# ANALYSIS OF BORAX IN YELLOW WET NOODLES USING BUTTERFLY PEA FLOWER EXTRACT (CLITORIA TERNATEA)

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# Analysis of Borax in Yellow Wet Noodles using Butterfly Pea Flower Extract (*Clitoria ternatea*)

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## ABSTRACT

One of the most popular foods is noodles. To get delicious noodles, often added food additives such as borax. Consuming foods that contain borax, will be at risk of serious health problems, it can even cause death. The purpose of this study was to determine the presence of borax in yellow wet noodles using butterfly pea flower (*Clitoria ternatea*) extract as an indicator. This type of research was descriptive study. The population was yellow wet noodles which were sold in the Lakarsantri area of West Surabaya. Sample was obtained from 10 sellers of yellow wet noodles in Lakarsantri. The borax testing method with a qualitative test of butterfly pea flowers (*Clitoria ternatea*) extract. The results found that 6 out of 30 samples (20%) were positive for borax, while 24 out of 30 samples (80%) did not contain borax. In conclusion, in this area, there are still yellow wet noodles that contain borax.

**Keywords:** wet noodles; borax; butterfly pea flower; extract

## INTRODUCTION

Noodle consumption is increasing by about 25% per year. In the early 2000s, it was estimated to increase by 15% per year. Noodles are divided into two types, dry noodles, and wet noodles. Dry noodles are made through a steaming process and then dried. Wet noodles are made by steaming or boiling without going through the drying stage. Wet noodles have a water content (52%) higher than dry noodles (10%). Wet noodles have a relatively short shelf life, and people are looking for ways to extend their shelf life. Chemical additives are often used in the noodle-making process to extend shelf life. Food additives according to the Food and Agriculture Organization-World Health Organization (FAO-WHO) are ingredients that are added intentionally to food in certain quantities, to improve the appearance, color, shape, taste, texture, taste, and prolonging shelf life. (1)

Borax is a dangerous ingredient in the food but is still often misused by manufacturers. Borax is a compound with the chemical name sodium tetraborate in the form of soft crystals. Borax when dissolved in water will decompose into sodium hydroxide and boric acid. Uses of borax for non-food ingredients: glass-making mixtures, wood preservatives, skin ointments, glycerin borax (cancer medicine), plant fertilizer mixtures. Borax in foods is used as a thickener such as meatballs, noodles, crackers, and chips. (2)

Consuming foods containing borax will not immediately experience health effects but the dose will accumulate in the body. If the dose is high, it will cause stomach, intestine, liver, and even acute kidney failure which can lead to death. Clinical symptoms are cough, fever, eye irritation, vomiting, shortness of breath, cell poisoning, weakness, etc. In small children and infants, doses >5 grams in the body cause death, while in adults doses of 10-20 grams can cause death. Foods containing borax are difficult to distinguish from the five senses, so we need a way to detect the presence of borax in food. Detection of borax is carried out using the flame test method, volumetric titration, and spectrophotometric analysis, each of which has advantages and disadvantages. An alternative method of borax analysis that is faster, easier, and cheaper. One of them is qualitatively using an indicator. (3)

Indicators are chemicals that can change the color of a solution by changing the pH after an increase in acid or base. Acid-base indicators that are often used in chemical laboratories today are synthesis indicators, each synthesis indicator has a characteristic in the form of a pH tray which is indicated by a change in the color of the acid and alkaline conditions and the indicator price is fixed. In addition, synthetic indicators are quite expensive and can cause environmental pollution. [4] Therefore, it is necessary to look for alternative indicators (natural indicators) that are easy to obtain and environmentally friendly.

Natural indicators can be made from colored plants, but not all colored plants can give a clear color change under acidic or alkaline conditions. A butterfly pea flower (*Clitoria ternatea*) is a plant that has the potential as a natural indicator. The butterfly pea flower (*Clitoria ternatea*) contains anthocyanin compounds. Anthocyanins are used to detect borax compounds because borax is alkaline and will react when mixed with anthocyanins. Butterfly pea flower (*Clitoria ternatea*) has not been widely used to detect borax in food. Butterfly pea flowers (*Clitoria ternatea*) are generally used as ornamental plants. [5] Based on the description above, the authors are interested in researching borax analysis in wet noodles with qualitative tests using alternative indicators of natural ingredients by utilizing from butterfly pea flowers (*Clitoria ternatea*) extract.

## METHODS

This research was a descriptive study to determine the borax content in yellow wet noodles using butterfly pea flower (*Clitoria ternatea*) indicator. The population was yellow wet noodles which are sold in the Lakarsantri area of West Surabaya. The sample was yellow wet noodles from 10 sellers, 3 of which were taken each, so the total sample was 30. Sampling was carried out in the Lakarsantri area of West Surabaya, while testing was done at the Chemistry Laboratory of the University of Muhammadiyah Surabaya. The study was conducted from December 2020 to July 2021, while the testing time was in June 2021.

The variable was the borax content in wet noodles using the butterfly pea flower extract (*Clitoria ternatea*) as an indicator. Collection technique by observation and testing in the laboratory. Data collection steps: pea flower (*Clitoria ternatea*) extraction, identification of borax using butterfly pea flower (*Clitoria ternatea*) extraction, qualitative test. The data obtained were then analyzed descriptively using in the form of frequency and percentage.

## RESULTS

The results of the laboratory test on yellow wet noodles containing borax showed a change in color to light blue in the mashed sample. On yellow wet noodles which do not contain borax does not show a color change. The results are presented in the following table.

Table 1. Test results of wet noodles sold based on borax

| Contains borax | | Not contain borax | |
|---|---|---|---|
| S | % | S | % |
| 6 | 20 | 24 | 80 |

Table 1 shows that the percentage of wet noodles sold positive (+) contains borax was 6 out of 30 samples (20%) and negative (-) was 24 out of 30 samples (80%).

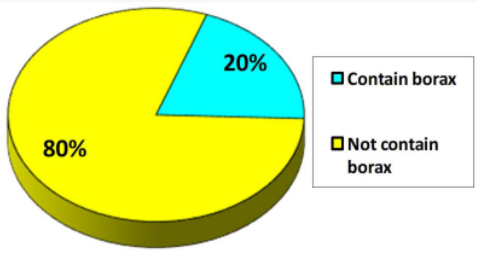


Figure 1. Borax testing results on yellow wet noodles using butterfly pea flower extract indicator

From the results of the research above, the results were obtained in the form of a percentage of wet noodle samples containing 20% borax and 80% not containing borax

## DISCUSSION

As many as 30 samples of yellow wet noodles from 10 traders in the Lakarsantri area of West Surabaya were examined for borax content in the chemical laboratory of the University of Muhammadiyah Surabaya using natural indicators of butterfly pea flower (*Clitoria ternatea*) extract. Butterfly pea flower (*Clitoria ternatea*) extract was obtained from 40g of fresh butterfly pea flower (*Clitoria ternatea*) macerated for 24 hours with 40 mL of 50% ethanol. Qualitative analysis by mashing the wet noodle test material as much as 2 grams, then adding 1 ml of ethanol or alcohol. Leave it for 10 minutes. The filtrate was added with a small amount of *Clitoria ternatea* flower extract and the color change was observed.

The results showed that the butterfly pea flower (*Clitoria ternatea*) was able to qualitatively detect the borax content in yellow wet noodles. The ability of butterfly pea flower (*Clitoria ternatea*) to detect borax content in yellow wet noodles is because butterfly pea flower (*Clitoria ternatea*) contain anthocyanin compounds. Anthocyanins are amphoteric compounds, which can react both with acids and with bases. In acidic media, anthocyanins are red and in alkaline media, they turn purple and blue [6]. The results showed that the autocyanin in the butterfly pea flower (*Clitoria ternatea*) can react with alkaline borax, indicating a color change to blue.

The butterfly pea flower (*Clitoria ternatea*) is a vine that is usually found in gardens or forest edges. This plant member of the leguminous tribe originates from tropical Asia but has now spread throughout the tropics. Since the first, this plant was planted in the yard as an ornamental plant because of its bright blue or purple flowers. The flowers in various places in Southeast Asia are used as traditional and modern medicine and food coloring. It has recently attracted much interest because it has potential applications in both modern medicine and agriculture, and as a source of natural food coloring and antioxidants [7]. In the field of plant chemistry, this plant can be used as an alternative in detecting the borax content in food.

The results of laboratory tests to identify borax in yellow wet noodles using butterfly pea flower (*Clitoria ternatea*) extract obtained 6 of 30 samples (20%) contained borax and 24 of 30 samples (80%) did not contain borax. These results indicate that there are still noodle producers who still use borax in wet yellow noodles and do not yet know the negative impact. Consuming foods containing borax more often will accumulate in the brain, liver, fat, and kidneys which in turn can cause cancer, circulatory disorders and can even lead to coma and death. Borax is used as a food additive to produce a chewy, non-sticky, and durable texture. Factors that encourage producers to use illegal chemicals such as borax because it is more practical and cheaper than using permitted food additives, lack of knowledge about the negative impact of borax, and economic problems. [3]

## CONCLUSION

The results of the study concluded that butterfly pea flower (*Clitoria ternatea*) extract can detect borax content in yellow wet noodles because of the anthocyanin content in butterfly pea flower (*Clitoria ternatea*). The results of the study show 30 samples (20%) contained borax and 24 of 30 samples (80%) did not contain borax. The lack of awareness of noodle producers regarding the negative impact of borax causes the existence of yellow wet noodles sold in the community.

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