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The Production Process of Pendap as an Integrated Science Learning Media: Ethnoscience Study of the Lembak Tribe Bengkulu Province

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abstract

This study aims to reconstruct the original knowledge of the community in the pendap production process into scientific knowledge used as a medium for science learning. Data collection was carried out on Jalan Irian, Tanjung Agung Village, Sungai Serut District, Bengkulu City. The research method is descriptive qualitative with data collection techniques through observation, questionnaires, and interviews. The data obtained is then analyzed, verified, and reduced then constructed into scientific knowledge and interpreted into science concepts in science learning. The results of the study indicate that the process of making pendap by the community can be interpreted into scientific knowledge and implemented in science learning. This study concludes that the pendap production process is the community's original knowledge, which is used as a science learning medium.

1. Introduction

Education is an effort to empower human potential to inherit, develop and build a civilization in the future (Wijaya et al., 2016). One of the efforts to build civilization is to increase understanding of the surrounding environment, especially those related to culture as a legacy from previous generations (Riyanta, 2016). Culture will be better known if it is included in learning activities, one of which is in the field of science (Machin, 2014). Cultural values which are local wisdom differ depending on each region, especially in Indonesia which consists of various tribes, ethnicities, and traditions (Suastra, 2010; Hariri et al., 2016; Jufrida et al., 2018). It is hoped that with this process the younger generation will have a higher value of nationalism and pride as an Indonesian nation (Astuti & Bhakti, 2021).

Learning science that pays attention to local cultural wisdom as national identity and the character and customs of local culture is called learning with an ethnoscience approach. according to Sudarmin et al. (2018), Ethnoscience learning is very important because Indonesia consists of various ethnic groups and various cultures that must be preserved. Sudarmin et al. (2015) stated that the conservation message listed on the notice board in the Karimunjawa National Park still retains local knowledge. Sumarni (2018) stated that the process of making coconut sugar can be used as a scientific learning resource by reconstructing the original knowledge of the community into scientific knowledge. Suastra (2010) stated that almost 90% of

teachers stated that they wanted to develop a local culture-based science learning model but in fact, only 20% had the ability to implement it.

The lack of insight/knowledge of the teacher to look for examples of events/events that contain local wisdom as indicated by the lesson plans prepared by the teacher are still few that relate to local culture (Sapri et al., 2021; Mulyati et al., 2015; Qolbi et al., 2016). Therefore, it is hoped that by integrating the values of local wisdom in science learning, it is hoped that science learning will become more meaningful and not only textbook oriented. Reconstruction is expected to increase students' sensitivity to the surrounding environment (Ansyah & Walid, 2021). The Lembak tribe of Bengkulu province as one of the tribes in Indonesia is also rich in cultural treasures, one of which is the manufacture of typical pendap food (Ramdhani, 2019).

Pendap is a traditional Bengkulu food. Because of its unique, spicy, and savory taste, this dish was favored by the first president of the Republic of Indonesia Soekarno during his exile in Bengkulu from 1938 to 1942 (Dahniar et al., 2018). This Pendap cuisine was once proposed as an intangible cultural heritage by Bengkulu Province. It turns out that the prestige and reverberation of this food is not only in Bengkulu but also well known in various other areas such as Jakarta, Lampung, Lubuk Linggau, Palembang, South Sumatra, Pangkal Pinang, Jambi, and now it has spread to other areas in Indonesia because it has become -by typical Bengkulu (Abdillah, 2021).

Pendap which is made from mackerel, grated coconut, and spices that are crushed together and then wrapped in taro leaves is a learning process in which there is a scientific process. So far, this process has only been passed down from generation to generation from the cultural roots of the Bengkulu people who like to mix food. This process will be discussed in detail in the view of ethnoscience. In this study, it is expected to get new scientific treasures related to the production of regional specialties that are reconstructed into ethnoscience studies so that later they can be used in learning. Ethnoscience learning helps unite local science with formal science in a more balanced process (Azizah & Premono, 2021; Abonyi, et al., 2014). Ethnoscience-based learning is also able to bring up a scientific attitude (Fasasi, 2017). and active students during learning activities (Subali & Aminah, 2018). The application of ethnoscience makes it easier for students to learn science by associating science with the culture around their home. Several studies also show that ethnoscience can indeed improve students' scientific literacy (Shidiq, 2016; Sari et al., 2020).

The purpose of this study is to identify and explain the indigenous knowledge of the community in the pendap production process which is still being carried out today even though it has been followed by advances in science and technology. The process of making pendap is expected to be a contextual learning resource for students. In addition, it is hoped that incorporating local wisdom into science learning can encourage students to try to become drivers in an effort to improve the welfare of the surrounding community. The formulation of the problem in this study is to look at the reconstruction of public knowledge into scientific knowledge and how the relationship between the process of making opinions and the basic competencies in schools is related.

2. Method

The research used is a qualitative approach based on ethnoscience. The reconstruction process focused on the activities carried out by the community in the creation of ideas to be linked with science. Data collection includes primary data collected through observation and interview techniques, while secondary data is collected by studying literature and documents regarding the making process pendap that exists in society.

The sample population in this study is the people who live on Jalan Irian, Tanjung Agung Village, Sungai Serut District, Bengkulu City. This location was chosen because most of the area is pendap maker and seller. Samples taken purposively (using purposive sampling technique).

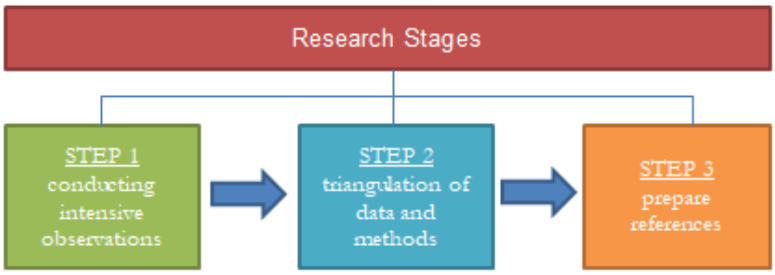

Figure 1. The Steps of level of confidence in the data

The research instrument was in the form of an interview guide to see the community's knowledge of the production of pendap and an observation sheet to determine the community's understanding. Before the interview was given, first the interview guide and the sheet were tested to determine the level of validity, and reliability. From the validity and reliability test, it was declared valid and reliable. To ensure the level of confidence in the data, it is carried out in several ways: (1) intensive observation, (2) triangulation of data and methods, (3) preparing the references.

3. Result and Discussion

Based on the results of observations and interviews with salt farmers, information was obtained that the pendap production process was carried out traditionally and passed down from generation to generation

Figure 2. Typical food of pendap

From the figure 2, it can be seen that the process of making pendap begins with making and combining raw materials obtained from nature and then through the manufacturing process so that it can be served on the dining table to be enjoyed. This traditional pattern in making it turns out to contain a lot of scientific concepts that we can use in the learning process as a learning medium. Following are the results of the reconstruction of community knowledge into scientific knowledge that is adapted to the questions that lead to the habits and definitive knowledge of the community.

Table 1. Results of community knowledge reconstruction into scientific knowledge

No	Question	Community science	Scientific science
1	Do you know what is meant by pendap?	Pendap is a traditional food from the Bengkulu region consisting of spices mixed with mackerel and wrapped in taro	Pendap is one of the typical foods in Bengkulu Province which is made from fish, the fish commonly used is mackerel, apart from the fact that the fish meat is dense and not easily crushed. Mackerel is also rich in nutritional value, mackerel contains 103 kilo calories of

No	Question	Community science	Scientific science
		leaves.	energy, 22 grams of protein, non-carbohydrates, 1 gram of fat, 20 milligrams of calcium, 200 grams of phosphorus and 1 milligram of iron. It also contains 30 IU of vitamin A, 0.05 milligrams of vitamin B1, and 0 milligrams of vitamin C. Science concept: elements, compounds, ionic bonds
2	What is the basic/raw material for making pendap?	Pre-deposited sea fish, not too old grated coconut, complete spices (chili, laos, garlic, onion, coriander, ginger, turmeric)	Additives are food additives that are added to food, either during processing, processing, packaging, or storage. The process of making pendap uses natural additives, such as turmeric to give it a yellow color. Shallots, garlic, salt, chili as seasoning. Science concept: Additives, compounds
3	How to make pendap?	1. Grated coconut is ground with the prepared spices 2. The fish that has been deposited is put into the prepared spices. Then wrapped in taro leaves	Coconut (Cocos nucifera) flesh contains 77 calories, 1.4 grams of protein, 3.6 grams of fat, 10 grams of sugar, 257 grams of potassium, and 6 milligrams of vitamin C. The texture of coconut that is not too old is softer than old coconut which has a coarser texture because it contains more fiber. Mature coconut contains 30% more vegetable oil than young coconut Science concept: Protein, Vitamin, Lemak, Kalium
4	What are the stages that occur in the process of forming a pendap?	Fish that have been cleaned are given salt to absorb and finely ground turmeric is precipitated and left (rotted) naturally (does not enter the freezer) ± 12 hours	Fermentation of marine fish by adding salt has been known for a long time by the public to make marine fish more durable. Salt has hygroscopic properties that can absorb water so that in the absence of water microorganisms in food cannot grow. Sea fish fermentation is good for facilitating the digestive system. Science concept: Compound, Hygroscopic, Fermentation
5	How long does the process of making pendap food?	Making pendap lasts for 8 hours steaming on medium heat	The long steaming process, this aims to keep the cakes from getting stale as well as to remove the oxalate substances contained in the stems of taro leaves. Because, if consumed raw is toxic and can cause itching. In a recipe, when converted to medium heat, it is worth ± 150 C – 170 C Science concept: Temperature, Chemical Compound
6	What causes fresh taro leaves to become very soft and tender	The process of boiling taro leaves using water and salt for 8 hours	Boiling is a food preparation technique in which food is cooked in a hot sauce that is placed below the boiling point of water (lower than 100 degrees Celsius or 212 degrees Fahrenheit) and above the simmering temperature (higher than 71-82 degrees Celsius or 160-180 degrees Fahrenheit). . The process of boiling taro leaves

No	Question	Community science	Scientific science
			for 8 hours at a temperature of 2,000 degrees Celsius, using dihydrogen oxide (H2O) and sodium chloride (NaCl) which aims to remove oxalate substances that cause itching when consumed and make the taro leaves soft and tender. Science concept: Temperature, Chemical Compounds, Temperature, Chemical Elements, Time
7	How is the process of sterilizing tools and materials in making pendap?	To sterilize tools such as pots, the container must be washed first using sunlight. Then for the ingredients, just wash it with water.	Sterilization is the liberation of utensils and food materials from bacteria and microorganisms or washing of utensils and food materials from pests. For sterilization, the tools are washed first using dihydrogen oxide (H2O) and sunlight with a composition of 15% active ingredients (sodium alkyl benzene sulfonate, sodium lauryl ether sulfate) so that they are completely clean and sterile when used. Then for the sterilization of these materials, it is enough to use only dihydrogen oxide (H2O) Science concept: Temperature, Chemical Compounds, Temperature, Chemical Elements, Time
8	Is there a change in color and shape in the process of making pendap?	Yes, the color changes from fresh green to dark brownish green and the shape is from hard to soft	A chemical change is a change in a substance that produces a new substance. This chemical change is permanent, which means that the resulting substance cannot be converted into its original substance. Changes in color and shape on taro leaves occur because when boiling it uses a temperature of 2,000 degrees Celsius, causing a change in color and shape from the beginning of the taro leaf from a fresh light green color to a dark green color and shape, slightly brownish and has a soft texture. Science concept: Natural Dyes, Temperature, Chemical Elements, Time
9	Is there some kind of preservative contained in the pendap?	No preservatives	For settling resistance, do not use preservatives such as citric acid or others, just use natural ingredients such as sodium chloride (NaCl), Curcuma Longa, Allium Sativum, Allium Ascalonium L, Zingiber Officinale, Coriandrum Sativum and others. Science concept: Chemical Elements, Ionic Compounds, Herbs
10	How long can pendap last at normal temperature?	At normal temperature it can last up to 3 days, normally it only lasts 1 day	Temperature regulation is also closely related to the humidity (humadity) of the surrounding air so that it affects the water content on the surface of the food. For pendap resistance, it can last for 3 days at a normal temperature of 27.3 oC and a normal ambient temperature of 20-25 degrees Celsius (68-77 degrees Fahrenheit), in the

No	Question	Community science	Scientific science
			refrigerator which is below 4 degrees Celsius then reheated by steaming at a temperature of 2,000 degrees Celsius. But normally to guarantee the quality of the pendap it only lasts for 1 day. Science concept: Temperature, Ph, heat

From table 1 it can be seen that the process of making opinions can be related to basic competencies in junior high schools based on the revised 2013 curriculum, including:

Table 2. The relationship between the process of making pendap with basic competencies in junior high school

No	Competency standards	Science concepts in the process of making Pendap
1	Explain the concept of mixtures and single substances (elements and compounds), physical and chemical properties, physical and chemical changes in everyday life	The names of the compounds contained in the process of making pendap from raw materials to finished materials.
2	Analyzing the concepts of temperature, expansion, heat, heat transfer and their application in everyday life, including the mechanism for maintaining a stable body temperature in humans, and animals.	The process of evaporation because it is a radiation heat transfer in the process of making pendap until it is cooked.

Based on the table above, it can be seen that the process of making pendap can be studied with various science concepts (both physics, chemistry, or biology), namely on the material of temperature, heat, compounds, elements, and content in each plant. Each element in the process of making pendap obtained different knowledge. The process of making this pendap can be used as an integrated science learning media based on ethnoscience so that students can learn science that is linked to the local culture. Learning media greatly affects the science learning process. Science learning media can increase student interest in learning and learning activities (Dwiqi et al., 2020). Learning media that directly displays concrete events or everyday life that are able to explain science concepts so that students can understand them easily. The existence of learning media that supports science learning can increase student interest in learning (Vikagustanti et al., 2014). In addition, according to Chairunnisa and Rahman (2017), science learning media can increase science learning activities so as to liven up the atmosphere in the classroom and make students active.

The application of this kind of culture-based learning has the potential to develop learning methods into active, student-centered learning (Julita & Anggoro, 2019; Karnia et al., 2013; Hidayatulloh et al., 2013). Ethnoscience is able to encourage students to better recognize their respective cultures. Learning with a cultural approach is based on the recognition of culture as a fundamental (fundamental and important) part of education as an expression and communication of an idea and the development of knowledge (Agyeman & Erickson, 2012).

In research conducted by Damayanti et al. (2017) in learning using learning tools with an ethnoscience approach, students are actively involved in learning so that they have a better understanding than students who study conventionally. Students who are active in learning activities will have better understanding and learning outcomes than students who only listen to the teacher's explanations and are passive during the learning activities. Learning by connecting

in everyday life based on culture can explore student activity and creativity (Harris & De Bruin, 2018).

4. Conclusion

Based on the results of the study, it was found that the pendap production process which is knowledge acquired from generation to generation can be analyzed from scientific concepts so that it can be a source of learning for students. Teachers are expected to be able to correlate public knowledge with science concepts in schools so that learning is expected to be more meaningful. Suggestions for further research is to explore the traditions and culture that exist in the Lembak tribe so that they can be constructed into scientific knowledge to become a source of learning for students.

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