



Ethnoscience Phenomenon: The Chemical Element Glucose as a Symbol of Human Enjoyment of Life in The Nyadran Celebration in Magelang

Raden Ary Bhagawan Wijaya^{1*}, Andrik Purwasita¹, Andre Novi Rahmanto¹

¹ Master of Communication Science Program, Faculty of Social and Political Sciences, Sebelas Maret University Surakarta

Received: June 5, 2023

Revised: July 9, 2023

Accepted: August 25, 2023

Published: August 31, 2023

Corresponding Author:

Raden Ary Bhagawan Wijaya
Asnidarnidar16@yahoo.co.id

DOI: [10.29303/jppipa.v9i8.4107](https://doi.org/10.29303/jppipa.v9i8.4107)

© 2023 The Authors. This open access article is distributed under a (CC-BY License)



Abstract: The purpose of this study is to determine the symbolic meaning represented by the food that must be present in every nyadran performance in Magelang City. This study is a case study with ethnographic approach. With the guidance of symbolic interactionism theory, the meaning of the taste of the chemical elements of the food will be analyzed so that there is a scientific explanation present. The informants in this study are artists, art observers and nutritionists. The results of the study, ethnoscience representations appear when the previous artists even though they cannot parse the chemical elements of coffee that create bitterness. Likewise, in the chemical elements of bananas that cause sweetness. Bitter is a flavor that in chemistry is caused by the compound trigonelline (niacin), which is found in coffee. Sweetness is a flavor that, according to chemistry, is caused by glucose in bananas. According to the informants, the sweet and bitter flavors in the food that must be present at the event represent how human life is always filled with two dominant feelings, namely bitter which is a representative of sadness, difficulty, suffering and sweetness which represents pleasure, happiness.

Keywords: Chemical Element; Ethnoscience; Glucose; Nyadran; Symbol of Human Enjoyment

Introduction

In the nyadran ceremony, the food element cannot be separated from the procedures and procedures in accordance with the rules adopted (Nurrahma et al., 2022). The perpetrators of the activity always follow these rules by serving various foods which of course have certain meanings. As reviewed in various academic texts that nyadran is part of culture which is an overall social heritage that is seen as a result of works that are arranged regularly and orderly such as objects, technical skills, skills, thoughts and ideas, habits, and certain values (Junaidi, 2019; Mumtaza, 2021). The form of culture as a complex of ideas, values and norms and regulations, and reflects patterns of behavior and

society. Behavior patterns occur because of the manifestation of the results of the learning process (Hikmawati et al., 2021). These manifestations are usually in the form of works as cultivation. The form of behavior is in the form of certain symbols, for example religious ceremonies which are manifestations of religious behavior.

The cultural reality presented in Nyadran celebration in Magelang City is composed of various elements that collaborate with each other (Purwani et al., 2020). Material elements include the body, musical instruments, costumes, places, and foodstuffs. Non-material elements are dance movements, rhythmic music and symbolic expressions of food. More specifically in terms of food, which in the context of taste

How to Cite:

Wijaya, R. A. B., Purwasita, A., & Rahmanto, A. N. (2023). Ethnoscience Phenomenon: The Chemical Element Glucose as a Symbol of Human Enjoyment of Life in The Nyadran Celebration in Magelang. *Jurnal Penelitian Pendidikan IPA*, 9(8), 6452-6457. <https://doi.org/10.29303/jppipa.v9i8.4107>

is divided into 2 flavors that are considered representative, namely sweet and bitter. The identification of food elements is an ethnoscience study, where why foods with certain flavors represent certain realities in life (Sturtevant, 1964; Tupas & Banas, 2021). The chemical elements in coffee drinks display a bitter taste. The chemical elements in bananas, for example, display a sweet taste. Sweetness and bitterness are symbolic realities that humans face in life (Arsal et al., 2023).

The nyadran tradition is a symbol of the relationship with the ancestors, others, and the almighty over everything (Saddhono et al., 2019). Nyadran is a ritual pattern that mixes local culture and Islamic values, thus forming a locality that is thick with Islam. Nyadran is also an example of religious acculturation and local wisdom. Cultural acculturation is very evident in the Nyadran tradition practiced by the Javanese community (Friskadewi, 2019). Nyadran is a Hindu-Buddhist tradition (Wahid, 2011), around the 15th century which experienced acculturation with Islamic culture. In the past, the procedure for worshiping spirits was then straightened out by the scholars (wali songo) and became a habit for the Javanese people until now. The sadranan tradition is able to unite the heterogeneity of Javanese society because it is thick with plurality values and becomes the character of the community. These values become the character of Javanese society that is integrated into the soul of the next generation.

Returning to the element of food in the nyadran tradition, the presence of food actually displays or represents symbolic elements that are interesting to study. This study will be conducted with the theoretical guidance of symbolic interaction as an effort to approach the problem scientifically and methodologically. The urgency of this research in a scientific perspective is the implementation of cultural theories, symbolic theory and the rules of meaning representation.

Method

The type of research is qualitative research. Qualitative research is research whose final results produce descriptive data sourced from information on people and behavior that is usually observed directly (Budianto, 2020). This means that the author will provide factual information in data and information because of direct observation. The approach used is ethnography. Ethnography is a building of knowledge that includes research techniques, ethnographic theory, and various kinds of cultural descriptions (Moriolkosu et al., 2020).

The research was conducted by taking a location in Magelang city. The reason why the researcher chose this

location is because the local community runs, implements and maintains the Nyadran Tradition (Purwani & Arvianti, 2020). From the technical side, the data will also be obtained more easily because the researcher lives in Magelang.

Accurate data sources and the resulting information data as follows: (a) Primary data is the source of information data where the author comes directly to the location of the incident and obtains information from the intended object. In this Nyadran Tradition, the author presents primary data that will start from the beginning of the Nyadran event or starting from preparation, implementation, closing and will conduct interviews with local community leaders such as Nyadran actors, Stake Hoder and other related elements related to this research, (2) Secondary Data If primary data is data taken directly. Secondary data is data that is not taken directly. Examples are such as the author documenting ongoing activities, using books, research journals as reference materials from researchers. You can also get information by asking for existing data from various sources that will be used as research locations.

The steps for collecting data are as follows: (a). Observation. The author will make observations using documentation to reveal related facts. So the author makes observations and participates directly in the Nyadran Tradition, (b) Interview. Interviews were conducted to find out the origin of the Nyadran Tradition, how the Nyadran Tradition procession was running. Interviews were conducted with local elders, cultural observers and nyadran actors who were considered as people / parties who knew how the Nyadran Tradition was still practiced until now. Many do not know about this Nyadran Tradition, (c) Documentation. The function of documentation is that the author is able to record or record all information from resource persons from the object to be studied.

The author uses data analysis techniques using a semiotic study approach as a material to interpret and find out the meaning of each Nyadran Procession. The author will first describe thoroughly the Nyadran procession in Magelang city, what ornaments are used during the tradition. In addition, researchers also find out how the symbolic meaning of each ornament used during Nyadran using theories of symbolic interaction to draw conclusions.

Result and Discussion

Chemical Elements and Meanings: A Symbolic Manifestation Food Chemistry

Banana fruit will experience an increase in sugar content along with increased respiration due to the

breakdown of starch that occurs. According to Mohapatra et al. (2010), when the ripening process occurs, the starch content in unripe bananas is 20-30% and in ripe bananas it reaches up to 1-2%. The sugar content in banana fruit will increase in unripe bananas by 1-2% while in ripe bananas it reaches 15-20%.

The combination that produced the highest reduced sugar content was the cocoa leaf steeping method with a steeping time of 9 days. This is due to the fact that on day 9, the enzymes have not converted much of the reduced sugar into other compounds (Anam, 2011). The use of leaves can produce high CO₂ (Dusenge et al., 2019; Li et al., 2021). The high CO₂ content will affect the slow maturation reaction and will also affect the low storage temperature (Wakerley et al., 2022). Low temperature will slow down the biochemical processes (Apandi, 1984). The treatment combination that resulted in the lowest reduced sugar content was the control method for 3 days.

The breakdown of polysaccharides in the form of amyllum (starch substance) into disaccharides (sucrose) and monosaccharides in the form of reduced sugars (glucose and fructose) occurs during respiration assisted by the enzyme amylase. The enzyme amylase plays a role in increasing reduced sugar levels in bananas during the ripening process (Pujimulyani, 2009). In addition, carbohydrates in the form of cellulose assisted by cellulase and cellobiase enzymes will degrade the cell wall into a simple form until it becomes glucose (Fitriyningrum et al., 2013).



Figure 1. Glucose in bananas as a symbol of life's pleasures

The increased cellulose content will give a sweet taste to the banana fruit and affect the decrease of phenolic substances that cause a sepet taste (Anam, 2011). Vitamin C content Using 0.5% ethylene resulted in the highest vitamin C content (Figure 1). Growth stimulating substances such as ethylene can stimulate

banana fruit tissue to release ethylene. An exogenous increase in ethylene concentration can increase vitamin C content. Utami et al. (2016) reported that the use of ethylene on plantain caused the highest vitamin C content of 8.51 mg/100g. Murtadha et al. (2012) also confirmed that the use of ethylene can affect the vitamin C content of barangan banana fruit.

The vitamin C content in jackfruit banana fruits that were garnered using cocoa leaves was higher than the use of 2 other types of leaves (Lebaka et al., 2021). The use of the right dose of leaves is also very influential on the maturation of excessive doses can trigger anaerobic respiration resulting in a decrease in vitamin C content (Prabawati et al., 2008; Prasditiio et al., 2023).

The 6-day ripening treatment showed the highest vitamin C content (66.01 mg/100g) in jackfruit banana. Ripening of the fruit will result in a decrease in the levels of organic acids. The decrease in organic acids is due to the conversion of organic acids into sugars. The process will be experienced by fruits except for bananas and pineapples, where when bananas experience ripening until they reach full maturity, vitamin C will continue to increase (Sade, 2023; Utami et al., 2016). During the 9-day ripening period, the vitamin C content decreased due to the aging and decay of the bananas. The decrease in vitamin C content is due to the process of oxidation and biosynthesis of vitamin C (Paciolla et al., 2019). Vitamin C will change into L-dehydroascorbate and further change into L-diketogulonate. It is during this process that vitamin C will become soluble solids so that its content in the fruit decreases (Almatsier, 2006; Alristina et al., 2021).

Flavors and symbols

The symbolic meanings contained in each food include, 1) white rice means a holy, clean, halal staple food that can be enjoyed by everyone regardless of degree, 2) ketupat symbolizes admitting mistakes from the lust of the world that can be covered by conscience, 3) tumpeng yellow rice means the source of radiant life that gives brightness, glory and prosperity, 4) the arrangement of eggs, shallots and chili symbolizes that humans all come from eggs live prosperous and established from the symbol of red pepper, also red chili implies being able to give intelligence and share it, 5) the crops are a form of gratitude to God for being given grace and fertility in the land of Pulesari so that the harvest is abundant, 6) ingkung contained in ambengan symbolizes men being tied up by three bad behaviors in the world, processed tempeh, crackers, soybean peyek and entho-entho as a symbol of complementing the world, 7) salak in the form of gunung symbolizes the superior harvest of Pulesari land and as a form of gratitude.



Figure 2. The element of sweetness in various food offerings.

Food offerings basically only display a maximum of two flavors, namely sweet and bitter. The dimetral division is to illustrate how life is perfectly paired. Sweetness and bitterness are just interchangeable flavors in life, even though humans adore to live in sweetness, which is a taste filled with pleasure. Even if the enjoyment of life is only seen from the point of view of fulfilling physical and mental needs.

Conclusion

Sweetness in the context of this study is represented by bananas, where the fruit is a fruit that must be present in the nyadran event is a symbolic manifestation of the sense of happiness experienced by humans. Besides that the sweetness that comes from banana glucose also represents great pleasure as a gift from the Almighty God. The results of the study, ethnoscience representations appear when the previous artists even though they cannot parse the chemical elements of coffee that create bitterness. Likewise, in the chemical elements of bananas that cause sweetness. Bitter is a flavor that in chemistry is caused by the compound trigonelline (niacin), which is found in coffee. Sweetness is a flavor that, according to chemistry, is caused by glucose in bananas. According to the informants, the sweet and bitter flavors in the food that must be present at the event represent how human life is always filled with two dominant feelings, namely bitter which is a representative of sadness, difficulty, suffering and sweetness which represents pleasure, happiness.

Acknowledgments

The author would like to thank the parties who have played a role in this research activity, so that this research can be carried out well. Thank you to the informants, and the local government for giving permission to researchers to complete this academic task.

Author Contributions

In this study, all researchers contributed actively with the tasks that were carried out together. In other words, this research was supported by equal distribution of roles and contributions of all authors, because each stage was always discussed together.

Funding

This research is an empirical research funded by the researchers themselves or independent research. So on this happy occasion, I as the first author express my highest appreciation and gratitude to my colleagues who are members of this research team for their financial participation.

Conflicts of Interest

In this research, there is no tug of interest and or hidden interests among the researchers. In addition, this research is also not an order from any funder because it is an independent research, or in other words, the research team itself plays a role in preparing proposals, selecting topics, conceptualizing problems, collecting data, analyzing problems, drawing conclusions until the publication stage in this journal.

References

- Almatsier, S. (2006). *Prinsip Dasar Ilmu Gizi, edisi ke-6*. Jakarta: Gramedia Pustaka utama.
- Alristina, A. D., KM, S., Ethasari, R. K., Gz, S., Gz, M., Laili, R. D., Hayudanti, D., Gz, S. (2021). *Ilmu Gizi Dasar Buku Pembelajaran*. Penerbit CV. Sarnu Untung.
- Anam, M. F. (2011). *Pengaruh cara dan lama pemeraman terhadap kadar gula reduksi, kadar air, kandungan vitamin A, dan tekstur pada buah pisan raja nangka (Musa paradisiaca L.)* Universitas Islam Negeri Maulana Malik Ibrahim. Retrieved from <http://etheses.uin-malang.ac.id/1036/>
- Apandi, M. (1984). *Teknologi buah dan sayur* (Vol. 106). Yogyakarta: PT Rineka Cipta.
- Arsal, T., Setyowati, D. L., & Hardati, P. (2023). The inheritance of local wisdom for maintaining peace in multicultural society. *Journal of Aggression, Conflict and Peace Research*, 15(2), 137-151. <https://doi.org/10.1108/JACPR-01-2022-0673>
- Budianto, A. (2020). Legal research methodology reposition in research on social science. *International Journal of Criminology and Sociology*, 9(1), 1339-1346. Retrieved from <https://lifescienceglobal.com/pms/index.php/ijc/s/article/view/7848>
- Dusenge, M. E., Duarte, A. G., & Way, D. A. (2019). Plant carbon metabolism and climate change: elevated CO₂ and temperature impacts on photosynthesis, photorespiration and respiration. *New Phytologist*, 221(1), 32-49. <https://doi.org/10.1111/nph.15283>
- Fitriningrum, R., Sugiyarto, Ss., & Susilowati, A. (2013). Analisis kandungan karbohidrat pada berbagai

- tingkat kematangan buah karika (*Carica pubescens*) di Kejajar dan Sembungan, Dataran Tinggi Dieng, Jawa Tengah. *Asian Journal of Tropical Biotechnology*, 10(1), 6-14. <https://doi.org/10.13057/biotek/c100102>
- Friskadewi, N. (2019). Keeping the Tradition of Honoring Ancestors (Study of the Traditions of Sadran Gedhe in Gumelem Village, Susukan, Banjarnegara). *Proceedings of First International Conference on Culture, Education, Linguistics and Literature, CELL 2019, 5-6 August, Purwokerto, Central Java, Indonesia*, 150-164. <https://doi.org/10.4108/eai.5-8-2019.2289794>
- Hikmawati, Suastra, I. W., & N M Pujani. (2021). Local wisdom in Lombok island with the potential of ethnoscience for the development of learning models in junior high school. *Journal of Physics: Conference Series*, 1816(1), 12105. <https://doi.org/10.1088/1742-6596/1816/1/012105>
- Junaidi, M. A. (2019). *Microcredit Programmes in Development in Rural Indonesia: Gender, Cultural, and Religious Perspectives*. University of Southampton. <https://eprints.soton.ac.uk/451368/>
- Lebaka, V. R., Wee, Y.-J., Ye, W., & Korivi, M. (2021). Nutritional composition and bioactive compounds in three different parts of mango fruit. *International Journal of Environmental Research and Public Health*, 18(2), 741. <https://doi.org/10.3390/ijerph18020741>
- Li, Q., Liu, S., Wang, L., Chen, F., Shao, J., & Hu, X. (2021). Efficient nitrogen doped porous carbonaceous CO₂ adsorbents based on lotus leaf. *Journal of Environmental Sciences*, 103, 268-278. <https://doi.org/10.1016/j.jes.2020.11.008>
- Mohapatra, D., Mishra, S., & Sutar, N. (2010). Banana and its by-product utilisation: an overview. *Journal of Scientific and Industrial Research (JSIR)* 69. Retrieved from <https://nopr.niscpr.res.in/handle/123456789/8581>
- Moriolkosu, A. D., Handayani, S. S. D., & Sunarso, A. (2020). Ethnomathematics and ethnoscience analysis of Aru culture related to mathematics and science concepts at elementary school. *Educational Management*, 9(2), 163-171. Retrieved from <https://journal.unnes.ac.id/sju/index.php/eduman/article/view/39504>
- Mumtaza, M. A. (2021). *Design of Art Centre in Nitiprayan, Yogyakarta With Regionalism Approach Universitas Islam Indonesia*. Retrieved from <https://dspace.uui.ac.id/handle/123456789/32402>
- Nurrahma, N., Rifa'i, A., & Susilawati, S. (2022). Java Culture In The Qur'an Perspective (Case Study: Nyadran Culture In The Region Mt. Merapi Yogyakarta). *Al-Misykah: Jurnal Studi Al-Qur'an Dan Tafsir*, 3(2), 123-139. <https://doi.org/10.19109/almissyah.v3i2.15054>
- Paciolla, C., Fortunato, S., Dipierro, N., Paradiso, A., De Leonardis, S., Mastropasqua, L., & De Pinto, M. C. (2019). Vitamin C in plants: from functions to biofortification. *Antioxidants*, 8(11), 519. <https://doi.org/10.3390/antiox8110519>
- Prabawati, S., Suyanti, S. D. A., & Setyabudi, A. (2008). *Teknologi pascapanen dan teknik pengolahan buah pisang*. In Bogor: Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian Badan Penelitian dan Pengembangan Pertanian.
- Prasditio, A. G., Syawala, A. A., Faizah, A. T., Mardani, A. C., Widodo, A. R., Pamungkas, C. D. G., Hambali, F. L., Sanni, G. J., Azizah, H., Candraningtyas, M., & others. (2023). Pemberdayaan Masyarakat melalui Pembuatan Pisang Crispy sebagai Sosiopreneur Baru Usaha Produk Lokal di Desa Ngunut, Jumantono Karanganyar: Community Empowerment through the Making of Crispy Banana as a New Sociopreneur for Local Product Business in Ngunu. *PengabdianMu: Jurnal Ilmiah Pengabdian Kepada Masyarakat*, 8(2), 284-290. <https://doi.org/10.33084/pengabdianmu.v8i2.4175>
- Pujimulyani, D. (2009). *Teknologi pengolahan sayur-sayuran dan buah-buahan*. Graha Ilmu.
- Purwani, T., & Arvianti, I. (2020). Constructing harmonization of multicultural society. *Social Science Learning Education Journal*, 5(6), 157-170. Retrieved from <http://www.sslej.in/index.php/sslej/article/view/3418>
- Purwani, T., Arvianti, I., & Karyanti, T. (2020). The Model of Harmonization of Multiculturalism Society at Magelang Regency. *Tarumanagara International Conference on the Applications of Social Sciences and Humanities (TICASH 2019)*, 349-355. <https://doi.org/10.2991/assehr.k.200515.062>
- Saddhono, K., Setiawan, B., & Yuliningsih, F. S. (2019). Local wisdom on Nyadran tradition in Sragen Regency. *INCOLWIS 2019: Proceedings of the 2nd International Conference on Local Wisdom, INCOLWIS*, 56. Retrieved from <https://eudl.eu/doi/10.4108/eai.29-8-2019.2288957>
- Sade, Y. A. T. (2023). *Kadar Vitamin C Yang Ditambahkan Kalsium Karbida (Cac2) Pada Buah Pisang Kepok Dan Pemanfaatannya Sebagai Media Pembelajaran*. Universitas Tadulako. Retrieved from <https://repository.untad.ac.id/11520/>
- Sturtevant, W. C. (1964). Studies in ethnoscience. *American Anthropologist*, 66(3), 99-131. <https://doi.org/10.1525/aa.1964.66.3.02a00850>

- Tupas, F. P., & Banas, L. B. (2021). Traditional Science learning in local recipes: A cross-disciplinary exposition. *Indian Journal of Science and Technology*, 14(3), 197-207. <https://doi.org/10.17485/IJST/v14i3.1332>
- Utami, S., Widiyanto, J., & Kristianita, K. (2016). Pengaruh Cara Dan Lama Pemeraman Terhadap Kandungan Vitamin C Pada Buah Pisang Raja (*Musa Paradisiaca* L). *JEMS: Jurnal Edukasi Matematika Dan Sains*, 1(2). <https://doi.org/10.25273/jems.v1i2.131>
- Wahid, M. (2011). Sunda Wiwitan Baduy: Agama Penjaga Alam Lindung di Desa Kanekes Banten. *El Harakah: Jurnal Budaya Islam*, 13(2), 150-168. <https://doi.org/10.18860/el.v0i0.1888>
- Wakerley, D., Lamaison, S., Wicks, J., Clemens, A., Feaster, J., Corral, D., Jaffer, S. A., Sarkar, A., Fontecave, M., Duoss, E. B., & others. (2022). Gas diffusion electrodes, reactor designs and key metrics of low-temperature CO₂ electrolyzers. *Nature Energy*, 7(2), 130-143. Retrieved from <https://www.nature.com/articles/s41560-021-00973-9>