



# Formalin and Borax Content of Chicken Sempol Marketed in Purworejo Regency, Indonesia

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**Abstract.** Non-food additives are sometimes added to food, for example borax and formalin. One type of food that uses formalin and borax is chicken sempol. The purpose of this study was to determine the absence of formalin and borax content in chicken sempol sold in Purworejo Regency. The method used in this research is descriptive analysis method. Test the content of formalin and borax with qualitative analysis using a test kit. The results showed that the characteristics of sempol traders in Purworejo Regency were 58.2% male, with the most age being 31-40 years, namely 45.5%. Most of the stalls of sempol traders are in Purworejo and Kutoarjo Regencies with 16.4%. Chicken sempol that is sold contains 21.82% formalin and 27.27% borax. It can be concluded that the characteristics of sempol traders in Purworejo Regency are that they are mostly male, with the most age being 31-40 years. Most of the stalls of sempol traders are in Purworejo and Kutoarjo Regencies. Some broiler chicken sempol contain formaldehyde and borax. Recommendations to the Office of Cooperatives, Small and Medium Enterprises to hold counseling and solutions to replace borax and formalin in foods that are licensed by SNI.

**Keywords:** Sempol, Chicken, Formalin, Borax, Purworejo.

## 1 Introduction

Sempol is one of the snacks that has recently been favored by school children and the general public because the price is relatively cheap and tastes good. Sempol is a food innovation adopted from meatball snacks because it uses the same raw materials, namely meat, flour, tapioca, eggs, onions. Sempol is made by wrapping the dough with a stick and then boiling it. When served the eggs are beaten and fried. Sempol is consumed by mixing it with tomato sauce. Sempol before and after being fried is presented in Fig 1 and Fig 2. As a healthy and undercooked food, the shelf life of Sempol is relatively short. Sellers usually add natural preservatives to chemicals that are prohibited from using such as formaldehyde. In addition to the addition of preservatives, thickeners are sometimes added. Almost all 34 samples of chicken nugget circulating in Sukolilo District, Surabaya tested positive for borax and formalin, except for 1 negative sample [1].

Formalin was a chemical used as a preservative for corpses. Formalin was dangerous because it can react with the mucous lining of the digestive and respiratory tracts in the

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body. The use of formalin in food can cause poisoning, namely acute abdominal pain accompanied by vomiting and depression of the nervous system [2]. Among other dangerous preservatives, formalin has a low price and was easy to use because it dissolves easily in food [3]. Consuming formalin in the long term can result in disturbances in digestion, liver, kidney, pancreas, central nervous system, and cause cancer [4].



**Fig. 1.** Sempol Before Frying



**Fig. 2.** Sempol is Ready to be Served

A food additive that was widely used by traders besides formalin was borax. Borax 11 or commonly called boric acid, has another name, sodium tetraborate was commonly used as 12 an antiseptic and cleaning agent. Borax was widely used as an industrial raw material for the 13 manufacture of detergents, wood preservatives, cockroach (pest) control, ant exterminators and others [5]. Foods that contain borax when consumed do not have a direct effect, but will accumulate little by little and be absorbed in the body. Even though the consumption of borax in the long term has a very harmful effect on health [6].

Most of the sale of chicken sempol was sold by street vendors. Street vendors (PKL) are business actors with relatively little capital, the business they are engaged in was the production and sale of goods to meet the needs of certain groups in society, these businesses are located in places that are considered strategic [7]. One of the products from street vendors that are widely sold on the roadside was processed food. Street vendors are part of micro, small and medium enterprises.

Purworejo Regency was one of the districts in Central Java Province. Purworejo district area on the south coast of Java Island [8]. The boundary of Purworejo Regency was to the west of Kebumen Regency, to the east of Kulon Progo Regency, to the north it was bordered by Magelang and Wonosobo Regencies. The number of micro, small and medium enterprises in Purworejo Regency was 3,480 [9]. Micro, small and medium enterprises play an important role in economic growth, in reducing poverty and absorbing labor and fostering an entrepreneurial spirit. One of the growing businesses is the sempol street vendors. Sempol street vendors are presented in Fig 3 The purpose of this study was to determine the content of formaldehyde and borax in chicken sempol sold by street vendors in Purworejo Regency.

## 2 Method

This research was conducted on broiler traders in Purworejo Regency. The method in this study was interviewed by way of direct questioning and sampling of chicken sempo from street vendors in Purworejo Regency. The samples taken were all broiler traders in Purworejo Regency, namely 55 people.

The material used was a set of formalin test kits as a test tool to test the formaldehyde content, a set of borax test kits as a test kit to test the borax content.



**Fig. 3.** Sempo street vendors in Purworejo City, Indonesia Source: Primary Data (2022)

The variables of this study include:

1. Characteristics of broiler traders in Purworejo Regency. Measuring the characteristics of broiler traders in Purworejo Regency was carried out using a questionnaire.
2. The content of formaldehyde in chicken sempo sold by street vendors in Purworejo Regency. Testing for formalin levels according to [5].
3. The content of borax in chicken sempo sold in Purworejo Regency. Testing for Borax content according to [5].

The data obtained will be analyzed using descriptive analysis. The processed data was then qualitatively assessed for the presence or absence of formaldehyde and borax and presented in tabular, narrative and descriptive form.

### 3 Result and Discussion

#### 3.1 Characteristics of Chicken Sempol Traders in Purworejo Regency

Characteristics of chicken sempol traders based on gender. The number of chicken sempol traders according to gender was the condition of male and female respondents in the research location. Gender describes how much work can be done by the chicken sempol street vendors. Characteristics of free-range chicken sempol traders can be seen in Table 1.

There were 32 male chicken sempol traders or 58.2% more than female chicken sempol traders. Chicken sempol traders who were female were 23 people or 41.8%. The male sex was more numerous due to more manpower, so the ability to sell can be more far-reaching and can be more resistant to fatigue. Gender differences significantly affect the income of micro, small, and medium enterprises [10].

**Table 1.** Characteristics of chicken sempol traders

Characteristics	Number of Respondents (People)		Percentage (%)
Gender	Man	32	58.2
	Woman	23	41.8
	<b>Total</b>	<b>55</b>	<b>100</b>
Age (Years)	10-20	0	0
	21-30	11	20
	31-40	25	45.5
	41-50	12	21.8
	>51	7	1.78
<b>Total</b>	<b>55</b>	<b>100</b>	

Source: Primary Data Processed (2022)

**Table 2.** Characteristics of Chicken Sempol Traders Based on Business Location

No	Subdistrict	Number of Respondent	Percentages (%)
1	Bagelen	1	1.8
2	Banyuurip	2	3.6
3	Bayan	2	3.6
4	Bener	1	1.8
5	Bruno	1	1.8
6	Butuh	4	7.3
7	Gebang	3	5.5
8	Grabag	2	3.6
9	Kaligesing	0	0.0
10	Kemiri	4	7.3
11	Kutuaro	9	16.4
12	Loano	5	9.1
13	Ngombol	2	3.6
14	Pituruh	7	12.7
15	Puwodadi	3	5.5
16	Purworejo	9	16.4
<b>Total</b>		<b>55</b>	<b>100</b>

Source: Primary Data Processed (2022)

Age was a factor that influences the workability of a street vendor because the workability of a street vendor was strongly influenced by age level. Sempol chicken traders aged 31-40 years occupy the highest order, namely 45.5% and are of productive age which will make a person more mature in thinking, working, assessing, and considering an event. Ages that are still in their productive period usually have a higher level of productivity compared to workers who are aged so they are physically weak and limited [11].

Characteristics of chicken sempol sellers in Purworejo Regency based on business location can be seen in Table 2. Chicken sempol traders based on business location that Kutoarjo and Purworejo occupy the highest rank, namely each got 9 people (16.4%). Kutoarjo and Purworejo are sales centers for chicken sempol in Purworejo Regency because Kutoarjo and Purworejo are the main sub-districts. Business location was a place of operation or a place to carry out activities to produce goods and services that prioritize the economic aspect [12]. Business location also has a positive effect on merchant income [13].

### 3.2 Formalin Content Test on Chicken Sempol

The formalin level test was carried out by a qualitative test using the formalin test kit presented in Table 3.

**Table 3.** Amount and Percentage of Formalin Content in Chicken Sempol

No	Subdistrict	Number of Respondents	Positive Formalin		Negatif Formalin	
			$\Sigma$	%	$\Sigma$	%
1	Bagelen	1	0	0.00	1	100.00
2	Banyuurip	2	0	0.00	2	100.00
3	Bayan	2	0	0.00	2	100.00
4	Bener	1	1	100.00	0	0.00
5	Bruno	1	0	0.00	1	100.00
6	Butuh	4	0	0.00	4	100.00
7	Gebang	3	0	0.00	3	100.00
8	Grabag	2	2	100.00	0	0.00
9	Kaligesing	0	0	0.00	0	0.00
10	Kemiri	4	1	25.00	3	75.00
11	Kutuarjo	9	3	33.33	6	66.67
12	Loano	5	1	20.00	4	80.00
13	Ngombol	2	0	0.00	2	100.00
14	Pituruh	7	3	42.86	4	57.14
15	Puwodadi	3	0	0.00	3	100.00
16	Purworejo	9	1	11.11	8	88.88
Total		55	12	21.82	43	78.18

Source: Primary Data Processed (2022)

Chicken sempol traders in all sub-districts of Purworejo Regency contained 21.82% formalin and 78.18% did not contain formalin. Traders who sell sempol containing formalin are found in Bener District 100%, Grabag 100%, Pituruh 42%, Kutoarjo 33.33%

and the rest contain formalin below 33.33%. As many as 12 respondents or 21.82% of chicken Sempol traders used formalin in the processed chicken sempol sold. This result was lower than what was reported [14]. That 25.5% of the snacks sampled by elementary school students in Bantul contained formalin with the largest proportion coming from the sausage-type snacks sample and followed by the meatball sample snacks (round, fried and skewered). Not only sempol, cilok sold in Cilacap also contains formaldehyde [15]. The hawkers around Yudharta University, Pasuruan, do not contain formaldehyde [5]. Market snacks such as tofu sold at the Matchmaking Market in Batam City also do not contain formaldehyde [16].

### 3.3 Borax Content Test on Chicken Sempol

The borax content test was carried out using a qualitative test using a borax test kit 16 presented in Table 4. Chicken sempol sold in Purworejo Regency contains borax as many as 15 respondents or 27.27%. A total of 40 respondents, namely 72.73% of chicken sempol did not contain borax. This result was greater as reported by [14] that of the 98 samples of snacks tested, there were 15 samples (15.3%) that tested positive for containing borax. Meatballs were the type that tested positive for borax the most. In contrast to formalin, the addition of food borax was still permitted up to a maximum limit of 1 g per kilo of food [17]. Even though it was permissible to use borax, it hurts food. Borax has a very dangerous toxic effect on the human metabolic system. Borax will be absorbed in the liver, and because it was insoluble in water, borax will accumulate in the body [18].

**Table 4.** Amount and Percentage of Borax Content in Chicken Sempol

No	Subdistrict	Number of Respondents	Positive Formalin		Negatif Formalin	
			$\Sigma$	%	$\Sigma$	%
1	Bagelen	1	0	0.00	1	100.00
2	Banyuurip	2	0	0.00	2	100.00
3	Bayan	2	0	0.00	2	100.00
4	Bener	1	0	0.00	1	100.00
5	Bruno	1	0	0.00	1	100.00
6	Butuh	4	0	0.00	4	100.00
7	Gebang	3	1	33.33	2	66.67
8	Grabag	2	2	100.00	0	0.00
9	Kaligesing	0	0	0.00	0	0.00
10	Kemiri	4	1	25.00	3	75.00
11	Kutuarso	9	3	33.33	6	66.67
12	Loano	5	2	40.00	3	80.00
13	Ngombol	2	2	100.00	0	0.00
14	Pituruh	7	2	28.57	5	71.43
15	Puwodadi	3	0	0.00	3	100.00
16	Purworejo	9	2	22.22	7	77.77
Total		55	15	21.82	40	72.73

Source: Primary Data Processed (2022)

Traders selling chicken sempol containing borax were in the District of Grabag 100%, Ngombol 100%, Loano 40%, Gebang and Kutoarjo 33.33% and the rest contained borax below 33.33%. The large proportion of borax in chicken sempol sellers who are sold far from Purworejo City, this was suspected of a lack of knowledge of the seller about food safety. When viewed from Purworejo Sub-District as the city center, the borax content in chicken sempol was only 22.22%. The use of borax in food can also be avoided, this was according to research by [19], 2013 in Blawirejo Village Kedungpring Lamongan Sub-District that cilok pentol sellers do not use hazardous materials such as borax.

## 4 Conclusion

The characteristics of sempol traders in Purworejo Regency are 58.2% male and 41.8% 9 female with the most age being 31-40 years, namely 45.5%. The location of the stalls of the 10 most sempol traders was in Purworejo District and Kutoarjo District as much as 16.4%. 11 Chicken sempol traders contained 21.82% formalin and 78.18% did not contain formalin. The 12-borax content in chicken sempol was 27.27% while those that did not contain borax were 13 72.73%.

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## References

1. T. Hardinata and A. B. Djauhari, "Kandungan Boraks dan Formalin Pada Sempol Ayam Yang Beredar di Sekolah Dasar Kecamatan Sukolilo Surabaya," *Foodscitech*, vol. 1, no. 1, pp. 28–37, 2018, doi: 10.25139/fst.v1i1.1003.
2. H. Ma'ruf, M. S. Sangi, and A. D. Wuntu, "Analisis Kandungan Formalin Dan Boraks Pada Ikan Asin Dan Tahu Dari Pasar Pinasungkulan Manado Dan Pasar Beriman Tomohon," *J. MIPA*, vol. 6, no. 2, p. 24, 2017, doi: 10.35799/jm.6.2.2017.17073.
3. J. Wahyudi, "Mengenal Bahan Tambahan Pangan Berbahaya : Ulasan," *J. Litbang*, vol. XIII, no. 1, pp. 3–12, 2017.
4. BPOM, Bahan Tambahan Ilegal - Boraks, Formalin dan Rhodamin B. 2004.
5. S. Kholifah and D. Utomo, "Uji Boraks Dan Formalin Pada Jajanan Disekitar Universitas Yudharta Pasuruan," *J. Teknol. Pangan*, vol. 9, no. 1, pp. 10–19, 2018, doi: 10.35891/tp.v9i1.933.
6. F. K. Hartati, "Analisis Boraks Dengan Cepat, Mudah Dan Murah," *J. Teknol. Proses dan Inov. Ind.*, vol. 2, no. 1, pp. 33–37, 2017, doi: 10.36048/jtpii.v2i1.2827.
7. I. K. A. Antara and L. P. Aswitari, "Beberapa Faktor Yang Mempengaruhi Pendapatan Pedagang Kaki Lima Di Kecamatan Denpasar Barat," *E-Jurnal EP Unud*, vol. 5, no. 10, pp. 1265–1291, 2019.

8. A. P. Damayanti, "Faktor-Faktor Yang Mempengaruhi Perkembangan Permukiman Di Wilayah Pesisir Kabupaten Purworejo," 2018.
9. Dinas Koperasi Usaha Kecil dan Menengah Provisi Jawa Tengah, "Daftar Persada KUMKM ( Portal Satu Data )," <https://satudata.dinkop-umkm.jatengprov.go.id/>, 2022.
10. R. Nainggolan, "Gender, Tingkat Pendidikan Dan Lama Usaha Sebagai Determinan Penghasilan Umkm Kota Surabaya," *Kinerja*, vol. 20, no. 1, pp. 1–12, 2016, doi: 10.24002/kinerja.v20i1.693.
11. S. Aprilyanti, "Pengaruh Usia dan Masa Kerja Terhadap Produktivitas Kerja (Studi Kasus: PT. OASIS Water International Cabang Palembang)," *J. Sist. dan Manaj. Ind.*, vol. 1, no. 2, p. 68, 2017, doi: 10.30656/jsmi.v1i2.413.
12. S. T. Marfuah and S. Hartiyah, "Pengaruh Modal Sendiri, Kredit Usaha Rakyat (KUR), Teknologi, Lama Usaha, dan Lokasi Usaha terhadap Pendapatan Usaha," *J. Econ. Bus. Eng.*, vol. 1, no. 1, pp. 183–195, 2019.
13. B. Prihatminingtyas, "Pengaruh Modal, Lama Usaha, Jam Kerja, dan Lokasi Usaha terhadap Pendapatan Pedagang di Pasar Ladungsari," vol. 7, no. 2, pp. 147–154, 2019.
14. Y. Paratmanitya and A. Veriani, "Kandungan bahan tambahan pangan berbahaya pada makanan jajanan anak sekolah dasar di Kabupaten Bantul," *J. Gizi dan Diet. Indones. (Indonesian J. Nutr. Diet.*, vol. 4, no. 1, p. 49, 2016, doi: 10.21927/ijnd.2016.4(1).49-55.
15. A. R. Faoziyah, L. T. Agustina, and T. H. Wijaya, "Analisis Kandungan Boraks dan Formalin pada Bakso dan Cilok di Wilayah Cilacap Kota," *J. Ilm. Kefarmasian*, pp. 65–70, 2019.
16. S. Fitriani Sammulia, T. Poluan, and Y. Friscia Yusri, "Analisis Kualitatif Kandungan Formalin Pada Tahu di Pasar Jodoh Kota Batam," *J. Endur.*, vol. 5, no. 1, p. 144, 2020, doi: 10.22216/jen.v5i1.4585.
17. R. R. Dampolii, "Mengenal Boraks dan Dampak Penggunaannya," *Kementeri. Lingkung. Hidup dan Kehutan. Direktorat Pengelolaan B3*, p. 2015, 2015, [Online]. Available: <http://sib3pop.menlhk.go.id/index.php/articles/view?slug=mengenal-boraks-dan-dampak-penggunaannya>.
18. Sajiman, Nurhamidi, and Mahpolah, "Kajian Berbahaya Formalin, Boraks, Rhodamin
19. B, dan Metahlyn Yellow Pada Pangan Jajanan Anak Sekolah di Banjarbaru," *J. Skala Kesehatan.*, vol. 6, no. 1, pp. 1–5, 2015.
20. N. K. Rohmah and S. Handayani, "Kajian Keamanan Pangan Pentol Cilok Di Desa Blawirejo Kecamatan Kedungpiring Lamongan," *J. Tata Boga*, vol. 2, pp. 58–65, 2013, [Online]. Available: <https://jurnalmahasiswa.unesa.ac.id/index.php/jurnal-tataboga/article/view/1139>.

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