MERDEKA BELAJAR
BERBASIS KEARIFAN LOKAL

Abd.Halik,Tadzkirah, Tri Ayu Lestari Natsir, Novita Ashari, Tien Asmara Palintan, Alrabiatul Putri, Fitriani Mustamin, Rustan Efendy, Moh. Zulkarnaen, Nasruddin, Hasmiah Herawaty, Jumaisa, Ahdar, Fuad Guntara, Satriani, Wahyu Hidayat, Nanning, Humaeroah, Kalsum, Nanning Nur Asizah, Muh Yusuf, Munawir, Mujahidah

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PENGANTAR PENULIS

بِسۡمِ ٱللَّهِ ٱلرَّحۡمَٰنِ ٱلرَّحِيمِ

Alhamdulillah, segala puji bagi Allah swt. atas segala rahmat, hidayah dan inayah-Nya sehingga buku yang berjudul Merdeka Belajar Berbasis Kearifan Lokal ini dapat diterbitkan. Salawat dan salam semoga senantiasa tercurahkan kepada Nabi Muhammad saw. yang telah mengerahkan segenap daya dan upayanya dalam merintis umat-Nya ke jalan kebenaran.

Buku ini disusun untuk memenuhi kebutuhan referensi pengembangan Merdeka Belajar Berbasis Kearifan Lokal tingkatdosen maupun mahasiswa pada khususnya dan seluruh aktivitas akademika pada umumnya. Buku chapter ini penting diterbitkan karena sebagaireferensi update atau rujukan utama untuk mengaplikasikan model pengembangan Merdeka Belajar: Kampus Merdeka yang Berbasis Kearifan Lokal agar dapat diimplementasikan di dunia Pendidikan formal, informal, dan nonformal.

Proses penyusunan dan penerbitan buku ini telah melibatkan banyak pihak. Oleh karena itu, dalam kata pengantar ini, kami hanya dapat menyampaikan penghargaan yang setinggi-tingginya dan ucapan terima kasih yang sedalam-dalamnya kami ucapkan kepada:

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Penyusunan dan penerbitan buku ini diharapkan mampu menambah koleksi referensi baru dan menghadirkan kajian-kajian baru yang mengikuti perkembangan baru. Dengan tidak melebarkan uraian kalimat dalam kata pengantar ini, maka sekali lagi diucapkan terima kasih kepada semuanya baik yang disebutkan secara langsung maupun tidak langsung karena berkat jasa-jasa mereka, buku ini dapat diselesaikan dengan baik. Tidak ada yang dapat dilakukan untuk membalas budi baik mereka selain hanya mendoakan semoga Allah swt. senantiasa melimpahkan ridha, rahmat dan inayah-Nya kepada kita semua, Amin....

Parepare, 23 September 2021

Penyusun.

DAFTAR ISI

Paud Holistika Berbasis Merdeka Belajar

Internalisasi *Pangngadereng* Berbasis Merdeka Belajar

Education in independent learning and local wisdom

OVERVIEW OF ETHNOSCIENCE: INTERNALIZATION OF BUGIS LOCAL WISDOM IN SAINS MATERIALS

Wahyu Hidayat

Summary

The goal of national education is to produce quality Indonesian people with education rooted in the nation's cultural diversity to build a better nation's life. Therefore, the education process in schools can't be separated from the roots of local culture. One of the efforts that can be done is to insert or integrate local Bugis cultural values in the learning process, including in science learning in junior high schools (Sekolah Menengah Pertama - SMP). Some materials that can be inserted in science learning related to local cultural values include the process of making Pisang Hijau (colloidal material), Burasa (material change),Tuak Cenning (mixed separation process) and Bilah Badik (Change of Form).

INTRODUCTION

The rapid progress of science and technological sophistication has accompanied the global community. This requires the community to represent basic skills that can be used to socialize in society. It takes a competitive generation in science and technology that refers to scientific literacy skills.

In the 21st century, scientific literacy is the focus of science education or natural science (Safitri et al., 2015), because the level of development of a nation is determined by the awareness of human resources towards science and technology (Genç, 2015; Jurecki & Wander, 2012).

Scientific literacy is related to scientific knowledge with technology, society and the environment (Yuenyong & Narjaikaew, 2009). Scientific literacy is inseparable from society, one of which is local community wisdom.

Based on the Regulation of the Minister of Education and Culture (Permendikbud) of the Republic of Indonesia Number 69 of 2013, one of the objectives of implementing the 2013 curriculum is to produce quality Indonesian people with education rooted in the nation's cultural diversity to build the nation's life. Therefore, it is necessary to make efforts to connect the learning of Sciences subject (*Ilmu Pengetahuan Alam – IPA*) with local cultural wisdom as national identity, this is what is then called "ethnoscience". Learning science with a cultural approach is a necessity as an effort to preserve and remind students of their national identity (Sudarmin & Pujiastuti, 2015).

In the Regulation of the Minister of Education and Culture Number 20 of 2016 concerning Competency Standards for Elementary and Secondary Education Graduates, gradations for the dimensions of attitudes, knowledge, and skills between education levels need to pay attention to the psychological development of children, scope and depth, continuity, function of the education unit and the environment. This shows that every graduate student needs to consider environmental aspects. Therefore, each person in charge in the learning process needs to

consider environmental aspects including the wisdom of local values around the environment where students live.

Lately, there is a spirit of exploring local cultural resources as an integral part of the learning process. This is what gave birth to the idea of ethnopedagogy. This idea pays special attention to local wisdom as an initial model (Alwasilah et al., 2009; Alwasilah et al., 2009). Ethno refers to group members in a cultural environment identified by cultural traditions, codes, symbols, and myths to consider and infer concepts (Rosa & Orey, 2011).

Knowledge possessed by a nation, ethnic group or social group is a form of local wisdom (Aikenhead, 2002). Ethnoscience is a system of knowledge and cognition that is unique to a particular culture. The nature of science from the perspective of anthropology gives birth to the essence of ethnoscience, namely the knowledge system (Alexander, 2000; Singh, 2016; Sudarmin & Pujiastuti, 2015). The knowledge system includes classifications through local languages or local terms, rules of moral values based on local cultural categories, depictions of indigenous knowledge systems found in the culture of citizens or community groups (Sudarmin, 2015).

In practice, ethnopedagogy can be applied to all subjects, including science subjects. Linking various cultural practices that describe the practice of science (science) of cultural groups that are scientifically related and identifiable

as the study of scientific ideas that can be found in any culture is referred to as ethnoscience (Singh, 2016).

Ethnoscience is actually in line with the concept of "*Merdeka Belajar*" which gives independence and flexibility to educational institutions, especially for teachers to explore the intelligence and abilities of students according to the potential, interests and tendencies of each student in a democratic, flexible and fun manner (Mustagfiroh, 2020). With ethnoscience learning, teachers and students can exchange ideas about science concepts in science learning. Ethnoscience also gives teachers freedom or independence to be creative in the learning process (Sumarni, 2018).

Ethnoscience learning brings students closer to the surrounding environment (*contextual*) and can understand local wisdom so that an attitude of respect and love for local culture grows. Science learning will be more interesting if it is relevant to students' knowledge and experience (Aikenhead, 2002). Therefore, science learning is contextual and meaningful. Ethnoscience learning indirectly can act as a reinforcement of national character and identity, because by learning ethnoscience, students will appreciate diversity. A sense of nationalism can also be embedded in students from the ethnoscience learning process, namely loving local products and loving the four-footed earth (Nadlir, 2014), because students are starting to forget the culture and local wisdom that exists in their area.

The connection between the practice of local wisdom and science is actually a hereditary tradition, the Ivatan people in the Philippines who recognize the position of the north and south winds based on the sign of the south direction called "Sasadengan" or more popularly with "Masen" (*scorpio star*) and star *mina mahabteng*" indicates north (Balay-As et al., 2018). Likewise, the Kankanaey community of the Philippines has knowledge in detecting and anticipating typhoon disasters. In Indonesian society, the determination of the direction of the wind is determined by the color of the clouds in the sky, the sign of the Jagong indicates the west and the northwest, the group of the Big Dipper indicates the north direction, the stingray star indicates the south direction, the *star Orion* as the west direction, and the seven star indicates the east direction and the three stars indicate the southeast direction (Setiawan et al., 2017).

In local culture in Indonesia, some local wisdoms such as making brown sugar, making shrimp paste, and making table salt are processes related to science (Hadi & Ahied, 2017; Sumarni et al., 2016; Wiwin Puspita Hadi et al., 2019). Likewise, in the context of Bugis culture, there are several local wisdoms that can be included in science subjects, including the process of making *Pisang Hijau*, *Burasa*, *Tuak Manis Cenning* and *Bilah Badik*.

Learning science concepts can be done by reviewing concepts by showing their application to phenomena in everyday life, especially community activities that have been carried out for a long time and even become a source of income. Learning both models and tools must include the potential of culture that becomes the daily life of the community, one of which is the PBL (Project based Learning) learning model based on local wisdom.

Internalization Of Bugis Local Wisdom And Junior High School Materials In Science Courses

The process of internalizing chemistry material in science learning with local Bugis cultural wisdom can be carried out thoroughly by combining concepts of junior high school chemistry that are relevant to the potential of local wisdom in the Bugis community. Even the natural environment can also be used as a learning resource by linking indigenous knowledge of local communities with science.

The learning system carried out must comprehensively combine the concepts and potential of local wisdom that exists in the community. The natural environment can also be used as a learning resource by linking the community's original knowledge with science. Ethnoscience-based learning requires students to conduct direct investigations of a culture, including observations, interviews, and even literature analysis regarding the

indigenous culture of the surrounding community (Indrawati & Qosyim, 2017; Sriyati et al., 2021)

The following are some local wisdom of Bugis culture that can be inserted or internalized into the material or concept of science learning in junior high school.

1. Pisang Hijau

In the process of making *pisang hijau* (green bananas), there are several related chemicals, including the manufacture of marrow in *pisang hijau* involving coconut milk as examples of colloids, sugar, salt, rice flour and water as examples of compounds. Then the mixture in the manufacture of marrow is a physical event. In the process of making *pisang hijau*, a science teachers can explain the relationship between marrow in *pisang hijau* as a colloidal solution.

Mixtures are divided into two types, namely homogeneous mixtures (true solutions) and heterogeneous mixtures (suspensions). Between these two states, there is one type of mixture that resembles a true solution, but has different properties so that it cannot be classified as a true solution or suspension (Sunarya & Setiabudi, 2009). Such solutions are called colloids

In the process of making *pisang hijau* marrow, a mixture of rice flour, sago flour, coconut milk, sugar, paste will form a suspension. If a mixture of marrow is mixed with cold water, it does not form a solution but a suspension

because the mixture of ingredients to make marrow is not soluble in cold water. However, when heated, the mixture will form a very viscous solution. There are several similarities and differences between the *pisang hijau* marrow mixture and the true solution. The equation is to form a single phase and cannot be separated. The difference is that the green banana marrow mixture is not transparent to light and the solute particle size is relatively larger, and many other properties.

Based on the particle size, colloidal systems are in between a coarse suspension and a true solution. The colloidal particle size is smaller than the coarse suspension so that it does not form separate phases, but it is not small enough when compared to the true solution.

Table 1. Differences in True Solutions, Colloidal Systems and Suspensions

Variable	True Solution	Colloidal System	Coarse Suspension
Particle size(cm)	10–8 – 10–7	10–6 – 10–4	10–3 – 10–1
Mixed phase	single phase	single phase	polyphasic
Penetration by light	Transparent	Transparent	-
Filtering	Inseparable	Inseparable	Inseparable
Solution stability	Very stable	Diverse	Unstable

Source: Chemistry with Inorganic Qualitative Analysis(Vogel & Svehla, 1996)

2. Burasa

Burasa is actually similar to lontong because the basic ingredient is rice wrapped in banana leaves. In the process of making *Burasa*, a science teacher can relate it to the concept

of changing material/substances, namely chemical changes. In the process of making *Burasa*, there is a change of rice into solid rice. This process of change includes chemical changes due to the formation of new substances. *Burasa* in the form of solid rice cannot be turned back into rice. However, in the process of making Burasa, physical reactions are more visible than chemical reactions. Some of the physical reactions that occur during the process of making *Burasa* include:

a. Absorption reaction: Rice grains absorb water through their pores
b. Gelatinization reaction, in which starch molecules absorb or trap water in the matrix
c. Thermal reaction (heat), which causes molecules to break apart

Chemical changes that occur in the process of making *Burasa* are due to the accompanying chemical reactions to produce new substances.

a. Starch Hydrolysis Reaction

The hydrolysis reaction is a reaction "splitting" sugar molecules from one another in the presence of water molecules. Not that the starch will completely turn into sugar as well, but the shape of the starch molecule will just shorten. That's also why, cooked rice will taste sweet when compared to when we taste rice flour. But again: starch is not 100% turned into sugar! The structure just shortens it.

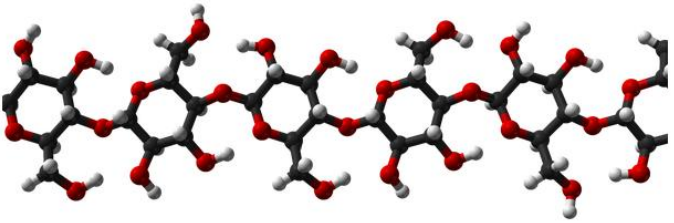

Figure 1. Starch Molecular Structure

The hydrolysis reaction is a reaction "splitting" sugar molecules from one another in the presence of water molecules. Not that the starch will completely turn into sugar as well, but the shape of the starch molecule will just shorten. That's also why, cooked rice will taste sweet when compared to when we taste rice flour. But again: starch is not 100% turned into sugar! The structure just shortens it.

Hydrolysis occurs as the final process of the physical gelatinization reaction. When enough water molecules are trapped, the water molecules will break the chains (bonds) that connect the sugar molecules:

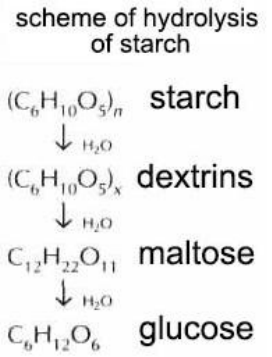

Figure 2. starch hydrolysis scheme

b. Protein and Fat Hydrolysis Reaction

Water molecules can not only break down starch into smaller pieces, but also break down proteins and fats. However, the protein and fat content in rice is not as large as the carbohydrate content. Protein will be hydrolyzed into smaller pieces, as well as fat will break up into fatty acids. These components contribute to the taste and aroma of *Burasa*.

C. Aroma Compound Formation Reaction

One of the formation of aroma compounds in Burasa is 2-Acetyl-1-pyrroline. This is the compound that causes the most fragrance.

3. Tuak Manis Cenning (Chemical Change/fermentation)

Tuak is a type of traditional drink found in several regions in Indonesia. One of them is in South Sulawesi, Tuak is widely available in Tana Toraja, Jeneponto and Takalar Regencies. Tuak is a fermented drink made from sap, rice and fruit drinks that contain sugar. Other names are *kawung*, *taren*; *akol*, *akel*, *akere*, *inru, indu* (languages in Sulawesi), *moka, moke, tuwa,* tuwak (in Nusa Tenggara) and others. This drink has a low alcohol content, even lower than beer or wine though.

One of the palm products is sap. The trick is to tap the stalk and then it is accommodated in a kind of bamboo which is usually taken in the morning or evening. It is this sap that produces various types of products. For example,

palm sugar and palm wine. Nira from palm sugar contains between 10-15 percent. This liquid can be processed into fresh drinks, fermented into palm wine, made into palm syrup or further processed into palm sugar, palm sugar, and so on.

In the process of making *Tuak*, science teachers can explain the concept of compounds contained in sweet wine. In Tuak Manis, the science teacher can explain concepts/materials about sucrose/sugar compounds which are included in the carbohydrate group with the formula C12H22O11. Then the teacher explores that the teacher's compound consists of the elements Carbon (C), Hydrogen (H) and Oxygen (O).

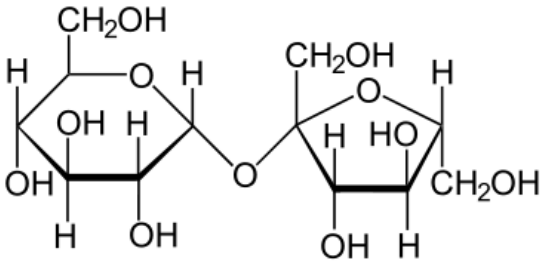

Figure 3. Structure of Sucrose

In *Tuak Manis Cenning*, science teachers can explain the concept of separating mixtures in making sugar. The process in the manufacture of sugar consists of the stage of squeezing (extraction) then purification by distillation (distillation) and the last step is crystallization.

4. Bilah Badik

One of the cultures that has become the motto of the Bugis Makassar community is the value of *'Siri' na Pacce*. *Siri'* lexically can be interpreted as shame. While Pacce lexically has a painful or painful meaning, namely in the form of social care for others. *Siri* as an abstract cultural value system is very difficult to define, because it can only be felt perfectly by adherents of that culture (Wahid, 2010). *Siri* will appear if one of the cultural values of the Bugis Makassar community is violated. For the Makassar Bugis, there is no higher purpose in life than to maintain their siri (Wahid, 2010). *Siri* in the Makassar Bugis tradition is highly guarded and upheld by the community, especially men, and often fights occur in the community because they feel they are '*nipakasiri'* or humiliated. These fights do not only rely on muscle strength, but often they use sharp weapons in the fight. The traditional weapon that is often used is the badik. Badik symbolizes self-respect and courage as a man. On the other hand, badik is sometimes still considered as something sacred in the Bugis Makassar tradition, for example, it is used during the "*angngaru*" ritual. *Badik* as one of the traditional Bugis weapons which has become a cultural heritage which until now still survives has artistic value and high economic value.

Bilah Badik (Mata bassi) is made through the process of smelting and smelting iron. Therefore, science teachers

can explain the concept of changes in elements and forms of matter.

CONCLUSION

Some local wisdom of Bugis culture can be internalized in the science learning process, including *Pisang Hijau* in the concept of solutions and colloids, *Burasa* in the concept of changing the state of matter (physical and chemical changes), *Tuak Manis Cenning* in the concept of elements, compounds, and mixture separation, and the concept of change of form and substances in the process of making Bilah Badik. A science teacher needs to understand the linkage of local wisdom with the concepts of the science material being taught. Science learning is in line with the "*Merdeka Belajar*" program because it gives teachers the flexibility to explore the intelligence and abilities of students according to the potential, interests and tendencies of each student in a democratic, flexible and fun way.

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