



## Survey Situation Of Formaldehyde Contamination In Seafoods Sold In Muang Nakhon Ratchasima

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### Abstract

**Background:** Formaldehyde is a chemical that is useful in various industries. Formaldehyde was detected in foods. Due to the chemical properties of formaldehyde, it created a detrimental effect on the health of consumers.

**Objective:** To study the situation of formalin contamination in seafood sold in fresh market in Nakhon Ratchasima Province

**Study methods:** A total of 28 seafood samples; consisted of 7 samples of fresh shrimp, squid, cuttlefish, crispy squid each, were randomly selected from different shops in different fresh markets located in Muang Nakhon Ratchasima Province. The samples were examined by formaldehyde test kits, manufactured by the department of medical science.

**Result:** From a total of 28 seafood samples (35.71%), 10 samples were found to contain formaldehyde, comprising 7 crispy squid samples (100%), 2 samples of banana squid (28%), 1 shrimp sample (14%). Formaldehyde was not detected in any of the cuttlefish samples.

**Conclusion:** Formaldehyde was found to contain in seafood samples sold in fresh markets. Consumers should know how to choose to buy safe seafood products from fresh markets such how to avoid seafood that is contaminated with formaldehyde, and buy from trusted seafood shops.

**Keywords:** formaldehyde, seafoods, squid, fresh market

### Introduction

Nowadays, formaldehyde is widely used in all corners of the world due to its properties that can inhibit or slow down the degradation of microorganisms. Formalin was initially used in medicine. The embalming of the corpse so that the corpse does not decompose removes germs Including some industries as well, such as the weaving industry, etc.<sup>(1)</sup> But some food vendors illegally use formaldehyde to make their produce non-perishable, which is useful for storage and sale because some commodities cannot be kept fresh for long regardless of the potential harm to the consumer. Formaldehyde is prohibited to use in food. If formaldehyde enters the body of the consumer, possibly through food

intake or other methods. which negatively affects health that is life threatening Therefore, a law was issued to prohibit the use of formalin in food by the Ministry of Public Health. No. 151 (B.E. 2536) of the Food Act, B.E. 2522 by stipulating that formaldehyde or formalin solutions are prohibited substances in food.<sup>(2)</sup>

Formaldehyde, a chemical synthesized from formaldehyde (CH<sub>2</sub>O), dissolves in water at a concentration of 37% and contains 10-15% methyl alcohol, is classified as a hazardous substance with serious toxicity. It can enter the human body in a variety of ways, whether it is the gastrointestinal

tract. respiratory system or other. When it enters the body, the body can excrete only part of formaldehyde by excreting it in the form of formic acid (Formic Acid). If received in an amount that exceeds the body's ability to excrete (more than 0.1 ppm), if received in an amount higher than 100 ppm, will result in unconsciousness and eventually death. Formic acid will destroy cells in the body. When cells are destroyed, the body deteriorates. Various systems in the body do not work properly, such as the respiratory system. When inhaling or inhaling formalin, it destroys the tissues of the trachea and lungs, causing swelling of the bronchi. This results in coughing, sneezing, sore throat, and difficulty breathing. If the lung tissue is damaged it may cause a chance of pneumonia, the lungs flooded until he suffocated and eventually died. In addition to the respiratory system, there is also a gastrointestinal system. When taking formaldehyde, it will result in severe stomach pain, vomiting and nausea. Stomach inflammation leads to stomach ulcers, which when ulcers can cause infection and other diseases. If not treated in time, it will cause various organs to fail, such as the liver, heart and brain. In addition, formalin is one of the substances that cause cancer. It can therefore be said that formaldehyde is harmful to humans both in the long term and in the short term.<sup>(3)</sup>

In Thailand, formaldehyde has been detected in many studies. Most of them are often found in foods such as seafood, fresh vegetables, fruits, processed foods, fresh foods, and others such as mackerel, pork, shrimp, chicken, Chinese cabbage, cucumbers,

bamboo shoots and others. Formalin is used even in places where it is produced, as well as in places adjacent to seas or rivers.<sup>(4-8)</sup> From past studies, formalin has been found in seafood, including in the Nakhon Ratchasima Province area.<sup>(6)</sup> Therefore, this study was conducted to determine the amount of formaldehyde in food in Nakhon Ratchasima Province. To demonstrate the situation of formaldehyde contamination in seafoods.

**Objective**

To study the situation of formalin contamination in seafood sold in fresh market in Nakhon Ratchasima Province

**Study Methods**

This study was a descriptive research. It examined formaldehyde contamination in 5 types of seafood, consisting of 7 samples of fresh shrimp, squid, cuttlefish, and crispy squid each. The samples were randomly selected from different shops in different fresh markets located in Muang Nakhon Ratchasima Province. The samples were examined by formaldehyde test kits, manufactured by the department of medical science.

**Population and sampling**

Conducted convenient sampling (Convenient Sampling Methods) from seafood vendors in fresh markets (in the district), including shrimp, squid1, squid2, and crispy squid, 7 samples each, totaling 28 samples.<sup>(9)</sup>

**Table No.1 Seafood sample randomly selected from fresh markets**

No.	Seafood type	No. of Samples
1	Shrimp	7
2	Splendid squid	7
3	Cuttlefish	7
4	Crispy squid	7
	Total	28

**Instrument**

The samples were examined by formaldehyde test kits, manufactured by the department of medical science.<sup>(9)</sup>

**Test procedure**

The test kit contains 3 bottles of chemicals labeled 1, 2, and 3.

- 1) The water samples were poured into bottle 1 until it was filled ¾ way, the bottle was then capped and shaken until all solids were dissolved.
- 2) Contents from bottle 1 were poured into bottle 2. The bottle was capped and shaken until all solids were dissolved.
- 3) Contents from bottle 2 were mixed with the liquid in bottle 3 then shaken. Results displayed by mixing the 2 bottles show whether or not the sample has been contaminated with formaldehyde

**Result Interpretation**

The mixing of contents in bottles 2 and 3 shows whether or not the sample was contaminated with formaldehyde. After mixing, if the liquid changes color to red/pink, is it a positive result (+), meaning the sample is contaminated. If no color change takes place, then the test is negative (-), meaning the sample has not been contaminated. (Figure 1.)

Picture No. 1



**Result**

A total of 28 seafood samples were tested for formaldehyde contamination, comprising fresh shrimp, squid, cuttlefish, crispy squid, 7 samples each. 10 samples were found to contain formaldehyde. Formaldehyde contamination was detected in all 7 crispy squid samples, accounting for 100.00%. 2 out of 7 samples of banana squid examined formaldehyde contamination, representing 28.00%. Formaldehyde was found to be contaminated in one sample of shrimp, representing 14.00%. Formaldehyde was not detected in all 7 cuttlefish samples.

**Table No. 2 Test results for formaldehyde in marine samples (n=28)**

No.	Seafood Sample	Total No. of Sample	No. of Sample detected Formaldehyde (%)
1	Shrimp	7	1 (14.00)
2	Splendid squid	7	2 (28.00)

3	Cuttlefish	7	0 (0.00)
4	Crispy squid	7	7 (100.00)
	Total	28	10 (35.71)

## Discussion

A total of 28 seafood samples were tested for formaldehyde contamination, comprising fresh shrimp, squid, cuttlefish, crispy squid, 7 samples each. 10 samples were found to contain formaldehyde consisting of 7 crispy squid samples (100%), 2 samples of banana squid (28%) and one sample of shrimp (14%). Out of 10 samples, formaldehyde was detected. It was found that there were 7 samples of crispy squid, representing 70% of the samples that had formalin and accounted for 100% of all crispy squid samples. This may be due to the production of crispy squid, the that manufacturers believe that adding formaldehyde will make the ink cycle more flexible which is popular with consumers therefore illegally adding formaldehyde in the process of producing crispy squid.<sup>(10)</sup> In addition, the samples used for testing are random samples from the fresh market which fresh markets may not have a way to inspect quality of food before they are sold. Therefore, there is a risk of contamination in the food that is sold in fresh markets. The results of the detection of formalin in the crispy squid samples in this study are consistent with the results of Punyaporn Daicharoensuk *et al.*<sup>(8)</sup> that examines formalin in seafood samples including 26 crispy ink samples, 11 samples were found to be contaminated with formaldehyde, representing 42.3%.

Formalin was detected in 1 sample of shrimp, representing 14.00% and 2 samples of banana squid, representing 28.00%. This may be due to the seller's concern that seafood products may not be sold in time. They may lose freshness. Formaldehyde may be added to these foods to ensure they are always fresh, and because the seafood is perishable.<sup>(11)</sup> In addition, the area of Nakhon Ratchasima Province is far from the sea. Seafood products have to go through a courier that takes time to transport. As a result, shrimp and squid have a chance to spoil. Therefore, formalin is used in some shrimp and squid.<sup>(12)</sup>

According to the study, formaldehyde was not detected in all 7 samples of cuttlefish. This may be because cuttlefish are very popular when it comes to delicious cooking which make it sell out fast the seller does not need to use formalin to preserve the seafood.<sup>(13,14)</sup> A place where seafood is sold such as in a supermarket. or a large fresh food market There may be some random food quality checks. While most general fresh markets do not randomly check the quality of food ingredients that are sold. Makes products that are not up to standard or contaminated with harmful chemicals to be sold easily. However, the department responsible for food safety has some random inspections but still encounters contaminants from time to time. The detection of formalin in this seafood sample shows that formaldehyde is still illegally used in fresh seafood. Especially in crispy squid samples. Which was found to be contaminated in a very high percentage of formaldehyde is harmful to the health of consumers in large amounts of formaldehyde and it may accumulate, which increases the risk of long-term health problems.

## Conclusion

From a total of 28 seafood samples (35.71%), 10 samples were found to contain formaldehyde, comprising 7 crispy squid samples (100%), 2 samples of banana squid (28%), 1 shrimp sample (14%). Formaldehyde was not detected in any of the cuttlefish samples.

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