained approximately 33% water (v/v), while the inter pot had pores to let chicken essence drip into the bottom. The experiment was assigned using the Completely Randomized Design (CRD). The sterilization condition was 1.0, 1.50, and 2.0 hrs. with 100 ºC, and all experiments were conducted in triplicate. The chicken essence was filtered through cotton sheets and weighed. Some chicken essence was selected for analysis.

The analysis of proximate composition

Ash, fat, and moisture contents were determined following the Association of Official Analytical Chemists (AOAC, 2019) methods 920.153, 922.06, and 925.45, respectively. Calories and carbohydrate contents were measured using a calories and carbohydrate analyzer (In-house method TE-CH-169 based on Method of Analysis for Nutrition Labeling (1993) page 106), while protein contents were quantifies using the %N×6.25 equation In-house method TE-CH-042 based on AOAC (2019)981.10.

The analysis of physical properties

For pH measurement, each chicken essence was measured using the calibrated pH meter (C1010 CONSORT, Belgium), while color value of chicken essence was detected using a Colorimeter Miniscan EZ 4500L spectrophotometer (HunterLab, USA). The color was expressed as L*, a* and b* values. The L* value indicates the perfect reflecting diffuser when L* value is maximum or is equal to 100. On the other hand, the minimum for L* value represents black color when L* value is zero. Positive a* value is red and negative one is green. Positive b* value is yellow and negative value is blue. The a* and b* values have no specific numerical limits.

Inosine 5 '-monophosphate measurements

In order to extract nucleic acids, 1 g. of chicken essence was mixed homogeneously with 25 ml. of 0.7 M perchloric acid and homogenized at 1,130 x g for 1 min and centrifuged using Union 32R at 2,090 × g, 4 ºC for 15 min. Then supernatant was filtered through Whatman no. 4 (Whatman Inc., Maidstone, UK) and was adjust pH to 7 with potassium hydroxide (SevenEas, Mettler-Toledo Int.Inc., Schwerzenbach, Switzerland). The supernatant was adjusted to 100 ml with 0.7 M perchloric acid (pH 7) and 5 N potassium hydroxide and was centrifuged using Union 32R at 2,090 × g, 4 ºC for 15 min. Inosine 5 ′-monophosphate contents in the final supernatant were detected using HPLC (ACME 9000, Younglin Instruments Inc., Seoul, Korea). HPLC consists of Waters-Atlantis dC18 RP column (4.6 .250 mm, 5-µm particles; Waters Co., Milford, MA), and the column thermostat was maintained at 35 ºC. The mobile phase was buffer solution (0.1 M triethylamine, and 0.15 M acetonitrile (pH 7)), and the analysis was carried out at a flow rate of 1.0 mL per minute utilizing UV detection at 260 nm. After detection, the column was washed for 25 min. The reference material and the samples were injected with a volume of 10 µL. Inosine 5 ′-monophosphate as the reference material was purchased from Sigma Co. (St. Louis, MO).

Peptide analysis

Peptide analysis was performed according to Bordoni *et al.*, (2014) method with a slight modification. All steps of enzymatic digestion were carried out in 50-ml centrifuge tubes. Each 0.1 g sample individual was packed in a plastic bag. To simulate oral digestion, the samples were mixed with 1 ml of buffer solution (50 mM NaCl, 5 mM KCl and 6 mM $CaCl_2$, pH 6.9) containing 50 U/ml α-amylase for 10 minutes. The pH of the mixture was adjusted to pH 1.8 by adding 6M HCl. In order to replicate gastric digestion, pepsin solution was added to the mixture to a final concentration 200 unit/mL for 90 minutes, and then the pH of the mixture was adjusted to pH 7.5 by adding 4M NaOH. To mimic intestinal digestion, 100 unit/mL pancreatin solution and 50 mM bile salt were added for 6 hours and the enzyme reactions were stopped by incubating at 95 °C for 10 minutes. Finally, all samples were centrifuged at 10,000g for 60 min and supernatant was filtered through a 0.2-mm membrane. Lyophilized peptide powder was solubilized in 0.1% formic acid in water (200 ng/mL). The characteristics of peptidomic was analyzed using Tribrid™ Mass Spectrometer with ESI ion source (Thermo Fisher Scientific). Four microliters of the samples were loaded on a C18 column, and one sample was measured in triplicate. The column oven temperature was 52 °C, while the mobile phase was composed of water with 0.1% formic acid and acetonitrile with 0.1% formic acid. The total time of each analysis was 35 min. A blank sample (0.1% formic acid/water)

was administered after every injection. MS spectral data were acquired using a Top15 method dynamically choosing the most abundant precursor ions from the survey scan (300–1,600 m/z) with charge states (+1 to +5) for high-energy collision dissociation fragmentation. Dynamic exclusion duration was 15 seconds. Isolation of precursors was performed with a 1.6 m/z and MS/MS scans were acquired with a starting mass of 60 m/z. Survey scans were acquired at a resolution of 120k. Resolution for fragmentation spectra was set to 30,000. Normalized collision energy was 27 eV. For molecular weight distribution and de novo peptide sequencing, 3 replicate analytical LC–MS runs (.raw files) were achieved using Peak StudioX software (Bioinformatics Solutions Inc., Waterloo, Canada). The peptide mass tolerance was set to 20 ppm and 0.1 Da for MS/MS. To obtain high-confidence peptide identification, false discover rate of 1% was used for identified peptide filtering.

Microbial detection

The 30, 90 and 180-day storage of chicken essence in the retort pouches was kept at room temperature and was submitted for microbial analysis. Microbial detection was performed at Kamphaengsaen Veterinary Diagnostic Center, Faculty of Veterinary Medicine, Kasetsary University, Thailand.

Statistical analysis

All data were analyzed for variance (Analysis of Variance: ANOVA) according to the randomized complete block design (RCBD), and the mean differences were compared by Duncan's New Multiple Range Test (DMRT) using the statistical package SPSS version 26.0

RESULTS AND DISCUSSION

The proximate composition and physical properties of the chicken essence

Table 1 represents the amounts of moisture, protein, fat, carbohydrate, ash, and calories in chicken essence in this study. Proximate compositions were similar to those of commercial chicken essence reported in previous studies (Suttiwan et al., 2018; Wu and Shiau, 2002). The factors affecting proximate compositions are breeds, age, genders, feed, body weight, and environments. The pH value of chicken essence extracted from three native chicken meat ranged 6.02-6.18 due to hydrolysis and Maillard reactions. These reactions break down and release free amino acids, especially aspartic acid, glutamic acid, lysine, arginine, and histidine influencing pH value change.

The reaction between sugar and amino acids during processing causes brown color of chicken essence and then the color of chicken essence is darker. The L* value represent the lightness; 100 and 0 are equal to the brightness and darkness, respectively. The L* value of all chicken essence was approximately 58.57 to 68.02 as shown in Table 2-4 found that the L* value was lowest with increasing extraction time.

In disagreement with one previous report, Lin et al. (2016) used Taiwanese native chickens as the raw materials, and the L* value of chicken essence was about 16 to 18. On the other hand, the positive value of a* value means the redness, while the negative value of a* value means the greenness. The findings show that the a* value was increased with increasing extraction time. Unlike a* value of chicken essence in this study, Taiwanese native chickens as the raw materials yielded chicken essence with 4 to 6 a* value (Lin et al., 2016). The positive and negative b* value indicates yellow and blue, respectively. The b* value of all chicken essence in the present study was 96.42 to 99.41, while b* value of chicken essence in Lin et al., (2016) study was only 2 to 4.

Nevertheless, we did not know the disagreement between our results and Lin et al. (2016) study. Maillard reaction causes the L* a* and b* value change since amino acids interact reducing sugars originated from heat. As a result, melanoidin compound develops pale-yellowness to brown chicken essence when heating is increased.

Table 1. Proximate composition of the chicken essence originated from three chicken.

	This study (KU Betong)	This study (Tapaotong Kasetsart)	This study (KU-Phuparn)	Suttiwan *et al.*, (2018)	Wu and Shiau, 2002
Moisture (g/100g)	92.98	93.08	93.35	ND	91.1 – 95.6
Protein (g/100g)	6.39	5.98	5.73	7.51	2.7 -7.8 (crude protein)
Fat (g/100g)	0.11	0.07	0.07	0.06	ND
Carbohydrate (g/100g)	< 0.01	< 0.01	< 0.01	0.00	ND
Ash (g/100g)	1.34	1.26	1.17	0.58	0.5-1.7
Calories (Kcal/100g)	26.55	24.55	23.55	30.58	ND

Note: grams or kilocalories per 100 grams of chicken essence.ND, not detected.

Table 2. The pH and color value of the chicken essence originated from KU Betong.

Parameters	KU Betong		
	1.0 hr.	1.50 hrs.	2.0 hrs.
pH	6.16±0.02[a]	6.09±0.02[b]	6.09±0.02[b]
L*	67.31±6.13[a]	65.41±1.67[a]	61.25±0.05[b]
a*	21.28±3.60	22.53±0.92	25.59±2.90
b*	97.99±1.79	99.41±0.06	99.40±0.07

[1] a-b Means± standard deviation in the same row with different superscripts are significantly different (p <0.05).

Table 3. The pH and color value of the chicken essence originated from Tapaotong Kasetsart.

Parameters	Tapaotong Kasetsart		
	1.0 hr.	1.50 hrs.	2.0 hrs.
pH	6.02±0.01[c]	6.07±0.01[b]	6.14±0.02[a]
L*	62.47±2.42	58.79±0.14	58.57±4.53
a*	23.93±1.52[b]	28.79±0.03[a]	30.51±2.68[a]
b*	97.95±0.58	96.79±0.18	96.42±4.68

[1] a-c Means± standard deviation in the same row with different superscripts are significantly different (p <0.05).

Table 4. The pH and color value of the chicken essence originated from KU-Phuparn.

Parameters	KU-Phuparn		
	1.0 hr.	1.50 hrs.	2.0 hrs.
pH	6.18±0.02[a]	6.15±0.02[b]	6.14±0.01[b]
L*	68.02±0.48	64.70±0.06	67.05±3.02
a*	21.67±0.01[c]	22.28±0.06[b]	25.95±0.16[a]
b*	99.00±0.03[a]	99.12±0.11[a]	98.01±0.46[b]

[1] a-c Means± standard deviation in the same row with different superscripts are significantly different ($p < 0.05$).

Table 5. Inosine 5 ′-monophosphate contents in chicken essence (mg/100 g chicken essence).

Chicken breeds	Extraction time (hour)		
	1.0 hr.	**1.50 hrs.**	**2.0 hrs.**
KU Betong	36.96 ± 4.62 [c]	40.87 ± 0.17 [b]	59.62 ± 20.51 [a]
Tapaotong Kasetsart	46.50 ± 3.86 [b]	56.60 ± 2.41 [a]	49.25 ± 1.63 [b]
KU-Phuparn	59.62 ± 2.51 [a]	58.06 ± 2.61 [a]	51.69 ± 0.58 [b]

[1] a-c Means ± standard deviation in the same row with different superscripts are significantly different ($p < 0.05$).

Inosine 5 ′- monophosphate content in chicken essence

Table 5 represents inosine 5 ′-monophosphate, a purine ribonucleoside 5'-monophosphate with hypoxanthine as the nucleobase. It is a dietary nucleotide since it is important for intestinal health and immunity, used as a flavor enhancer, and is typically obtained from chicken byproducts. The unique taste of processed animal meat depends on animal species, breeds, genders, age, and processing conditions (Bailey, 1983). Also, inosine 5 ′-monophosphate can be degraded in water (Vani *et al*., 2006). All of these factors might cause the different contents of inosine 5 ′-monophosphate in this study.

Peptide profiles in chicken essence

The peptides molecular weight of chicken essence derived from three native chicken meat ranged approximately 951.90 – 991.50 Dalton as shown in Table 6. In agreement with Wu, H-C. *et.al.*, (2005), the peptides molecular weight of chicken essence is approximately 900 and 1,400 Dalton having antioxidant activities. The limitation of human bodies is only less than 3 amino acid peptide absorption. The results demonstrate that minimum peptide molecular weights in all chicken essence were approximately 190 Da (data not shown). As a result, some small peptides were absorbed through the apical membrane of the enterocytes lining the small intestine via the proton-driven peptide transporter PEPT-1 (Keller, 2013).

Table 6. The peptides molecular weight (Dalton) of chicken essence.

Chicken breed	Peptides molecular weight (Dalton)
KU Betong	951.90
Tapaotong Kasetsart	975.80
KU-Phuparn	991.50

Study on quality properties of sterilized chicken essence kept for 180 days

We extracted chicken essence derived from three native chicken meat with 1.0, 1.50 and 2.0 hrs. and then chicken essence was filled in retort pouches with 30, 90, and 180 day storage.

The pH value of chicken essence from 3 KU chicken breed at 30-, 90- and 180-day storage

The pH value of chicken essence extract from three native chicken meat with 1.0, 1.50, and 2.0 hrs. ranged 6.02 – 6.18 as shown in Table 7 -9. When storage days increased, the pH value of chicken essence decreased since free amino acids may be released from hydrolysis reaction during heating and down the pH value.

The color value of chicken essence from three native chicken meat during storage

We analyzed the color value shown in show Table 10 – 12. All chicken essence were stored in retort pouches. The lightness and yellowness decreased, while the redness increased during increasing storage. Therefore, the color of chicken essence became darker due to Maillard reaction.

When chicken essence is heated, compounds such as reducing sugar such as glucose and amino acids such as lysine interact together. The reaction generates melanoidins, which are darker compounds. In addition, when increasing storage, there are many chemical and biological change such as increasing Maillard reaction to cause darker chicken essence.

Microbial quantification in chicken essence

The table 13 in the present study, Kasetsart University, Faculty of Veterinary Medicine, Animal Disease Diagnostic Center. We quantified total plate count, yeast and mold, Coliform bacteria, *E.coli, Salmonella* spp., *S. aureus*, and *C. perfringens*. The results demonstrate that all bacterial contents matched with the notification of the Ministry of Public Health in 2013.

Table 7. The pH of chicken essence originated from KU Betong during storge time.

pH	Shelf life (days)	Extraction time		
		1.0 hr.	1.50 hrs.	2.0 hrs.
KU Betong	30	6.14 ± 0.01[a]	6.09 ± 0.02[b]	6.09 ± 0.02[b]
	90	6.12 ± 0.01	6.12 ± 0.01	6.13 ± 0.01
	180	6.12 ± 0.06	6.12 ± 0.01	6.13 ± 0.01

[1] a-b Means ± standard deviation in the same row with different superscripts are significantly different ($p < 0.05$)

Table 8. The pH of chicken essence originated from Tapaotong Kasetsart during storge time.

pH	Shelf life (days)	Extraction time		
		1.0 hr.	1.50 hrs.	2.0 hrs.
Tapaotong Kasetsart	30	6.02 ± 0.01[b]	6.05 ± 0.01[a]	6.14 ± 0.01[a]
	90	6.03 ± 0.01	6.12 ± 0.01	6.13 ± 0.01
	180	6.00 ± 0.01	6.11 ± 0.02	6.13 ±0.02

[1] a-b Means ± standard deviation in the same row with different superscripts are significantly different ($p < 0.05$).

Table 9. The pH value of chicken essence originated from KU-Phuparn during storge time.

pH	Shelf life (days)	Extraction time		
		1.0 hr.	1.50 hrs.	2.0 hrs.
KU-Phuparn	30	6.18 ± 0.01[a]	6.15 ± 0.02[a]	6.14 ± 0.01[b]
	90	6.18 ± 0.01	6.16 ± 0.01	6.16 ± 0.01
	180	6.17 ± 0.01[a]	6.16 ± 0.01[b]	6.13 ± 0.03[b]

[1] a-b Means ± standard deviation in the same row with different superscripts are significantly different ($p < 0.05$)

Table 10. The color value of chicken essence originated from KU Betong during storage time.

	Shelf life (days)	Extraction time		
		1.0 hr.	1.50 hrs.	2.0 hrs.
L*	30	66.91 ± 6.49	65.01 ± 0.56	64.04 ± 0.41
	90	65.40 ± 0.29	65.18 ± 0.61	63.99 ± 3.75
	180	60.64 ± 0.28[a]	60.67 ± 0.77[a]	56.79 ± 0.58[b]
a*	30	21.11 ± 3.45	22.90 ± 0.27	25.72 ± 0.12
	90	22.56 ± 0.48	22.97 ± 0.67	25.94 ± 1.31
	180	23.38 ± 0.32[b]	24.01 ± 0.31[b]	28.07 ± 0.71[a]
b*	30	98.37 ± 0.43	98.25 ± 0.41	97.23 ± 0.93
	90	96.80 ± 1.84	97.94 ± 1.23	96.06 ± 0.35
	180	96.36 ± 0.19[a]	96.23 ± 0.17[a]	94.42 ± 0.61[b]

[1] a-b Means ± standard deviation in the same row with different superscripts are significantly different ($p < 0.05$).

Table 11. The color value of chicken essence originated from Tapaotong Kasetsart during storage time.

	Shelf life (days)	Extraction time		
		1.0 hr.	1.50 hrs.	2.0 hrs.
L*	30	62.43 ± 2.44	58.60 ± 0.27	57.94 ± 4.84
	90	62.85 ± 0.39	60.73 ± 0.79	59.50 ± 0.98
	180	61.73 ± 1.31[a]	61.30 ±1.82[a]	53.48 ± 1.62[b]
a*	30	23.87 ± 0.86[b]	28.70 ± 0.17[a]	30.35 ± 2.55[a]
	90	25.26 ± 0.46	28.68 ± 1.23	29.04 ± 0.53
	180	26.47 ± 0.15[b]	28.75 ± 0.17[b]	31.76 ± 1.01[a]
b*	30	98.08 ± 0.57	98.31 ± 0.65	98.57 ± 0.09
	90	97.95 ± 0.58	97.57 ± 0.30	98.48 ± 0.24
	180	98.40 ± 0.22[a]	98.71 ± 1.29[a]	94.35 ± 2.34[b]

[1] a-b Means ± standard deviation in the same row with different superscripts are significantly different ($p < 0.05$).

Table 12. The color value of chicken essence originated from KU-Phuparn during storage time.

	Shelf life (days)	Extraction time		
		1.0 hr.	1.50 hrs.	2.0 hrs.
L*	30	69.05 ± 0.67	68.48 ± 0.36	68.31 ± 0.52
	90	68.02 ± 0.47	67.75 ± 0.36	67.04 ± 3.01
	180	65.26 ± 0.08[a]	64.70 ± 0.06[a]	60.85 ± 0.47[b]
a*	30	23.73 ± 0.73	23.93 ± 0.64	25.63 ± 0.21
	90	22.77 ± 0.66	23.25 ± 0.91	24.91 ± 0.64
	180	22.77 ± 2.86	24.56 ± 0.05	25.17 ± 0.40
b*	30	98.01 ± 0.46	99.11 ± 0.10	99.00 ± 0.03
	90	98.01 ± 0.46	98.99 ± 0.29	98.81 ± 0.30
	180	97.13 ± 1.56	98.15 ± 0.33	98.18 ± 0.17

[1] a-b Means ± standard deviation in the same row with different superscripts are significantly different ($p < 0.05$).

Conclusions

The physicochemical properties of chicken essence prepared from three native chicken carcasses were not different. The pH value of chicken essence decreased when increasing storage time. On the other hand, chicken essence was darker when we increased extraction time and with increasing storage time. Inosine 5 ′-monophosphate contents in some chicken essences were significantly different since some factors might cause higher extraction or degradation such as breeds and extraction conditions. Some peptides in chicken essence might have anti-oxidant activities. All microbial amounts did not exceed law regulations. The recommended chicken carcasses are Betong KU chicken carcasses with 2.0 hours extraction time. Factors considered were proximate composition, 5’ Inosine monophosphate (IMP) and Molecular weight.

Acknowledgements

This research was supported by the National Research Council of Thailand and Pet Supply Co.Ltd.

Table 13. The microbial amounts in chicken essence.

Microorganisms	KU breeds		
	KU Betong	Tapaotong Kasetsart	KU-Phuparn
Total plate count (cfu/ml)	<10	<10	<10
Yeast and Mold (cfu/ml)	<10	<10	<10
Coliform bacteria	<10	<10	<10
E.coli	ND	ND	ND
Salmonella spp.	ND	ND	ND
Staphylococcus aureus	ND	ND	ND
Clostridium perfringens	ND	ND	ND

Note: ND, not detected.

References

Bailey, M.E. 1983. The Maillard reaction and meat flavor. In: the maillard reaction in foods and nutrition. American Chemical Society, Washington DC, p.169–183.

Bordoni, A., Laghi, L., Babini, E., Di Nunzio, M., Picone, G., Ciampa, A., Valli, V., Danesi, F., and Capozzi, F. 2014. The foodomics approach for the evaluation of protein bioaccessibility in processed meat upon in vitro digestion. Electrophoresis. 35(11): 1607-1614.

Food and Agriculture Organization of the United Nations (FAO) FAO: Global meat production to grow in 2024, led by poultry. 24 Jun 2024 https://avinews.com/en/fao-global-meat-production-to-grow-in-2024-led-by-poultry/

Huang, Z., Zhang, J., Gu, Y., Cai, Z., Feng, X., Yang, C., and Xin, G. 2022. Research progress on inosine monophosphate deposition mechanism in chicken muscle. Critical reviews in food science and nutrition. 62(4): 1062-1078. http://doi.org/10.1080/10408398.2020.1833832

Jaturasitha, S., Srikanchai, T., Kreuzer, M., and Wicke, M. 2008. Differences in carcass and meat characteristics between chicken indigenous to northern Thailand (Black- boned and Thai native) and imported extensive breeds (Bresse and Rhode Island Red). Poultry Science. 87(1): 160-169. https://doi.org/10.3382/ps.2006-00398.

Jung, S., Bae, Y.S., Kim, H.J., Jayasena, D.D., Lee, J.H., and Park, H.B. 2013. Carnosine, anserine, creatine, and inosine 5′-monophosphate contents in breast and thigh meats from 5 lines of Korean native chicken. Poultry Science. 92(12): 3275-3282. http://doi.org/ 10.3382/ps.2013-03441.

Li, Y., He, R., Tsoi, B., and Kurihara, H. 2012. Bioactivities of chicken essence. Journal of food science. 77(4): R105-R110. https://doi.org/10.111/1750.3841.2012.02625x.

Lin, Y., Chen, C., and Tan, F. 2016. Influences of different heating condition on the quality of native chicken essence. Proceeding 62nd International Congress of Meat Science and Technology, 14-19 August 2016, Bangkok, Thailand.

Lin, Y., Xu, X. L., and Zhou, G. H. 2007. Changes in taste compounds of duck during processing. Food Chemistry. 102(1): 22-26.

Makchumpon, S., Bunchasak, C., Poeikampha, T., Poonthawee, K., and Rakangthong.C. 2015. Comparison of meat quality between broiler and KU betong chickens. P. 836-843.

Nopchinda, S. 2015. Review Studies of Essence of Chicken for Health. Journal of The Royal Thai Army Nurses. 16(3): 132-137.Notification of the Ministry of Public Health in 2 0 1 3 https://food.fda.moph.go.th/media.php?id=510357187277758464&name=Compi_356.pdf

Parletta, N., Milte, C.M., and Meyer. B.J. 2013. Nutritional modulation of cognitive function and mental health. J Nutritional Biochemistry. 24(5): 725–743.

Sangsawang, N., Bunchasak, C., Sopanarat, P., and Loongyai, W. 2012. The comparison on growth performance, carcass characteristic and fat content in female Betong (KU line) and broiler chicken

Suttiwan, P., Yuktanandana, p., and Ngamake.N. 2018. Effectiveness of essence of chicken on cognitive function improvement: A randomized controlled clinical trial. Nutrients. p10(7): 845

Sopannarath, P., and Bunchasak, C. 2015. Betong chicken (KU line) or KU Betongchicken. Kasetsart Extension Journal. 61: 13-21.

Vani, N. D., Modi., V.K., Kavitha, S., Sachindra, N.M., and Mahendrakar, N.S. 2006. Degradation of inosine-5′-monophosphate (IMP) in aqueous and in layering chicken muscle fibre systems: Effect of pH and temperature. LWT-Food Science and Technology. 39(6): 627-632.

William, J., Lennarz, M., and Daniel, L. 2013. Gastrointestinal Digestion and Absorption. Encyclopedia of Biological Chemistry (Second Edition). p. 354-359.

Wutthikrairat, S., Chen,Y.C., Tinchan, P., Sanguankiat, A., and Nakthong, S. 2023. Effect of extraction time on the amounts of neurotransmitters and amino acids in chicken essence."Journal of Science and Agricultural Technology. p.39-45. https://doi.org/10.14456/jsat.2023.11

Wu, H.C., and Shiau, C.Y. 2002. Proximate composition, free amino acids and peptides contents in commercial chicken and other meat essences. Journal of Food and Drug Analysis. p170-177.

Wu, H.C., Pan, B.S., and Shiau, C.Y. 2005. Low-molecular-weight peptides as related to antioxidant properties of chicken essence. Journal of Food and Drug Analysis. p. 176-183.