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General Chemistry Class Perspective On The Utilization Of Young Coconut water To Treat Fever Symptom

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Abstract
This study aims to analyze the perspectives of students from the Department of Mathematics enrolled in a General Chemistry class regarding the use of young coconut water as a natural remedy to treat fever symptoms. The research is grounded in the widespread trust of Indonesian society in herbal medicine, particularly young coconut water, which has been traditionally used across generations to treat various health conditions, including fever. Young coconut water is known to contain vital nutrients such as electrolytes (potassium, sodium, magnesium), B-complex vitamins, and vitamin C, which help lower body temperature naturally, especially during dehydration caused by fever. A quantitative approach with a descriptive survey method was employed. The data were collected using a closed questionnaire based on a Likert scale, which was tested for validity and reliability, achieving a Cronbach's Alpha value of 0.977- indicating a high level of reliability. Results showed that students' average scores in knowledge (3.90), understanding (3.81), attitude (3.89), and application (3.87) were all in the high category. This indicates that students not only understand the benefits of young coconut water but also grasp scientific concepts related to electrolyte function in fluid balance and immune response. Despite the high scores, some misconceptions persist. For example, a few students believe young coconut water can entirely replace medical treatment or that higher consumption leads to faster healing without regard for appropriate dosage. This highlights the need for improved science-based health literacy. The study concludes that continuous health education through lectures, seminars, and healthy campus campaigns integrating both traditional and medical approaches is essential. These findings are significant in promoting the wise and measurable use of natural remedies like young coconut water while avoiding misuse. Furthermore, the results can serve as a basis for future research, such as clinical trials or laboratory comparisons with other rehydration fluids, and can help develop health promotion policies in academic settings to encourage smart and healthy decision-making among students.

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INTRODUCTION

Young coconut water has long been known and utilized as a natural solution to various health complaints, both in scientific and ethnomedical approaches. This research aims to scientifically understand the benefits of young coconut water in overcoming fever symptoms and encourage students to wisely choose health care alternatives based on natural and safe ingredients. Coconut water, as part of coconut fruit, is widely used as a fresh drink as well as a traditional medicine because of its properties. In addition to being refreshing, coconut water is also

believed to be beneficial for treating diseases such as kidney stones, hypertension, dengue fever, and heart disorders (Warman, 2021). However, the nature of coconut water that is easily damaged by heat and air makes it must be consumed in a fresh state (Azra et al., 2023).

Young coconut water is made up of 95.5% water, 0.1% protein, less than 0.1% fat, 4.0% carbohydrates, 0.4% ash, as well as vitamin C and B complex vitamins such as biotin, folic acid, and pyridoxine. Its mineral content is very complete, such as potassium (K), sodium, calcium, magnesium, phosphorus, and chlorine. Potassium functions to lower blood pressure and accelerate the absorption of drugs in the blood (Mantra & Ketut, 2022). Because it has a similar composition to body fluids, young coconut water can be used as a substitute for oralite for people with diarrhea and help maintain the body's electrolyte balance (Ibrahim, 2020). For a long time, young coconut water has been used for various traditional health purposes (Zulaikhah & Wibowo, 2022).

Coconut (*Cocos nucifera* L.) is a very versatile tropical plant, where almost all parts of the fruit can be used by humans, either directly or through processed processes such as oil, coconut milk, copra, and jam. The content of the amino acid glutamate in coconut functions to help the brain work and provide various important nutrients for the human body (Hadjatu & Laboko, 2023). Indonesia is known as the country with the largest coconut production in the Asia Pacific region, reaching 94.64%, outperforming the Philippines and India (Andriani et al., 2023).

Coconut water (*Cocos nucifera* L.) is an ancient tropical beverage whose popularity on the international market has been continuously increasing in recent years (Prades et al., 2011). Coconut is also a leading commodity for export and people's agriculture in Indonesia (Hellyatunisa et al., 2022). Public trust in herbal plants as a natural remedy makes coconut, especially young coconut water, an alternative treatment for diseases such as diarrhea, canker sores, and poisoning. Green and red coconuts are known to be the most commonly used varieties (Ramahdani et al., 2023).

Various studies show that young coconut water has a real effect on health. Research shows a decrease in systolic blood pressure in hypertensive patients after the consumption of young coconut water. In addition, young coconut water is also influential in relieving menstrual pain in adolescents as well as as an anti-inflammatory agent in dengue fever through the suppression of factors such as TNF-α, interleukin, and prostaglandin E2 (Pebriani et al., 2022). Its nutritional content also helps rehydrate the body after strenuous activity or exercise.

Young coconut water is considered to have various health benefits such as neutralizing toxins, preventing kidney stones, cleaning the digestive tract, and improving blood circulation. With its lauric acid content, coconut water has antifungal, antibacterial, and antiviral properties that are beneficial for the immune system (Pebriani et al., 2022). In the traditional context, Indonesian people have long used coconut water as a natural solution, especially in the pancaroba season. Children often experience fever due to erratic weather, and coconut water is used as an easy-to-reach natural solution to relieve symptoms such as fever, diarrhea, and smallpox (Prabowo et al., 2021).

Although the benefits of young coconut water have been proven both traditionally and scientifically, science-based understanding of its efficacy is still minimal among students. Many of them tend to rely on hereditary information or social media, without understanding the scientific basis. This shows that there is a gap between empirical knowledge and scientific understanding, even though students have the potential to be agents of change in the spread of healthy lifestyles based on natural ingredients. Therefore, this research is expected not only to provide an in-depth understanding of the benefits of young coconut water as a natural solution in overcoming fever symptoms, but also to foster students' critical awareness of the importance of using safe and scientific local ingredients.

The specific purpose of this study is to examine the benefits of young coconut water as a natural solution to reduce fever based on scientific and ethnomedic approaches and to identify the level of students' understanding of the science-based use of young coconut water**.** This research is also expected to be the basis for the development of health education on campus so that students are able to play an active role in promoting a healthy lifestyle based on the use of local natural resources.

METHOD

Research Design

This study uses a quantitative approach with an analytical descriptive design to describe the perspective of mathematics students to the perspective of students majoring in Mathematics in the General Chemistry Class about the use of young coconut water as a Natural Solution in Overcoming Fever Symptoms.

Population and Sample

The population in this study is active students of the Mathematics study program at one of the state universities in Indonesia. The sample was selected using the purposive sampling technique (Sugiono, 2019) with inclusion criteria: (1) active students of the Mathematics study program, (2) in semesters 2-8, and (3) willing to participate in research. The number of samples involved was 39 students, meeting the minimum requirement of 27 respondents for valid statistical analysis based on power analysis calculations with a confidence level of 95% and a margin of error of 5% (Naing et al., 2022).

Research Instruments

The instrument used was a structured questionnaire consisting of 16 statements with a Likert scale of 5 points (1 = Strongly Disagree to 5 = Strongly Agree) (Riduwan, 2015). The questionnaire covers three main dimensions:

1. Knowledge Aspect (6 items): measures respondents' knowledge of coconut water content, functional benefits of coconut water.
2. Understanding Aspect (3 items): measures respondents' understanding of the function of coconut moisture content during fever.
3. Attitude Aspect (4 items): measures the attitude and level of support of respondents towards the use of young coconut water as a natural solution that is beneficial for the body in overcoming fever symptoms.
4. Application Aspect (3 items): measuring the readiness and ability of respondents to implement the use of young coconut water as a natural alternative in dealing with fever symptoms in real situations.

Before use, the instrument has gone through validity and reliability tests. The results of the validity test showed that all statements were valid with an r-count value > r-table (0.316) and a p-value < 0.05. The reliability test yielded an Alpha Cronbach value of 0.976, indicating excellent reliability.

Data Collection Procedure

Data collection was carried out through the distribution of online questionnaires using Google Forms during the March-April 2025 period. Before filling out the questionnaire, respondents were given an explanation of the purpose of the research and asked to fill out an informed consent form. Filling out the questionnaire takes about 15-20 minutes. This research after going

through the review stage by the review lecturer was then continued with validation carried out by the chemistry lecturer (Aprilia & Lutfi, 2023).

Data Analysis

The collected data was analyzed using:

1. Descriptive analysis: to calculate the frequency, percentage, average, and standard deviation of responses to each item and dimension (Kemp at al., 2018).
2. Factor analysis: to identify the main factors influencing the perspective of students majoring in Mathematics in General Chemistry Class on the use of young coconut water as a natural solution in overcoming fever symptoms (Shrestha, 2021).
3. Correlation test: to determine the relationship between demographic variables and respondents' knowledge and attitudes (Kafle, 2019).

Data analysis was carried out using SPSS software version 26.0 with a significance level set at $p < 0.05$.

RESULTS AND DISCUSSION

Respondent Characteristics

Of the total 39 respondents, 77.5% were women and 22.5% were men with an age range of 17-20 years. The majority of respondents (92.5%) were in semester 2, while 7.5% were in semesters 6-8. Data collection is carried out using an online questionnaire that has gone through a validity and reliability test process.

Reliability Test Results

The results of the reliability analysis of the questionnaire instrument consisting of 16 items using the SPSS program showed a Cronbach's Alpha value of 0.977. This value indicates that the instrument has very high reliability, as Cronbach's Alpha value above 0.7 is generally considered to indicate good reliability, and a value above 0.9 indicates very high reliability (Intan Nur Aini & W.P. Sari, 2021).

As also explained by Rachman et al. (2024) in their book Quantitative, Qualitative, and R&D Research Methods, good reliability is characterized by an alpha value above 0.70, while a value above 0.90 indicates that the measuring instrument has very high reliability and can be trusted to measure the variables in question consistently.

Further, all items in the questionnaire had a corrected item-total correlation value above 0.7, indicating that each item had a strong relationship to the total score and that no item undermined the instrument's reliability. This is also in line with the findings of Dewi et al. (2024), who stated that the validity of an item is stated to be good if the item correlation value (r calculated) is greater than the r table.

Thus, it can be concluded that the instruments used are valid and feasible to be used in data collection because they have met the standards of content validity and statistical reliability. As seen in the Case Processing Summary table.

Table 1. Validity Test Results

		N	%
Case	**Valid**	39	100
	Exluded	0	0
	Total	39	100

Table 2. Static Reliability

Alpha Cronbach	N of Item
0,977	16

Table 3. Item Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
P1	57.7949	219.430	.874	.975
P2	57.9487	223.576	.780	.976
P3	58.4872	217.572	.805	.976
P4	58.2564	219.985	.899	.974
P5	57.9744	216.657	.954	.973
P6	58.2821	219.524	.847	.975
P7	58.0256	221.815	.847	.975
P8	58.2821	222.524	.808	.975
P9	58.3333	217.912	.853	.975
P10	58.3333	217.649	.844	.975
P11	58.4103	217.985	.827	.975
P12	58.1026	222.252	.785	.976
P13	57.6923	221.534	.809	.975
P14	58.2308	217.498	.832	.975
P15	58.1538	218.028	.849	.975
P16	58.0769	219.389	.847	.975

Based on the results of the reliability analysis using SPSS on a questionnaire consisting of 16 statements regarding the perspective of students majoring in general chemistry classes about the use of young coconut water as a natural solution in overcoming fever symptoms, an Alpha Cronbach value of 0.977 was obtained. This value falls into the very high category, which indicates that the instrument has excellent internal consistency (Taber, 2018).

The Total Items Statistics table shows that all items have a Corrected Item-Total Correlation above 0.7, indicating that each item has a strong relationship to the scale total score. The highest correlation value was found in item P05 (0.954), while the lowest value was in P02 (0.780).

All items in the questionnaire had a corrected item-total correlation value above 0.7, indicating that each item had a strong relationship to the total score and that no item undermined the instrument's reliability. This is also in line with the findings of Dewi et al. (2024), who stated that the validity of an item is stated to be good if the item correlation value (r calculated) is greater than the r table. Thus, it can be concluded that the instruments used are valid and feasible to be used in data collection because they have met the standards of content validity and statistical reliability.

In addition, there is not a single item that if removed will significantly increase Cronbach's Alpha value. All "Alpha if Item Deleted" values are in the range of 0.973 to 0.976, which means that all items contribute stably to the reliability of the instrument. This phenomenon shows that the entire question item has an equal measuring power and is in line with the construct to be studied, namely students' perception of the use of young coconut water as a natural solution to overcome fever symptoms (Sharma, 2016).

These results show that the questionnaire used is very feasible in measuring student perception. Each question item is not only relevant but also contributes positively to the consistency of the instrument. A high reliability score indicates that students' responses to statements in the questionnaire are consistent (Govindasamy at al., 2023).

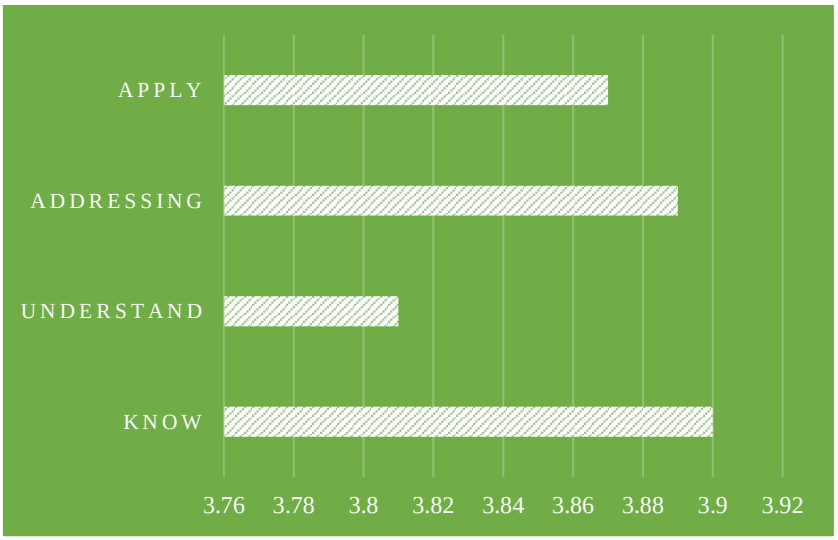

Figure 1. Respondents' Understanding Score of Coconut Water Applications in the Medical World

Based on the interval, the four aspects are in the "High" category (range 3.45 – 4.2). The analysis of respondent scores was carried out to determine the level of perception of students majoring in general chemistry classes towards the use of young coconut water as a natural solution in overcoming fever symptoms. Based on data obtained from 39 respondents through 16 statements, an average score was calculated for each indicator, namely: knowing, understanding, responding, and applying.

The results of the analysis showed that the indicator obtained an average score of 3.90, which indicates that students have a fairly high knowledge of the benefits of young coconut water. The comprehension indicator has an average score of 3.81, which indicates that students understand the mechanism or scientific reasons behind the use of young coconut water to manage fever symptoms. Furthermore, the response indicator obtained an average score of 3.89, which shows the positive attitude of respondents towards the use of young coconut water. Meanwhile, the application indicator obtained an average score of 3.87, which reflects that most students are willing and willing to use young coconut water as an alternative to handling fever.

When adjusted for the category of data interpretation on the Likert scale interval, all four indicators fall into the "High" category, with a score range between 3.45 and 4.20. This indicates that in general, students' perception of the use of young coconut water is very good.

The bar chart shown also reinforces these findings, where the entire indicator has an average value close to 4. Thus, it can be concluded that the majority of students have a positive perception of young coconut water as a natural solution in dealing with fever symptoms (Bangkok at al., 2019). This gives a positive signal to develop health campaigns based on natural ingredients in the college environment.

Discussion

Based on the results of the analysis of 39 student respondents, an average knowledge indicator score of 3.90 was obtained, which shows that students have a good insight into the benefits of young coconut water in overcoming fever. The comprehension indicator that obtained a score of 3.81 showed that students not only know, but also understand how young coconut water works scientifically, such as in helping to balance body fluids and lower temperature. The positive attitude of students towards the use of young coconut water is reflected in the score of 3.89, which shows their readiness and confidence in this natural solution. This is also

strengthened by an application score of 3.87, indicating that the majority of students are ready and have even started to implement the consumption of young coconut water when facing fever symptoms.

Scientifically, Dewi et al. (2024) emphasized that young coconut water contains electrolytes such as potassium and magnesium which are very important for maintaining fluid and electrolyte balance during fever, as well as playing a role in lowering body temperature naturally. This is in line with the high comprehension scores in the respondents, indicating that the students understand the biological benefits of young coconut water.

The results of this study show that students majoring in mathematics in general chemistry classes have a fairly good level of knowledge about the use of young coconut water as a natural solution in overcoming fever symptoms, as well as showing a positive attitude and tendency to apply it as an alternative to handling fever symptoms. These findings are supported by research by Zulaikhah and Wibowo (2022) which shows that young coconut water has the ability to increase levels of enzymatic antioxidants such as Superoxide Dismutase (SOD), Catalase, and Glutathione Peroxidase (GPx), which function against oxidative stress in the body, a condition that is common during fever.

In addition, young coconut water is also known to contain natural electrolytes such as potassium, magnesium, and sodium which can help replace body fluids lost due to fever or excessive sweating. Ibrahim (2020) in his research stated that young coconut water is effective in increasing the body's potassium levels, which is important in maintaining fluid and electrolyte balance when a person has a fever. The correlation between knowledge and high attitudes in this study suggests that accurate dissemination of information can increase positive attitudes towards natural remedies. This is also confirmed by the findings of Zulaikhah (2022), who developed a young probiotic drink made from coconut water and showed its benefits in boosting immunity.

In terms of medical potential, research by Toruan et al. (2023) also shows that young coconut water has characteristics that support the growth of certain bacteria, such as *Escherichia* and *Salmonella typhi*, two bacteria that are closely related to typhoid fever. Although the context is different, it suggests the presence of a fairly complex content of nutrients and compounds in young coconut water and could be the focus of further research in the development of complementary therapies for diseases characterized by fever.

However, there are still some misunderstandings and gaps in understanding related to technical aspects such as the working mechanism of young coconut water and its proper use. This is in line with the findings of Ferilda et al. (2024) who show that students' level of knowledge about natural therapies for fever is quite high, but there are still some perceptions that need to be straightened out in order for its use to be more effective. A study by Ridho et al. (2025) also found a positive correlation between knowledge of natural ingredients and the tendency to use natural-based products. Another study by Ridho et al. (2025) also indicated the need to strengthen cross-disciplinary education to improve non-health students' technical understanding of basic health interventions such as oralit therapy.

The misconceptions found, such as the assumption that the use of cold water is sufficient to treat fever without regard to other conditions, illustrate a common misconception encountered in various public health studies (Ferilda et al., 2024). These misconceptions, if left uncorrected, can hinder the application of proper natural remedies and potentially worsen the patient's condition. Therefore, although the application score shows a high tendency of students to apply the use of young coconut water, the existence of misconceptions that still arise indicates the need for *an evidence-based education* strategy. This approach is important so that the applicative behavior to natural solutions such as young coconut water is accompanied by a

deep scientific understanding and proper use, so that the benefits can be more optimal and do not cause negative impacts due to mistakes in practice.

CONCLUSION

The results of this study show that students of the Department of Mathematics in the General Chemistry Class have a high level of knowledge, understanding, attitude, and application of the use of young coconut water as a natural solution in overcoming fever symptoms. The average score in all four dimensions was in the high category, with scores of 3.90 (knowledge), 3.81 (understanding), 3.89 (attitude), and 3.87 (application) respectively. These findings show that students not only understand the empirical and scientific benefits of young coconut water, but also demonstrate a readiness to apply it as an alternative to early treatment of fever symptoms.

Young coconut water, which contains a variety of essential electrolytes as well as vitamins and bioactive compounds, has been shown to have the potential to help lower body temperature and maintain fluid balance, so it can act as a natural therapeutic agent. The positive support from students for its use reflects the good acceptance of the treatment approach based on natural ingredients.

However, a high score does not fully guarantee a correct and in-depth understanding. The study still found misconceptions, such as the notion that young coconut water can replace all forms of medical treatment, or that its use is always safe without restrictions. This shows that some students do not have a strong scientific foundation in assessing the benefits and risks of these natural ingredients. This condition is an important note that positive perception must be accompanied by evidence-based understanding and proper education.

Therefore, a more comprehensive and systematic health education strategy is needed—whether through learning curricula, thematic seminars, or healthy campus programs—that not only introduces the benefits of natural ingredients, but also emphasizes the importance of scientific knowledge, vigilance, and responsibility in their use.

The impact of this research is quite significant, both in the academic and practical realms. Academically, these results could be the starting point for further research related to the use of young coconut water as complementary therapy, including clinical studies or deeper pharmacological studies. On the other hand, practically, these findings can encourage the development of health promotion programs based on local wisdom in the campus environment, so that students become more aware, educated, and selective in using natural ingredients safely and responsibly.

This research is expected not only to strengthen students' understanding of traditional medicine, but also to be an early contribution in building a critical and sustainable culture of health literacy among the younger generation.

RECOMMENDATIONS

Based on the results of the study, we recommend that information about the benefits of young coconut water be provided more frequently, such as in classrooms, seminars, or campus social media. In addition, it is hoped that students will be more critical and intelligent in choosing natural health medicines. To scientifically prove the benefits of young coconut water, similar research can be carried out further, including direct trials or simple experiments.

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