Edukimia
e-ISSN: 2502-6399
http://edukimia.ppj.unp.ac.id/ojs/index.php/edukimia/

RESEARCH ARTICLE

Eksplorasi: Pemanfaatan Potensi Kearifan Lokal Sasak Tape Ketan (Poteng) Pada Materi Alkohol Eter Sebagai Sumber Belajar

Exploration: Utilization of the Potential of Local Wisdom of Sasak Tape Ketan (Poteng) on Alcohol Ether as a Learning Source

R Jannah[1*], S Wardani[1], and M Alauhdin[1]

[1] Magister Pendidikan Kimia, Pascasarjana, Universitas Negeri Semarang, Semarang, Indonesia. 50237.

* raudatuljh713@students.unnes.ac.id

ARTICLE INFO

Received on:
25 January 2023

Revised till:
31 January 2023

Accepted on:
24 February 2023

Publisher version published on:
23 May 2023

ABSTRACT

The purpose of this study was to analyze the form of the relevance of local Sasak wisdom to chemistry and explore the potential of Sasak local wisdom as a learning resource in chemistry subjects. This type of research is ethnographic research. Data collection techniques used are observation techniques, interviews, and documentation. The validity of the interview sheet is obtained from the validator, while the validity of the observation sheet is obtained from calculations using SPSS. The data obtained were analyzed using qualitative analysis techniques which are a combination of the Miles & Huberman and Spradley models. Based on the results of the research, it can be concluded that the form of the relevance of Sasak local wisdom to chemistry can be reviewed based on the perspective or approach of analogy, representation, apperception, visualization, and interpretation and the potential for local wisdom of Sasak Lombok as a learning resource in chemistry subjects with discussions including material and its changes, separation, and manufacture of an integrated mixture of local Sasak wisdom.

KEYWORDS

Chemical Literacy, Ethnochemistry, Sasak Local Wisdom

ABSTRAK

Tujuan penelitian ini adalah untuk menganalisis bentuk relevansi kearifan lokal Sasak dengan materi kimia dan menggali potensi kearifan lokal Sasak sebagai sumber belajar pada mata pelajaran kimia. Jenis penelitian ini merupakan penelitian etnografi. Teknik pengumpulan data yang digunakan adalah teknik observasi, wawancara, dan dokumentasi. Validitas lembar wawancara diperoleh dari validator, sedangkan validitas lembar observasi diperoleh dari perhitungan menggunakan spss. Data yang diperoleh dianalisis menggunakan teknik analisis kualitatif yang merupakan gabungan model Miles & Huberman dan Spradley. Berdasasrkan hasil penelitian diperoleh kesimpulan antara lain bentuk relevansi kearifan lokal Sasak dengan materi kimia dapat ditinjau berdasarkan perspektif atau pendekatan analogi, representasi, apersepsi, visualisasi dan interpretasi dan potensi kearifan lokal Sasak lombok sebagai sumber belajar pada mata pelajaran kimia dengan bahasan antara lain materi dan perubahannya, pemisahan dan pembuatan campuran terintegrasi kearifan lokal Sasak.

KATA KUNCI

Etnokimia, Kearifan Lokal Sasak, Literasi Kimia

1. INTRODUCTION

Ethnochemistry is a variety of cultural practices that exist in society and have a chemical relationship that describes the chemical practices of cultural groups that can be identified as the study of chemical ideas that can be found in any culture. In other words, ethno refers to members of a community group in any cultural environment that can be identified through certain cultural traditions, codes, symbols, myths, and ways used to consider and conclude [1]; [2]; [3].

Various previous studies that applied ethnochemistry in learning through the use of cultural products showed positive results such as the results of research conducted by using cultural products as a source of learning had an impact on improving learning outcomes, affecting chemical literacy, and human rights[1], [3], [4]. However, based on the results of the research show that cultural integration in chemistry learning and practicum is still very rarely done[5].

Other chemistry learning problems are also strengthened by the existence of the globalization era which greatly affects the personality of students and is marked by the eroding of local cultural values and local wisdom which is a sign of a threat to the fading of Indonesian national identity. In addition, the impact of the globalization era has also led to the emergence of behavioral deviations, as well as a very lack of cultural-based learning guides[6], [7]. Therefore, it is very urgent to apply ethnochemistry in learning through the use of cultural products and the surrounding environment as learning resources and natural laboratories. However, the current factual conditions show that the integration of ethnochemistry with the curriculum, learning tools, and the preparation of teaching materials is still very rarely done[8]. As well as the results of the study show the trend of research in the field of chemistry from 2004-2013 which raised local culture to be a study of only 1.7%[9]. What's more, the factual problem that occurs is the availability of chemistry teaching materials that are integrated with local wisdom in chemistry lessons has never been done.

The advantages of ethnochemistry-based chemistry teaching materials can make it easier for students to understand chemical concepts because they are directly related to students' daily experiences which are the implementation of constructivism learning theory[8];[9]. The essence of Constructivism learning theory is that the knowledge acquired by students is the result of construction that has been carried out through active involvement, both physically and mentally to acquire new knowledge. This knowledge is obtained through sensory experience, both seeing and hearing, carrying out motor activities, scientific thinking processes, and finally formulating it in the mind as knowledge[10].

Constructivism learning theory has an essence, namely the construction of knowledge and experience obtained is a combination of the results of the construction of old knowledge and experience obtained with new knowledge that is being experienced so that it can develop students' cognitive and psychomotor abilities[8];[11]. Likewise, the relevant research results also prove that the learning process refers to the context of students' lives with cultural heritage (local wisdom values) as a substance in understanding chemical material, a reference in developing aspects of attitudes and skills, as well as a reference in conducting laboratory-based scientific investigations. Nature can improve students' cognitive, affective, and psychomotor learning outcomes. This research is very urgent to be carried out to be a solution to the problem of not having achieved the maximum goals of chemistry learning due to the inadequate chemistry learning resources that are relevant to the context of students' lives[4];[2].

Therefore, through the application of constructivism-based learning (active and innovative learning models) equipped with learning resources that are integrated with local wisdom, it is hoped that it can activate students in constructing new knowledge through scientific thinking processes and involving problem-solving skills to develop literacy. student chemistry. However, the development of chemistry learning resources that are integrated with local wisdom is still very rarely done, moreover the currently available learning resources are still focused on abstract concepts without being integrated with the daily experiences of students so chemistry is still material that is the most difficult for participants to understand. students at every level of education[2],[8].

Referring to the theoretical and empirical studies above, the urgency of this research is to provide one of the best solutions to the problems of learning chemistry through integrating ethno-chemistry in the curriculum so that the learning process is placed based on the life context of students with cultural heritage as a substance for understanding concepts and natural laboratory-based scientific investigations. sourced from the local wisdom values of an area[2], as well as local wisdom owned by the Sasak tribe of Lombok, NTB. The local wisdom values of the Lombok Sasak tribe have relevance to chemistry learning which is reflected in the traditions of the Sasak people which originate from the social system, value system, and local cultural products.

Therefore, through exploring the potential of Sasak local wisdom as a source of learning chemistry and natural laboratories that will be carried out in this study, it is hoped that it will not only able to develop students' chemical literacy which is very relevant to the demands of 21st-century learning. The purpose of this research is to explore the potential of Sasak local wisdom which can be used as a learning resource and natural laboratory in chemistry subjects as a form of integrating ethnochemistry into the school curriculum.

2. METHOD

The approach used in this research is a naturalistic/qualitative approach with ethnographic

research. The use of a naturalistic approach is based on the consideration of sources and types of data to be taken that are holistic or comprehensive. In addition, naturalistic research is based on the overall social and environmental situation studied. The stages of ethnographic research consist of a description stage, an analysis stage, and an interpretation stage.

The description stage is carried out to explore the background of the problem through initial observation activities related to the object of research. The analysis phase is carried out to obtain accurate data based on the formulation of the problem and research objectives to answer research questions.

Data collection techniques used in this research are observation, interview, and documentation techniques. The use of these techniques is based on the type of data taken. In analyzing the data, the researcher used a qualitative data analysis technique combined with the Miles & Huberman, and Spradley models.

The use of this technique is based on its suitability with the type of data to be analyzed, namely data collected by observation, interview, and documentation techniques. Miles and Huberman's data analysis technique includes three stages, namely; data reduction, data presentation, and conclusion or verification. There are four analyzes of ethnographic research data, namely; (1) domain analysis; (2) taxonomic analysis; (3) componential analysis, and (4) cultural theme analysis.

Based on the predetermined analysis model, the stages of data analysis carried out by the researcher are as follows; After the data is collected, the researcher performs data reduction. At this data reduction stage, the researcher selects, simplifies, or sorts the raw data that has been collected or recorded in the observation and interview sheets, as well as removing unnecessary data. The data is reduced, and the researcher then arranges the data into a systematic arrangement and then analyzes it by consulting relevant theories and previous research results. After the process is completed, the researcher concludes the results of the data analysis which also answers the research problem formulation.

3. RESULT AND DISCUSSION

3.1. Results

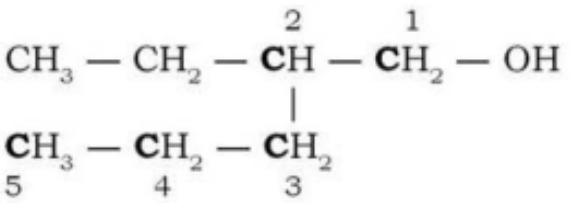
Based on the research findings, proves that Sasak local wisdom which consists of cultural products and local wisdom values contained in Sasak culture has a strong relevance to alcohol-ether material which can be used as a chemistry learning resource. Chemistry concepts can be integrated with local Sasak wisdom to make it easier for students to understand the concept of alcohol by using culture as a learning resource and natural laboratory.

The Sasak culture that has relevance to the alcohol-ether material is making poteng (glutinous tape). Making sticky tape (Poteng) as shown in Figure 1. As for the linkages, namely the existence of similarities in the theories or concepts that underlie them, the meanings, and values contained therein. Local wisdom values that underlie the concept of alcohol-ether are the alcohol content in tape ketan (Poteng). This concept underlies the making of tape ketan (poteng) as a learning resource that will be used by students in learning chemistry Table 1.

Figure 1. Making sticky rice tape (Poteng) for the Sasak tribe of Lombok, NTB

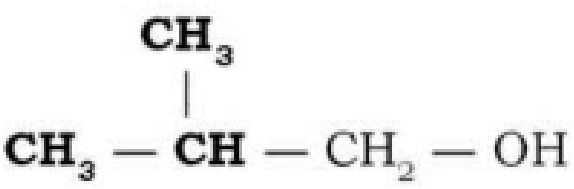
Compounds derived from alkanes that have the functional group OH- on their carbon chains are called alcohols or alkanols. Note that in this compound it is not easy for ionization to release OH– (the OH- group is not hydroxide).

In general, alcohol (alcohol) can be distinguished by the type of carbon atom that binds its -OH group, namely primary, secondary, and tertiary alcohols. The nomenclature of alcohols is the same as for carbon compounds in general, where the lowest number is given to the carbon that binds the OH- group, then in the nomenclature, give the number of the carbon that binds OH- (if not 1) before the ending -ol. For example for the following compounds:



The proper name is 2-ethylpentanol.

a. iso- indicates that there is a methyl branch next to the last carbon atom in the carbon chain, for example:



has the trivial name isobutyl alcohol

Table 1. Reconstruction of Original Science to Scientific Science.

Question focus		**Original Sanis**	**Scientific science**
Selected type of glutinous rice	White rice	(Reket putek)	Latin name: Oryza sativa glutinosa  https://id.wikipedia.org/wiki/Oryza_sativa
		(Warnen ye putik,ruen ye padet, kontek kance agak bolet.) White color, solid shape, short, and tend to be round)	Characteristic features White glutinous rice (Oryza sativa glutinosa) is a rice variety belonging to the Graminae family. Glutinous rice has a milky white color, with a fairly solid appearance and a shape that tends to be round and short. Rice grains consist mostly of starch (about 80-85%) which is contained in the endosperm which is composed of starch granules measuring 3-10 millimicrons.
			Nutrient content Glutinous rice also contains vitamins (especially in the aleurone), minerals, and water. The chemical composition of White Glutinous Rice consists of 79.4% carbohydrates; Protein 6.7%; Fat 0.7%; Ca 0.012%; Fe 0.008%; P 0.148%; Vit B 0.0002% and Water 12. From its chemical composition, it is known that the main carbohydrate constituent of glutinous rice is starch.
	Black glutinous rice	Reket bereng	Latin name: Oryza sativa. var. glutinosa.  https://id.wikipedia.org/wiki/Oryza_sativa
			Characteristics Black glutinous rice is a type of rice that has a deep purple color close to black and contains high phenolic compounds, especially anthocyanins. Black glutinous rice is a rice variety whose starch contains 92-98% amylopectin. This causes black glutinous rice to have sticky or sticky characteristics after steaming.
			Nutrient content Black glutinous rice also contains 169 kcal of energy, 36.7 g of carbohydrates, 3.5 g of protein, 0.3 g of fat, 0 mg of cholesterol, and 1.7 g of fiber. Black glutinous rice is known as a grain that contains high levels of iron, a high source of antioxidants, and a relatively high protein content.

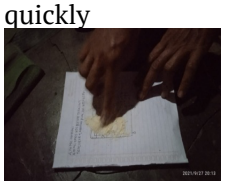
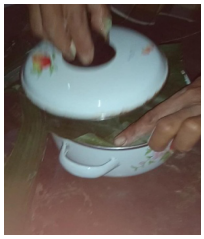
Table 1. Reconstruction of Original Science to Scientific Science (continuation).

Question focus		**Original Sanis**	**Scientific science**
Preparatory stages	White glutinous rice washing/ black glutinous rice	(Tebisok elek aik ngalir adekn bersih,kance telang warne putik lek akin) Washed under running water until clear colored water. 	Flowing water has mechanical energy consisting of potential energy and energy Kinetic. Because of the energy that flowing water has greater than that does not flow then sticky rice becomes cleaner and faster
		(Terendem selame sejam adekn lunak sekedik) The soaking process is carried out for 1 hour so that it is slightly soft. 	In the immersion process, an imbibition process occurs, namely the process of absorbing water into the rice embryo. The water content in the rice embryo initially increases rapidly and then slows down. Tissue metabolism becomes active, causing the embryo to produce the hormone gibberellin. The hormone gibberellins then diffuse into the aleurone cells that surround the endosperm or food reserve cells. These endosperm cells then form the enzymes amylase, protease, and lipase which are used to digest various food reserves stored in rice[12]

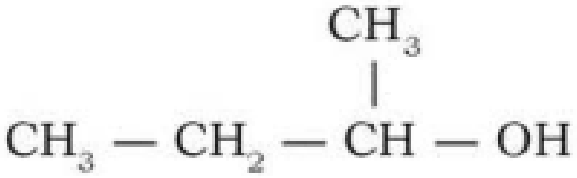
Table 1. Reconstruction of Original Science to Scientific Science (continuation).

Question focus		**Original Sanis**	**Scientific science**
Processing stages	Duration of steaming	(Tekokos setenge mateng untuk tahep pertamen) Half-cooked steamed for the first stage 	Steaming functions for the process of ripening glutinous rice into glutinous rice, so that a soft texture is obtained and kills pathogenic microbes. Steaming here aims to kill contaminating bacteria. The texture on the tape is caused by steaming, where the longer the steaming time will produce a softer texture. Meanwhile, on the contrary, the faster the texture measurement time, the harder it will be.
	Addition of natural dyes	(Teperes daun agah ampokn tetolon juk reket putek sak wah tekukus pertamen adekn manis kance betah tekadu) Katuk leaf water is poured into steamed glutinous rice as a natural dye and to add sweetness to glutinous rice tepe 	The juice of katuk leaves (sauropus androgynus) is used as a natural dye for white sticky rice so it looks attractive for consumption. Based on the observations that have been made, giving katuk juice can produce sticky rice tape which tastes sweet and can be stored much longer[13]. Katuk leaves also contain tannins, flavonoids, steroids, saponins, and tripertenoids which act as antibacterial in the presence of these bacterial substances that can inhibit fungal intruders that play a role in the fermentation process of glutinous tape.
	Cooling time	(Tetontong juk keliong terus tejejeh aden jelap nyet teadek selame 3 jam ampokn teragi adekn solah rasen) Scooped and placed crushed to stand for 3 hours so that when added yeast to make it tastes sweeter 	This cooling is intended so that the sticky atmosphere that will be given yeast is not damp so that it is not easily contaminated with unwanted microorganisms which can cause the tape to be damaged or fail (rot).

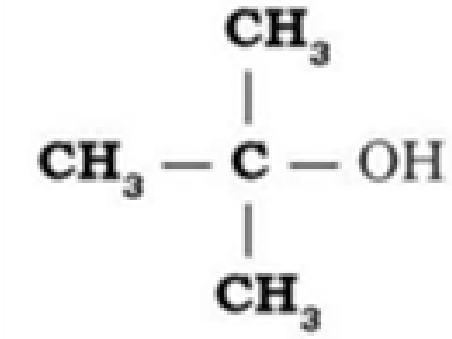
Table 1. Reconstruction of Original Science to Scientific Science (continuation).

Question focus		**Original Sanis**	**Scientific science**
Final stages	Addition of yeast	(Tepolokan ragi adekn jelap masak poteng) Yeast is added so that the sticky tape cooks quickly  	The addition of yeast aims to speed up the fermentation process because the basic ingredients of the yeast are the yeast Saccharomyces cerevisiae. Fermentation of sugar by yeast can produce ethyl alcohol and carbon dioxide which is the basis for making tape. Yeast $C_6H_{12}O_6 \rightarrow 2\ C_2H_5OH + 2\ CO_2 + 22$ kcal Sugar Fermentation Reaction by Saccharomyces cereviseae
	Storage	(Tesimpen dalam base sak wah telamak sik daun puntik) Stored in a closed container that has been coated with banana leaves 	After that, the mixture is tightly wrapped in banana leaves and stapled and stored for 2-3 days (fermented). The purpose of wrapping with banana leaves is to make the atmosphere aerobic because the fermentation process can take place well if the atmosphere is aerobic. In addition, banana leaves are also good for use because they need aeration during the fermentation process, where the fermentation process will produce CO2 gas

b. sec- indicates that the carbon atom that binds the functional group is a secondary carbon



c. It shows that the carbon atom that binds the functional group is a tertiary carbon



Chemistry learning through integrating the subject matter of alcohol-ether with the local wisdom of Sasak Lombok. Alcohol (C2H5OH) is a transparent, colorless, mobile, volatile liquid, miscible with water, ether, and chloroform, obtained by carbohydrate fermentation from yeast. After water, alcohol is the most common solvent and base material used in laboratories and the chemical industry. Ethyl alcohol can be made from anything that can be fermented by yeast. One of the most important and well-known uses of yeast is the ethyl alcohol product of carbohydrates. Carbohydrates will be converted to sugar and sugar will be converted to alcohol[14].

Tape is a fermented product. Rice, glutinous rice, corn, and cassava, can be used as basic ingredients for masking tape. The ingredients are steamed until cooked, laid out in winnowing and after it has cooled, added with yeast in Figure 2, then the mixture is placed in a pot, covered with banana leaves, and stored in a cool place. Soon thereafter leavened because of the working power of the organisms contained in the yeast.

Figure 2. Yeast Sowing Process on Glutinous Tape (Poteng) of the Sasak tribe

3.2. Discussion

An analogy approach is an approach to explaining comparative relationships by referring to the linkages between two different concepts, but having relevant meanings[11]. The application of an analogy approach between domains in chemistry learning can be done by integrating everyday life situations that have relevance to chemical concepts[15][16]. The application of apperception to learning is usually carried out at the beginning of learning which aims to increase students' scientific literacy so that they are more active in constructing knowledge independently.

The results of previous research prove that students who have high scientific literacy will be more active in doing assignments and constructing knowledge which has a positive impact on the learning outcomes obtained[17],[18]. The advantages of applying the representational and visualization approaches are needed in chemistry learning by giving examples of the presence of alcohol in everyday life that is relevant to the daily experiences or culture of the students themselves.

Providing concrete examples in the daily lives of students can make learning more interesting and meaningful so that they can develop students' representation abilities in learning chemistry at school[11]. The findings of the research prove that Sasak local wisdom has a very relevant potential to be integrated with the subject matter of chemistry subjects, namely the integrated alcohol-ether material of Sasak local wisdom.

The advantages of teaching materials integrated with Sasak local wisdom can increase students' chemical literacy in understanding chemical material that has relevance to students' daily lives so that learning becomes more meaningful. The meaning of learning is realized by integrating chemical concepts with the local wisdom values of the community which is factual in the daily activities of people who apply chemical concepts.

Community activities that apply chemical concepts in everyday life, for example making poteng (glutinous tape) which in the process is a concept of chemical change so that understanding the concept of chemical change will be easier for students to understand because it is associated with everyday life. Learning activities that refer to the characteristics and context of students' lives are the implementation of constructivism learning theory. The construct of new knowledge and experiences gained by students will be more meaningful if it is associated with the old knowledge and experiences they have experienced so that they have a positive effect on increasing students' cognitive, affective, and psychomotor abilities [18],[19],[11].

The advantages of applying analogies in learning make learning more meaningful so that learning becomes more fun and students are more motivated to be actively involved in the learning

process. The application of the analogy approach in chemistry learning makes learning more interesting and meaningful so that it can improve chemistry learning outcomes[11]. Chemistry learning activities supported by the availability of petrochemical-based chemistry learning resources refer to the context of students' lives which are local wisdom values that have relevance to chemistry concepts that can be used as supporting learning resources and references in conducting scientific investigations. Likewise, various relevant research results also show the implementation of ethnochemistry in learning, either in the form of integration with learning models, integration with learning strategies, or as a source of learning[4],[2].

Likewise, the culture or local wisdom values that belong to the Sasak tribe of Lombok, NTB have a very strong relevance to chemistry concepts or the concept of chemistry learning which is reflected in the traditions of the Sasak people which are reflected in the cultural products found in the Sasak people, Lombok, West Nusa Tenggara province. Thus, through exploring the potential of local Sasak wisdom as a source of learning chemistry and natural laboratories, it has been possible to develop aspects of knowledge, scientific attitudes, and critical thinking, and increase the love of the younger generation for their culture[20].

Several previous studies related to the implementation of ethnochemistry in learning, among others, Sing stated that ethnochemical practices in teaching chemistry turned out to have a positive effect on increasing high school students' attitudes toward chemistry. Conducted research on the integration of etnhochemistry in culturally responsive teaching in chemistry classrooms and has assisted students in developing a critical self-reflection on their cultural background. Integrating etnhochemistry into the curriculum can provide students with meaningful learning about the preservation and appreciation of the quality of students' cultural heritage [18],[19],[11].

4.CONCLUSION

The relevance of alcohol-ether material to Sasak local wisdom is reviewed from the reconstruction of original science to scientific science, as well as the potential of Lombok Sasak local wisdom as a source of learning in chemistry subjects integrated with Sasak local wisdom, separation and making integrated blends of Sasak local wisdom. The contribution of the research that has been carried out is in the form of integrated teaching material products for Sasak Local Wisdom as a source of chemistry learning that is ethnochemical based and relevant to the daily lives of students so that it influences the increase in students' chemical literacy. Based on the conclusions that have been stated.

REFERENSI

1. Y. Rahmawati, A. Ridwan, And Nurbaity, "Should We Learn Culture In Chemistry Classroom? Integration Ethnochemistry In Culturally Responsive Teaching, " In Aip Conference Proceedings, Aug. 2017, Vol. 1868. Doi: 10.1063/1.4995108.
2. I. Sen Singh And B. Chibuye, "Effect Of Ethnochemistry Practices On Secondary School Students' Attitude Towards Chemistry," J. Educ. Pract., Vol. 7, No. 17, Pp. 44–56, 2016, [Online]. Available: Http://Libproxy.Library.Wmich.Edu/Login?Url=Https://Search.Proquest.Com/Docview/1826544371?Accountid=15099
3. I. Abramova And A. Greer, "Ethnochemistry And Human Rights," Chemistry And Biodiversity, Vol. 10, No. 9. Pp. 1724–1728, Sep. 2013. Doi: 10.1002/Cbdv.201300211.
4. N. K. Said-Ador, "Ethnochemistry Of Maguindanaons' On The Usage Of Household Chemicals: Implications To Chemistry Education," J. Soc. Sci., Vol. 6, No. Special, Pp. 8–26, 2017, [Online]. Available: Http://Centreofexcellence.Net/J/Jss/Jss Mainpage.Htm.
5. M. Rosa And D. C. Orey, "Ethnomathematics: The Cultural Aspects Of Mathematics Etnomatemática: Os Aspectos Culturais Da Matemática," 2011. [Online]. Available: Http://Www.Redalyc.Org/Articulo.Oa?Id=274019437002.
6. M. Asrori, "Position Of Islamic Education In State Universities," Abjadia, Vol. 5, No. 1, P. 92, Jun. 2020, Doi: 10.18860/Abj.V5i1.9616.
7. A. Fadli And Irwanto, "The Effect Of Local Wisdom-Based Elsii Learning Model On The Problem Solving And Communication Skills Of Pre-Service Islamic Teachers," Int. J. Instr., Vol. 13, No. 1, Pp. 731–746, 2020, Doi: 10.29333/Iji.2020.13147a.
8. H. Sutrisno, D. Wahyudiati, And I. S. Y. Louise, "Ethnochemistry In The Chemistry Curriculum In Higher Education: Exploring Chemistry Learning Resources In Sasak Local Wisdom," Univers. J. Educ. Res., Vol. 8, No. 12a, Pp. 7833–7842, Dec. 2020, Doi: 10.13189/Ujer.2020.082572.
9. D. Wahyudiati, "Analisis Efektivitas Kegiatan Praktikum Sebagai Upaya Peningkatan Hasil Belajar Mahasiswa," Vol. 14, No. 2, 2016.
10. W. Sumarni And S. Kadarwati, "Ethno-Stem Project-Based Learning: Its Impact To Critical And Creative Thinking Skills," J. Pendidik. Ipa Indones., Vol. 9, No. 1, Pp. 11–21, 2020, Doi: 10.15294/Jpii.V9i1.21754.
11. D. Wahyudiati, "Etnokimia: Eksplorasi Potensi Kearifan Lokal Sasak Sebagai Sumber Belajar Kimia," J. Pendidik. Kim. Indones., Vol. 5, No. 2, Pp. 102–111, 2021, [Online]. Available: Https://Ejournal.Undiksha.Ac.Id/Index.Php/Jpk/Index
12. H. D. Pingge, "Kearifan Lokal Dan Penerapannya Di Sekolah," J. Edukasi Sumba, Vol. 01, No. 02, Pp. 128–135, 2017, [Online]. Available: Http://Jurnalstkip-Weetebula.Ac.Id/

Index.Php/Jes/Article/Download/27/27.
13. S. Dewi, "The Effect Of Student Metacognition Ability To Their Reasoning By Using Realistic Mathematical Education Approach At Secondary School Of Unggul Sakti Jambi," Vol. 15, No. 3, Pp. 171–176, 2015.
14. Z. Berlian Et Al., "Uji Kadar Alkohol Pada Tapai Ketan Putih Dan Singkong Melalui Fermentasi Dengan Dosis Ragi Yang Berbeda," 2016.
15. M. Çalik, N. Ültay, A. Kolomuç, And A. Aytar, "A Cross-Age Study Of Science Student Teachers' Chemistry Attitudes."
16. J. Jofrishal* And S. Seprianto, "Implementasi Modul Kimia Pangan Melalui Pendekatan Etnokimia Di Smk Negeri Aceh Timur Program Keahlian Tata Boga," J. Ipa Pembelajaran Ipa, Vol. 4, No. 2, Pp. 168–177, Dec. 2020, Doi: 10.24815/Jipi.V4i2.17262.
17. A. D. Paramita Et Al., "Pengembangan Bahan Ajar Berbasis Literasi Sains Materi Suhu Dan Kalor."
18. W. Suja, "Revitalisasi Etnosains Untuk Mendukung Literasi Ethnoscience Revitalization To Support Literacy," 2022. [Online]. Available: Http://Jurnal.Fkip.Unmul.Ac.Id/Index.Php/Bivalen.
19. L. Sumardi, A. Rohman, And D. Wahyudiati, "Does The Teaching And Learning Process In Primary Schools Correspond To The Characteristics Of The 21st Century Learning?," Int. J. Instr., Vol. 13, No. 3, Pp. 357–370, Jul. 2020, Doi: 10.29333/Iji.2020.13325a.
20. W. P. Hadi, F. P. Sari, A. Sugiarto, And W. Mawaddah, "Terasi Madura : Kajian Etnosains Dalam Pembelajaran Ipa Untuk Menumbuhkan Nilai Kearifan Lokal Dan Karakter Siswa Madura Shrimp Paste : Study Of Ethnoscience In Science Learning To Improve Student ' S Local Wisdom And Character," Vol. 10, No. 1, Pp. 45–55, 2019.