Ethnoscience knowledge of indigenous community in Sigi District-Central Sulawesi

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Abstract. This study aimed to find out how the understanding of indigenous community in Sigi district (Ongulero and Wiapore villages) that related to ethnoscience knowledge and its application in the daily lives. This study was a descriptive qualitative study using interview and documentation methods. Based on the results of the research, it was obtained that the indigenous community in Sigi district has the scientific knowledge that related to food and the processing, agriculture, and treatment for some diseases (medicines).

1. Introduction
Indonesia is the largest archipelago country in the world that characterized by the existence of 17,504 islands, including 9,634 unnamed islands and 6,000 uninhabited islands. Indonesia is also the country with the most ethnic groups in the world, which is more than 740 ethnic groups. In addition, Indonesia is also known as the country that has many most regional languages. It is more than 583 languages and dialects from 67 main languages used by various ethnic groups [1].

Central Sulawesi is one of the provinces on the island of Sulawesi which has many tribes as well as other regions in Indonesia. The main factor that causes ethnic diversity is geographical of the region. In addition, in this area, there are still remote indigenous communities (isolated tribes). Based on data from Statistic Indonesia, there are 33 remote indigenous communities scattered in the Central Sulawesi region that have not yet been empowered. Included are the tolare/da’a, rai, and ledo tribes. These tribes are a group of people who have similar cultures, customs, and places of residence in certain areas [2].

The behavior patterns of remote indigenous communities as a community group strongly follow the customs inherited from generation to generation by their ancestors [3]. Although the lifestyle adopted is still pure and is considered 'outdated', there are several examples that contain scientific content. One example is on managing agriculture land wisely which is not planting continuously in the same area of the land. This is intended to restore the fertility period of the land. Another example is in curing fever, diarrhea, and cough, they use plants that live around them to be used as medicines.

In connection with the matters mentioned above, it is necessary to find out the patterns of life behavior related to ethnoscience among remote indigenous communities. If the results of this study can be obtained, it is easy for educator experts to manage the mapping and inventory data into an approach to learning by promoting local wisdom. For the government, this data is useful for empowering remote indigenous communities, so that development programs can be felt throughout the Central Sulawesi region in particular and the Indonesian region in general.
2. Methods
This study was a descriptive qualitative research with ethnographic methods. The purpose of using descriptive qualitative studies is to describe or obtain information from research data as a whole, broad and in-depth [4]. The location of this study was in Ongulero and Wiapore villages, Sigi district, Central Sulawesi. The instruments used were 1) interview guidelines and its lists and 2) documentation. Data collection and data analysis techniques can be seen in Figure 1 and 2.

![Figure 1. Data Collection Techniques [5]](image1)

![Figure 2. Data analysis techniques [5]](image2)

3. Result and Discussion

3.1. Food and the processing
Food is a source of energy for humans that consumed every day. Food provides basic nutrition or nutrition in order to maintain life according to the climate and environment. However, staple foods do not provide all the nutrients or nutrients needed by the human body. To meet the overall nutritional needs of the human body, we need other complementary foods in order to live healthily and prevent malnutrition [6].

Based on the research results of indigenous community in Ongulero and Wiapore villages, staple foods which are often used are corn, cassava, and taro. These types of food contain very high carbohydrates so that it is good if consumed. Carbohydrates are organic compounds consisting of elements of carbon, hydrogen, and oxygen with a ratio of 1 C atom, 2 H atoms, and 1 O atom and the general formula of carbohydrates is Cn(H₂O)m. Carbohydrate functions are as an energy source, carbohydrates also function is as food reserves, giving sweet taste to food, helping excretion by
regulating intestinal peristalsis, protein saver because if food carbohydrates are fulfilled, the protein will mainly be used as a building material. Carbohydrates also function as a regulator of fat metabolism because carbohydrates are able to prevent incomplete fat oxidation.

Utilization of cassava as a substitute for rice (carbohydrates) is very appropriate, considering the content of cassava contains a lot of carbohydrates. According to [7] in 100 g of cassava peel the other nutrient content is protein 8.11 g; crude fiber 15.20 g; pectin 0.22 g; fat 1.29 g; 0.63 g calcium while the chemical and nutritional components of cassava meat in 100 g are protein 1 g; calories 154 g; carbohydrates 36.8 g; 0.1 g fat. Carbohydrates in cassava are carbohydrates in the oligosaccharide group. Oligosaccharides are carbohydrates that contain two to ten simple sugar molecules, which are combined with glucoside bonds. Oligosaccharides are often associated with the emergence of flatulence or bloating of the stomach because the fermented oligosaccharides by micro intestinal flora will produce CO₂, H₂, and CH₃ so that if consumed in excess it will cause fluctuations. To avoid this, people in Ongulero and Wiapore use water to soak the cassava more than one hour. This process can reduce raffinose level.

Taro can be a cheap source of carbohydrates instead of rice which is rich in nutrients and low in GI, which is 54. The biggest content in taro is carbohydrates and protein. The carbohydrate component in taro is starch which has a content of 77.9% and has easy to digest properties. While the protein content of taro is higher than cassava and sweet potatoes. The fiber content in taro is also high reaching 5.3 grams or 20.5% fulfilling fiber needs a day. In 100 grams of taro contains 142 kcal of calories, 1.9 grams of protein, 0.75 grams of fat, 28 milligrams of calcium, 61 milligrams of phosphorus, 1 milligram of iron, 20 IU of vitamin A, 0.13 milligrams of vitamin B1 and 2 milligrams of vitamin C. Taro consumption can prevent the risk of heart problems and high blood pressure [8]. The process of taro before being cooked or consumed, it is usually soaked for 1 night, so that the sap can be lost.

The popularity of corn as a food source is almost the same as potatoes. Similar to potatoes, as a source of carbohydrates, corn has not been fully chosen as a substitute for rice. Corn is mostly consumed as a snack in the form of various types of food. The sweet taste of corn comes from fructose, a type of fruit sugar that is safe for consumption by diabetics though. Fructose is a complex sugar that is not directly digested but must be processed first into simple sugar. Before fructose is digested, it is usually wasted with urine, so it is not absorbed by the body. Corn color pigments also have benefits for eye health and lung protection. GI levels of corn alone are low between 55-60. Besides being rich in calories, corn is also rich in antioxidants and a source of B vitamins, fiber, and minerals. In 100 grams of corn contains 255 kcal calories, 9.2 grams of protein, 3.9 grams of fat, 73.7 grams of carbohydrates, 10 milligrams of calcium, 256 milligrams of phosphorus, 2.4 milligrams of iron, 12 grams of water, vitamin B1 0.39 grams, Vitamin A 510 SI [9].

3.2. Agriculture

Agriculture is the activity of utilizing biological resources carried out by humans to produce food, raw materials for industrial or energy sources, and to manage the environment. The activity of utilizing biological resources included in agriculture is commonly understood by people as crop cultivation and raising animals. Ongulero and Wiapore village are areas whose livelihood is farming and raising livestock, this is in accordance with the conditions of the land at an altitude of ± 1350 masl. The types of plants cultivated in this area are coffee, kidney beans, corn, and chocolate while for livestock namely chicken, cow, and pig.

The results of the investigation in Ongulero and Wiapore Village, the cultivation process starts with seed selection, land selection, planting of seeds, maintenance, post-harvest, and traditional storage (Figure 1). The selection of seeds is the first step taken to obtain superior seeds by immersing the seeds and taking the seeds below (drowning seeds) and then drying by using sunlight for several hours. Land selection is an activity to find land that is good for planting, the process of selecting land as well as land clearing is by burning grass and not using the process of spraying pesticides. According to one of the informants, burning was carried out not only for cleaning but also for fertilizing the soil, but scientifically burning activities would not fertilize the soil but make nutrients disappear easily through water and air flow [10].
Treatment of plants carried out by farmers in Ongulero and Wiapore villages do not use pesticides but uses a salt solution used to remove insects and pests. Although scientifically there is no accurate proof that salt can eliminate insects and pests in plants. For the provision of fertilizers, namely using organic fertilizer that acts from a mixture of livestock manure and hay, according to [11] organic fertilizer is a soil enhancer material that is better than artificial enhancers, although in general organic fertilizers have N nutrient content, P and K are low but contain sufficient amounts of micronutrients which are very necessary for plant growth. The chemical compounds in pig manure are Nitrogen (N) 3.75%, P$_2$O$_5$ 3.13%, and K$_2$O 2.50%, the content of these compounds is higher compared to a cow, goat, and horse manure [12].

Postharvest is an activity that carried out after harvesting until it reaches consumers. Farmer always harvests red beans every 3 months, the process after harvest is drying using sunlight and then doing the drossing process, namely the separation of seeds and skin, besides red beans there are also coffee, chocolate, and corn which after harvesting are then dried and then processed again or saved to fulfill their own needs.

![Figure 3. Activities of farmers](image)

### 3.3. Medicines

The number of species of medicinal plants is abundant in Indonesia, so the use of traditional medicine by the community has been carried out from generation to generation until now. This habit has become the cultural heritage of Indonesia, including people in the villages of Ongulero and Wiapore. Traditional medicine is often used because of several supporting factors. Firstly, the experience previously obtained by parents who have been used for generations. It is easy to use or more practical because the materials used can be directly found from the nature around the house. The other factor, traditional medicine does not incur costs and perceived benefits. The using of plants as medicine by the community of Ongulero and Wiapore villages are cocor bebek (as medicine for fever, pain relief, and wound medicine), miana leaves (as cough medicine), and ginger (cold medicine).

Cocor bebek (Kalanchoe pinnata L.) is one of the medicinal plants that has long been used as traditional medicine, besides being used to treat fever, empirically cocor bebek (Figure 4) is widely used
to treat ulcers, phlegm laxatives, tonsillitis, burns and more other. The chemical content of cocor bebek is lemon acid, apple acid, vitamin C, quercetin-3-diarabinaside, kaempfenol-3-glucoside, and tannin. These chemical compounds are efficacious as an anti-inflammatory, stop bleeding, reduce swelling and fever [13].

![Figure 4. Cocor bebek (Kalanchoe pinnata L)](image)

The phytochemical substances contained in miana (Coleus scutellarioides) are volatile oil, tannins, flavonoids, eugenol, steroids, tannins, saponins, phytol, rosmarinic acid, streptozocin, and quercetin. Miana plants (Figure 5) are interpreted to play a role in curing diseases due to the pharmacological activity of the phytochemical content. Various pharmacological activities found in Miana include antimicrobial, antihemintic, antifungal, anti-inflammatory, antibacterial, antioxidant, antidiabetic, anti-inflammatory, and antihistamine. Regarding the correlation between phytochemical content and the pharmacological effect of miana on a disease that is believed to be curable, it is miana's ability to cure cough that is believed by the people of Ongulero and Wiapore Village. Coughing is a mechanism for the body to respond to viral and bacterial infections in the respiratory tract. The occurrence of coughing to remove from the body of viruses, bacteria, and body cells damaged by the infection of these microorganisms. The results of these interviews are scientific evidence of the traditional knowledge that miana leaf extract can be used to treat cough [14].

![Figure 5. Miana (Coleus scutellarioides)](image)

Ginger (zingiber officinale) contains many anti-inflammatory and antioxidant compounds, such as gingerol, beta-carotene, capsaicin, caffeic acid, curcumin, and salicylate. The antioxidants in ginger can help fight free radicals in the body. In addition, ginger also has the effect of warming the body and can help stimulate blood flow throughout the body, so it can alleviate circulatory problems. The warmth given by ginger can reduce the feeling of bloating or wind in the digestive tract so that the community in Ongulero and Wiapore village uses ginger for cold medicines.
4. Conclusion
Based on the results of research and data analysis, some understanding of science knowledge in the daily lives of the indigenous community in Sigi can be categorized firstly in food and the processing, medicines, and agriculture.

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