Ethnoscience Research on Nira Processing in Science

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ABSTRACT
This study is based on a restricted reconstruction of the real science that emerged in society and transformed into a branch of knowledge that students can use on their own to learn. Since no one has thoroughly studied this subject, research on "Ethnoscience Studies in Science Learning" is essential. This study should be kept since it can be learned about and taken into account while creating science education. The goal of this research is to convert the community's nira processing knowledge into scientific knowledge. It does this by explaining the natural science knowledge necessary to convert the nira processing knowledge into scientific knowledge. The descriptive qualitative method was employed in this investigation. Following the collection of research data, analysis of the data included data reduction, data visualization, and conclusion/verification. (1) There is a correlation between traditional knowledge held by the community and (2) scientific understanding in the processing of nira, particularly when it comes to combined materials, additives, and substances and their properties.

Keywords: *Ethnoscience, Nira, Natural Science*

1. INTRODUCTION

Natural science is a branch of ethnoscience that examines the natural occurrences of phenomena, situations, and symptoms in nature and its components. Learning science is crucial because it involves more than just memorizing information, concepts, and principles; it also involves making discoveries [1]. The development of life science is significantly influenced by scientific education. In general, people already possess a body of knowledge that is specific to their region's population culture. This body of knowledge and cognition is called a cognition system. Ethnoscience is the original knowledge that a civilization with scientific knowledge has generated in the form of language, customs, culture, and technology that is possessed by the community [2].

The local wisdom is reflected in the regional culture, which takes on the characteristics of the area. According to [3]local community beliefs and practices might be seen as examples of local knowledge. Every region has a distinct and unified culture. Implementing it in schoolwork is one approach to use local wisdom in learning. Unfortunately, local knowledge's potential for enhancing education has not been fully realized. Teachers still very rarely incorporate ethnoscience into classroom instruction. [4], claims that teachers have not been able to create instructional materials that are compatible with the social and cultural contexts of their students. In reality, knowledge that derives from social norms and beliefs can affect how people interpret and comprehend nature [5] . When teaching science using an ethnoscientific method, students are more likely to appreciate their local culture and be more interested in the subject matter. Conducted to [6] To make scientific knowledge simpler for students to learn and apply in daily life, ethnoscience might inspire teachers to teach science based on local knowledge or community culture.

Authentic science is a natural culture that has been ingrained in a society that people uphold and adhere to from generation to generation as a result of their adaptation to the environment and culture of the place they currently

reside. While formal knowledge in the form of concepts, principles, hypotheses, and laws that have undergone scientific inquiry is known as science. To create new scientific knowledge, it is necessary to merge real science and scientific science in education. An ethnoscience-based science curriculum with the local wisdom subtlety can be developed later by first establishing an inventory of the original science [7].

Currently, ethnoscience is regarded as a scientific discipline that should be used in Indonesia. The Kurikulum 2013 contains evaluation requirements for cognitive, affective, and psychomotor testing as part of ethnoscience-based science [8]. hese days, science education in schools should incorporate the culture that emerges in society. This is so that students may better understand concepts by studying the science found in the local community culture when the ethnoscience approach is used in the classroom [9] . Additionally, students can maintain their culture and connect it to understanding of science.

For the advantage of culture-based learning, there are many different cultures in Indonesia that can be studied. Traditional foods and beverages are one of the cultural components that hold a prominent position. Consider the traditional beverages that the Batak people frequently utilize as excellent beverages. Palm wine is a beverage made from refining nira into a drink that is unforgettable during weddings, birthday parties, holidays, and even funerals. People also believe that palm wine has additional health benefits, such as boosting confidence, in addition to warming the body.

This research related to sources of interviews and observations of Nira processing was carried out in Bangun Purba, Serdang Bedagai Regency. Due to the oil palm and nira trees that cover the majority of the land, farming is the most common occupation in Bangun Purba Village. Some of them also manufacture brown sugar and palm wine using nira as a source, and they also sell the authentic nira water used to make Bika Ambon cake. Nira is a liquid that can be made into both food and drink that is extracted from the stem of the sugar palm plant. In this community, nira water is converted into three different forms of food: tuak, brown sugar, and bika Ambon. In terms of this research, production is focused on turning sap into palm wine.

The researcher wants to bring up this subject in order to determine future research about the nira process of processing into palm wine and demonstrate that there is a scientific procedure involved, starting with the harvesting process and ending with materials that are ready for usage. Researchers want to disclose ethnoscience and local knowledge in these traditional drinks through their investigation.

2. METHOD

This study is a field study that places a greater emphasis on the information gathered from the informants. The authors conduct interviews, observations, and documentation in real-world settings [10]. The topic of this study is nira processing, and the subject is 54-year-old Tuak Producer Raliaman Barus, who is located at Dusun 2 Sungai Buaya Village, Kec. Silindak Kab. Serdang Bedagai.

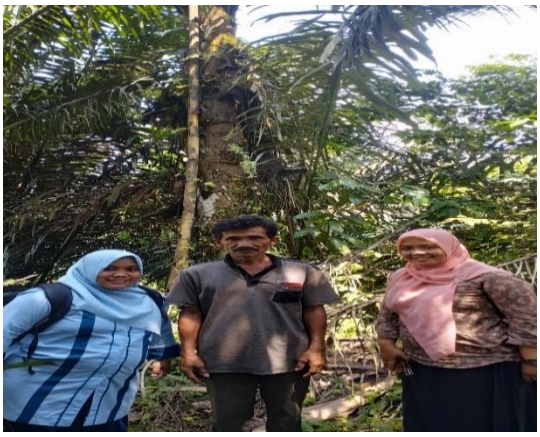


Figure 1. Interview Nira Processing

The descriptive qualitative method was employed in this investigation. For a study that is descriptive, qualitative research is also known as descriptive qualitative research [11]. A scenario or phenomena is described using phrases in qualitative descriptive research, from which inferences are made.

To ascertain the nira processing, the following methods were used to gather the data for this study: (1) interviews; (2) observation; and (3) documentation. We conducted interviews by posing inquiries about nira

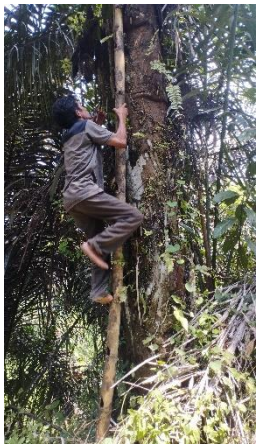
processing. Raliaman Barus, a resident of Dusun 2 Desa Sungai Buaya, Kec. Silindak Kab. Serdang Bedagai who is accustomed to making palm wine from nira as a traditional beverage, was interviewed for this study. Direct observation of the procedure used to collect nira water from trees, process it, and ferment it into palm wine allowed for observations to be made. Direct observation is the first step taken by researchers in order to gather information about the subject of their study. The nira procedure is documented by taking images of it. In qualitative research, documentation is a supplement to observations and interviews.

To analyse data, there are three things to do, (1) Data reduction, this step is done by focusing on the important things from the data that has been obtained. This process takes place from observation and interviews until the data is collected [12]. (2) Data display, or the presentation of data in qualitative descriptive research in the form of words and formed into tables for ease of understanding [13], and (3) conclusions/verification, this conclusion is a new finding that takes the form of a description or a description of an object that was unclear before but is now described in more detail. There are steps that must be taken into account when reaching conclusions, particularly the experimental step [14].

3. RESULTS AND DISCUSSION

3.2. Results

Researchers looked into community-owned, authentic knowledge of the nira processing process. The study's findings are subsequently converted into scientific theory, and the relevant natural science material is identified. The results are presented in table.1 below :

Observed Aspect	Figure	Interview	Observational Findings	Authentic Science	Scientific Science	STEM
Choosing Mergat midrib (Kolang Kaling Tree)		Q : What are the characteristic of a good midrib and have a lots of water? A : When the midrib is cut, we can determine how much juice contains nira can be processed without doing anything special.	A large-sized midrib will produce a lot of water.	- ,The Mergat tree, often referred to as the Kolang Kaling tree, is an untended wild plant that grows in the area. - The Mergat tree is typically found at the bottom of the ravine or house that surrounds the homes of the locals, however there are access routes that make it simpler for Nira farmers to harvest Nira.	Nira water appears in the midrib because the trunk of the mergat tree in it can be used as sago flour, so it can hold a lot of water causes the mergat tree producing nira water.	Because all parts of the Mergat or Kolang Kaling tree can be used to fulfill human requirements, it is also referred to as the "tree of 1000 benefits." The rods can be used to build bridges or roofs. The trunk's contents can be used to grow a sago tree. There are fibers that can be utilized to make home brooms and the leaves can be used as broomsticks. For kolang kaling, the fruit can be eaten as food, and the midrib can be utilized to make nira water.
Cutting Midribs Process		Q : How thick the midrib should be cut ? A : quite thin enough Q : How many liters of nira can therefore be produced in one midrib hand? A : so, in one midrib hand can produce ten liters of each midrib hand, because it is thin, so one midrib hand can produce 150-200 liters for three months.	The midrib that was too short or too worn out cannot regrow. This is seen by the amount of trees that cease to produce nira after the midrib has cut over	Because the nira, which is used to make palm wine, benefits from exposure to sunlight, cutting the midrib should be done in the daytime. Additionally, at the same time, stay the night on the tree so that it can be harvested the following day.	Mergat trees are similar to cactus trees which are able to store large amounts of water because of their foam-like stems. This is what makes this plant can produce water up to hundreds of liters	- to ease the cutting process, a bamboo ladder is made whose height can reach the height of the mergat tree. - bamboo ladders are also easy to make, durable, and strong and inexpensive

Observed Aspect	Figure	Interview	Observational Findings	Authentic Science	Scientific Science	STEM
taking the jerry can / container on the tree	 	Q : How is nira water prepared to produce palm wine? A : First, if the mergat midrib is visible, then it is beaten to make it easier to cut. The beating technique is carried out 4 times a week for a month. this midrib that can be harvested into Nira. Then in the jerry can put Berastagi / Raru wood into it. This is an item that can stimulate palm wine so that the content is more concentrated. Then also enter the root wine. After that, the jerry cans that have been processed are attached to mergat midribs that have been cut. after that, leave it overnight..	To measure in non-standard units, namely 2.5 fists, the bark (Raru wood) must be cut into small pieces. Ten liters of nira, made from the wood, are then fermented to make tuak.	- People believe that the bark of raru has an important role in the taste and benefits of Tuak. For this reason, although the price is quite expensive, this leather is still in demand. This wood was brought directly by the Raru distributor who came from Sibolga - People believe that drinking Tuak is not only able to warm the body, but can increase a person's level of confidence.	The name "raru" refers to the kind of bark that is used with palm sap to enhance flavor, increase alcohol content, and preserve the traditional tuak beverage. Raru bark is also known to some Tapanuli people as a diabetes treatment. According to a study, four different forms of raru, including Cotylelobium melanoxylon Pierre, Shorea balanocarpoides Symington, Cotylelobium lanceolatum Craib, and Vatica perakensis King, were discovered during the exploration of raru species in North Sumatra. The findings of the phytochemical screening revealed the presence of flavonoids, tannins,	- High-quality palm wine is directly exposed to sunlight, increasing the amount of gas produced. - Tuak should not be exposed to water because the water will interfere with the Tuak's content. - In addition to palm wine, sap can be used as sap without alcohol by adding jackfruit and betel bark to make it taste sweet. It can also be processed into additional ingredients for Bika Ambon and cooked into brown sugar.

Observed Aspect	Figure	Interview	Observational Findings	Authentic Science	Scientific Science	STEM
					and saponins in the aforementioned bark extract. The inhibitory activity varied from 88 to 97%, while Shorea balanocarpoides had the best inhibition with a 97% inhibitory activity of the patented medication glucobay.	

3.2. Discussion

The culture of the Indonesian people is extremely diverse. The various cultures of these communities contain the people's original knowledge, which can be reconstructed into scientific science and play an important role in the advancement of culture-based learning. Tuak, which comes from Nira, is a traditional Batak drink. The results of the reconstruction of the local community's original science related to tuak into scientific knowledge give scientific meaning to the beliefs that have been attached to the community's culture or beliefs. Because of the wide variety of science material links, it is known in Table 1 that the reconstructed processing process into scientific science can be used as a learning resource for students. For example, the addition of Berastagi wood changes the sweet taste of the sap to a slightly bitter and intoxicating taste. However, if this wood is not used, the results are not optimal, and the taste of palm wine is not unique. The significance of IPA is that a mixing process, similar to making coffee and tea at home, can change the taste and color of a mixture. This type of mixture is known as a heterogeneous mixture, or, more precisely, a suspension. Furthermore, the midrib to be extracted must be beaten first in order for the water to come out, demonstrating the need for a force that can change the shape of an object/material.

Based on the results of the reconstruction of authentic science in society into scientific science, it is clear that nira processing has a connection to scientific material. The process of nira processing can be linked to basic competencies in elementary schools based on the 2013 curriculum, allowing the culture of the community to be integrated as a reference material for school learning. First, it refers to the chemical change content, which explains the concept of mixtures and single substances (elements and compounds), physical and chemical properties, and physical and chemical changes in everyday life; and second, it refers to the results or works on solution properties, physical and chemical changes, or mixture separation.

Second, it relates to substances in Grade 5 Theme 9 Subtheme 1 about Atom, Objects and Mixtures, specifically homogeneous mixtures (solutions) and heterogeneous mixtures (suspensions and colloids). Science in the processing of sap related to homogeneous mixtures, particularly palm wine. Tuak is the result of combining authentic nira water with Berastagi wood, which causes the sap water to become cloudy and impossible to separate.

4. CONCLUSION

Based on the research, it can be concluded that there is scientific science in the process of nira processing into palm wine as a traditional drink, which is the result of the reconstruction of authentic knowledge that has been passed down from generation to generation. It is related to the Elementary School subject in science, which is a mixture in which nira water is fermented with Berastagi wood as the basic ingredient for making palm wine. Because this mixture blends together, it is referred to as a homogeneous mixture. Furthermore, palm wine is intoxicating, so it is included in the natural science additive material.

5. ACKNOWLEDGEMENTS

Thankyou in advance for Universitas Muhammadiyah Sumatera Utara that supporting this joint research with Univesitas Muhammadiyah Surakarta and Universitas Muhammadiyah Kupang. This joint research aims to analyzing the local wisdom in Sumatera, Java, and Kalimantan to relate in scientific knowledge.

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