Proceeding of Integrative Science Education Seminar Vol. 5 No. 1, 2025, pp. 252 - 260

Available online at

PISCES

Proceeding of Integrative Science Education Seminar

Beranda prosiding : https://prosiding.iainponorogo.ac.id/index.php/pisces

Article

Ethnosociofood Iwel-Iwel Cuisine in the Tedhak Siten Tradition of East Java Society "Educational Tools for Grounding Science through Local Wisdom"

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Article Info

5st AVES
Annual Virtual Conference of Education and Science 2025

Keywords:

Ethnosocioscience,
Cultural Integration in Science,
Iwel-iwel,
Local Wisdom,
Tedhak Siten.

ABSTRACT

The ethnosocioscience approach offers a new perspective in science education by contextually linking local cultural practices with scientific concepts. In the context of East Javanese society, the tedak siten tradition is not only ceremonial, but also contains hidden ecological, spiritual and scientific values. One of the strong symbols in this tradition is the culinary iwel-iwel, a traditional snack full of meaning and philosophy. This research aims to identify ethnosocioscience practices in the tradition and reconstruct the local knowledge inherent in iwel-iwel culinary into the scientific concept of science. The research method used is a qualitative approach with an ethnographic strategy through direct observation, in-depth interviews with community leaders and cultural actors, and literature studies related to the history and philosophy of iwel-iwel. The results showed that iwel-iwel culinary in the tedak siten tradition contains symbolism that can be related to science concepts such as the structure of matter, the nature of natural materials, and sustainable ecosystems. In addition, this practice has great potential to be integrated into culture-based science learning. In conclusion, iwel-iwel as ethnosociofood is not only a cultural heritage, but also a relevant educational tool to ground science through local wisdom.

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INTRODUCTION

Natural Sciences (IPA) are an integral part of human life that not only play a role in explaining natural phenomena, but also shape logical and systematic thinking patterns in understanding the world around us. Unfortunately, IPA learning in the classroom is often stuck in an abstract, theoretical approach that is detached from the cultural context of students (Ristiani, 2025). It is in this context that the ethnosociofood approach becomes important. Ethnosocioscience is an interdisciplinary approach that links local socio-cultural practices with scientific concepts, making them more relevant, contextual, and down-to-earth. One of its branches that is interesting and has potential for further study is ethnosociofood, an

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approach that uses traditional foods as a learning medium rich in cultural, social, and scientific values.

In society, food is not merely a means of satisfying biological needs, but also carries symbolic, spiritual, and social significance. This is where the importance of promoting traditional cuisine as an educational medium lies, as it not only strengthens local identity, but also opens new avenues for science education based on cultural wisdom. Traditional foods are often the result of a long process of adaptation by communities to their natural surroundings, containing ecological information, natural processing techniques, and values that have been upheld for generations. Therefore, ethno-socio-food is not only a cultural object but also a reflective space for grounding science in everyday life (Nasuxon, 2019).

One cultural practice that illustrates the integration of food, traditional values, and scientific symbols can be found in the tedak siten tradition of the people of East Java province, especially in the Mataraman region. Tedak siten is a traditional ceremony held when a baby steps on the ground for the first time, usually at the age of 7 or 8 months according to the Javanese calendar. This tradition symbolizes the child's readiness to interact with the outside world and embark on a broader life. In practice, tedak siten is not only rich in spiritual symbols, but also incorporates various cultural symbolism manifested through objects or foods presented in the procession, one of which is iwel-iwel cake.

Iwel-iwel cake is a traditional food made from glutinous rice flour and grated coconut with brown sugar filling, wrapped in banana leaves and steamed. This cake generally has a pyramid shape with a pointed tip, which philosophically symbolizes the vertical relationship between humans and God and socially reflects parents' hopes for their child's future. In the tedak siten tradition, iwel-iwel is not just a snack, but a symbol of prayer, hope, and spiritual values that have been passed down from generation to generation. Its shape, ingredients, and manufacturing process reflect ecological and social values that are in line with the basic principles of science, such as the structure of matter, changes in the form of substances, and the harmony between humans and their environment (Setiawan, 2016).

The local conditions of the people of East Java province, especially in the Mataraman region, who still preserve tedak siten, show that cultural practices such as this can not only be a means of preserving local identity but also have great potential as a source of science learning. In this context, the ethno-socio-food approach offers strategic opportunities to make traditional cuisine an educational tool for introducing science in a contextual, applicable, and culture-based manner. The study of iwel-iwel in the tedak siten tradition is important because not many previous studies have highlighted traditional cuisine as an integrative medium between local knowledge and scientific concepts in science.

This research is novel in its integrative effort to construct the traditional iwel-iwel cuisine as a source of science learning through the ethno-socio-food approach, which has not been explored much before. This novelty lies in the understanding of culinary symbols and processes not merely as cultural heritage, but as representations of scientific concepts such as material structure, energy, and local ecology. By linking tedak siten cultural practices and the philosophical meaning of iwel-iwel to the context of science, this study offers a new perspective that is educational, contextual, and based on local wisdom in science learning in the modern era.

This study aims to identify the cultural forms and meanings of iwel-iwel cuisine in the tedak siten tradition as a representation of the ethno-socio-food values of the people of EEast Java province, especially in the Mataraman region. This identification covers the philosophical, social, and ecological aspects contained therein. In addition, this study also aims to reconstruct and analyze the relationship between symbols in iwel-iwel and scientific concepts in science, such as the structure and properties of matter, environmental preservation, and sustainability systems in the use of natural resources. Thus, through an ethno-socio-science

approach, particularly from an ethno-socio-food perspective, this study presents an alternative approach to science education that not only emphasizes cognitive aspects but also touches on the affective and socio-cultural aspects of students. In this context, iwel-iwel becomes more than just food. It is a cultural narrative, a spiritual symbol, and an ecological reflection that can bridge science with the noble local values that live in East Javanese society (Syamsuri, 2021).

METHOD

This study uses a qualitative method with an ethnographic approach to explore in depth the cultural practice of iwel-iwel in the tedak siten tradition of the people of East Java province, especially in the Mataraman region. The ethnographic approach was chosen because it is able to holistically record the social, symbolic, and scientific values that live in the culture of the community through direct interaction between the researcher and the participants. Ethnography allows researchers to observe not only what the community does, but also how and why these practices are carried out and the meanings contained within them (Adji, 2024).

Data collection was carried out using three main techniques, namely: direct observation, in-depth interviews, and literature study. Observations were made by attending the tedak siten procession in person in one of the regions in East Java that still maintains this tradition from generation to generation. In these observations, the researcher recorded the process of presentation, the arrangement of traditional symbols, and the making of iwel-iwel as part of the ceremony.

In-depth interviews were conducted with cultural practitioners, such as the parents of babies who carry out the tradition, local iwel-iwel makers, and local community leaders or cultural figures. The interviews aimed to explore the philosophical meaning, social values, and their perceptions of the connection between culture and science. In addition, the researchers also conducted a literature study of scientific and credible sources, such as journal articles, ethnographic books, and writings on Javanese cultural history relevant to the themes of ethno-socio-food and iwel-iwel cuisine. All data were analyzed descriptively and qualitatively using an interpretive approach to reconstruct the relationship between cultural values and concepts in science learning in a contextual and meaningful manner.

RESULT AND DISCUSSION

1. History, Philosophy, Theological Values, and Cultural Values in the Tedak Siten Tradition

Iwel-iwel is a traditional Javanese culinary dish that is rich in cultural and spiritual meaning. This cake is made from simple ingredients such as glutinous rice flour, grated coconut, brown sugar, and a little salt, which are then wrapped in banana leaves and steamed until cooked. The history of iwel-iwel is closely related to the Javanese tradition of baby growth rituals, especially in ceremonies such as brokohan, sepasaran, selapanan, telonan, pitonan, and setahunan. Since the beginning of Islam in the archipelago, iwel-iwel has been an integral part of community life. According to linguistic studies, the name iwel-iwel has several root meanings: in Javanese, cemiwel means something adorable; in Arabic, the term waliwalidaya means parent, and the phrase laa ilaha illallah affirms the value of tauhid, which is the belief in the oneness of Allah. The conical shape of iwel-iwel, which resembles a pyramid, is not merely aesthetic, but reflects the five pillars of Islam that form the foundation of Muslim faith.

The philosophy contained in iwel-iwel is very deep and touches on various aspects of life. First, balance in life is reflected in the use of natural materials, which shows harmony between humans and nature. Second, tranquility and happiness are evident in the process of making and serving iwel-iwel in the atmosphere of a baby's birth celebration.

Third, the value of simplicity is emphasized through the selection of materials that are not luxurious but meaningful, as a reminder that happiness does not have to come from luxury. In addition, iwel-iwel also contains a philosophy of spiritual protection, whereby by sharing iwel-iwel, parents ask for protection and safety for their baby. The philosophy of harmonious diversity is also reflected in the combination of sweet and savory flavors in this cake, which illustrates the importance of tolerance in social life. The patience and warmth of the family can be seen in the stages of making iwel-iwel, which require diligence. All of this shows that iwel-iwel is not just food, but a medium for passing on noble values to the younger generation (Wulandari, 2024).

From a theological perspective, iwel-iwel contains a very strong message of faith. Surah Al-Mukminun verse 12, "And indeed, We have created man from the essence (originating) from the earth," reinforces that the human body comes from the elements of the earth, which are represented in the natural ingredients of iwel-iwel. Its pyramid structure also directs the human mind towards tawhid, namely that only Allah is worthy of worship. The tradition of distributing iwel-iwel at tedak siten ceremonies is a tangible expression of gratitude for the gift of life and a request for blessings for the baby. In addition, the value of sharing in this tradition fosters empathy, solidarity, and strengthens ukhuwah islamiyah (Islamic brotherhood) within the community. Thus, iwel-iwel not only fulfills nutritional needs, but also enriches the soul with spiritual values.

The cultural value of iwel-iwel is no less important. Local wisdom is reflected in the use of materials available in the surrounding environment, demonstrating cultural adaptation to the local ecosystem. The process of making iwel-iwel is often done collaboratively, which fosters a sense of togetherness and solidarity among community members. In every celebration, the distribution of iwel-iwel becomes a moment to strengthen social relations and foster a sense of belonging to the community. Iwel-iwel also serves as a symbol of the cultural identity of the Javanese people, strengthening their identity and pride in their ancestral heritage.

Through an understanding of the history, philosophy, theological values, and cultural values of iwel-iwel, we can see that this simple dish holds extraordinary meaning. It connects science, culture, and faith, making the iwel-iwel " " not only part of tradition but also a bridge for character education based on local wisdom.

2. Science Reconstruction

Tedhak siten or Tedhak Siti is a ceremony performed for babies aged 7 or 8 months. This tradition is intended to introduce babies to stepping on the ground (earth) for the first time. The tedak sinten ceremony involves the following steps: First, the baby is guided or, in Javanese, tetah, to step on seven colors of jadah (red, white, blue, black, yellow, purple, and pink). The philosophy behind the seven colors of jadah in Javanese, which means pitu, is that the child will always receive pitulungan or salvation from God when overcoming difficulties in life. Second, the baby is lifted onto a ladder made of red sugar cane with seven steps, which means that the child is expected to go through life from the lowest to the highest level (meaning from kindergarten to the child's future success in their career). Third, the baby is placed in a chicken coop containing rice, bracelets, rings, stationery, cotton, and various useful and valuable items. This symbolizes that the baby will be able to adapt to an environment with various professions or jobs that can lead the child to their desired goals by obeying all local rules and customs. Fourth, the baby is bathed with flower water (water mixed with jasmine, rose, ylang-ylang, and kantil) which symbolizes that the baby will bring fame to their family, country, and family. Fifth, replacing the baby's clothes with new, nice clothes is expected to bring the baby a good and prosperous life and make both parents happy (Setyowati *et al.*, 2021).

In the tedhak siten tradition, there is a symbolic food called iwel-iwel. Iwel-iwel is a traditional food made from glutinous rice flour, grated coconut, and palm sugar, which is then wrapped in banana leaves shaped like a pyramid and steamed. Wulandari (2024) states that iwel-iwel can be interpreted as the parents' hopes for their child and prayers for the safety and protection of the newborn baby. The Javanese word iwel-iwel is derived from the word cemiwel, which means adorable. On the other hand, some consider iwel-iwel to be derived from the Arabic word "waliwalidaya," which means parents.

The production of iwel-iwel using local ingredients such as coconut, sticky rice, and banana leaves supports the principle of sustainable food security in line with the strategy of diversifying food consumption based on local resource potential and local wisdom to achieve a diverse, nutritionally balanced, and safe food consumption pattern (Suryana, 2014). Additionally, using local ingredients helps preserve Indonesia's biodiversity, provides economic value for local farmers and producers, and reduces dependence on imported materials. Banana leaves are a biodegradable and environmentally friendly alternative to plastic packaging.

No	Topic	Community Science	Social Sciences
1	Ingredients for making iwel-iwel	Coconut, glutinous rice flour, palm sugar	Mature coconuts are high in calories, containing 354 calories per 100 grams, which come from approximately 33 percent oil, 15 percent carbohydrates, and 3 percent protein (Subagio, 2011) . Glutinous rice is high in carbohydrates, making it sweeter than brown rice and black rice (Sari *et al*., 2019). Coconut sugar is made from coconut sap or juice. Brown sugar contains vitamin C, potassium, phosphorus, magnesium, calcium, and iron, as well as flavonoids, anthocyanins, and antioxidants that can boost energy levels. The glycemic index of coconut sugar is quite low at 35, meaning that consuming coconut sugar does not significantly affect blood sugar levels (Listyaningrum et al., 2018).
2.	Iwel-iwel processing	a. Preparing tools and ingredients b. Add the ingredients one by one and mix (in Javanese, iteri/interi) evenly. c. Prepare cleaned banana leaves. d. Take about 2 tablespoons of the mixture and place it on the banana leaf. e. Add shredded brown	The process of mixing iwel-iwel ingredients reflects the concept of heterogeneous mixtures. Heterogeneous mixtures are mixtures whose constituent substances are not completely mixed. In heterogeneous mixtures, the constituent substances can still be distinguished (Fitriani, 2020) . For example, in iwel-iwel dough, grated coconut and glutinous rice flour can still be distinguished even though they have been mixed.

		sugar filling in the center. f. Wrap the dough by folding the banana leaf and securing it with a toothpick to keep it tight. g. Steam the iwel-iwel over medium heat for about 20-25 minutes until cooked.	The steaming stage of iwel-iwel involves chemical reactions, such as starch gelatinization. Excessively high temperatures can accelerate this reaction unevenly, which can result in an undesirable texture. Low heat helps maintain the optimal temperature for this reaction to occur evenly.
3.	Packaging iwel-iwel	Using banana leaves shaped into limas	Although banana leaves are only used as wrappers, they also contain antimicrobial and antioxidant compounds that can help maintain food quality (Rahmadhia *et al*., 2019). Iwel-iwel is wrapped in a pyramid shape because a pyramid has five sides, which represent the five pillars of Islam. The pointed tip of the pyramid symbolizes the direction toward God Almighty, while the pyramid shape in general symbolizes wholeness and perfection, with the hope that the baby will grow up perfectly and prosperously.

3. Relevance of the Science Concept

The Tedhak Siten traditional ceremony, which literally means "stepping on the ground," is generally performed by the Javanese people to mark an important stage in a child's life, namely when they first step on the ground. In this procession, parents express their hopes that their children will grow up to be independent, virtuous individuals who are able to face the dynamics of life in the future.

One of the important components of the tedhak siten ceremony is the serving of a traditional food called iwel-iwel. Iwel-iwel is a traditional Javanese moist cake made from a mixture of glutinous rice flour, brown sugar, grated coconut, and a little salt. This dough is then wrapped in banana leaves and steamed. This cake is a dish that is almost always present in various baby blessing rituals in Javanese society. The baby celebration tradition itself is a series of thanksgiving ceremonies held from when the baby is born until the age of one, usually marked by a feast and the distribution of blessed rice and other items (Wulandari, 2024). In Javanese culture, iwel-iwel is considered an important part of the traditional menu that must be present at every stage of the baby celebration. Starting from brokohan (when the baby is born), sepasaran (five days old), selapanan (thirty-five days old), telonan (three months old), pitonan or tedhak siten (seven months old), to setahunan (one year old), iwel-iwel is always served as a symbol of prayers and good wishes for the child (Budiman, et al., 2022).

Iwel-Iwel not only has symbolic value in a cultural context, but also has the potential as a medium for contextual learning in science education. The use of natural

ingredients and traditional processing methods in the making of Iwel-Iwel reflects various concepts of natural sciences, such as changes in the form of substances, the physical and chemical properties of materials, heat transfer, and the utilization of biological resources.

Table of the Relationship between the Iwel-Iwel Production Process and Learning Outcomes in Junior High School

No	Learning Outcomes	Science Concepts in the Iwel-Iwel Production Process
1	At the end of phase D, students are able to classify living things and objects based on observed characteristics, identify the properties and characteristics of substances, distinguish between physical and chemical changes, and separate simple mixtures.	a. Identify the physical properties of glutinous rice flour, grated coconut, and brown sugar. b. The change in the form of brown sugar from solid to liquid when heated.
2	Students are able to measure the physical aspects they encounter and utilize various motions and forces, understand the relationship between the concepts of work and energy, measure the temperature caused by the heat energy provided, and distinguish between heat insulators and conductors.	a. The steaming process causes heat transfer, resulting in the dough becoming cooked.
3	Students can describe atoms and compounds as the smallest units that make up matter and cells as the smallest units that make up living things, identify life organization systems, and perform analyses to find the relationship between organ systems and their functions as well as abnormalities or disorders that arise in certain organ systems (digestive system, circulatory system, respiratory system, and reproductive system). Students identify interactions between living things and their environment, and can design efforts to prevent and overcome pollution and climate change. Students identify the inheritance of traits and the application of biotechnology in everyday life.	a. The carbohydrate content in glutinous rice flour as a source of energy and grated coconut as a source of fat and fiber. b. Banana leaves as wrappers demonstrate the use of plant parts in everyday life and can be linked to the structure and function of leaves in plants.

From an ethnosocial perspective, iwel-iwel is not only food, but also a symbol of hope and protection. In piton-piton or tedhak siten, iwel-iwel symbolizes a child's transition to the next stage of development, reflecting social and spiritual values in Javanese culture.

The relationship between science and ethnosociofood in the context of traditional iwel-iwel food shows that science does not stand alone but is integrated with social practices and local values. Through an understanding of biology, chemistry, and physics, we can better appreciate the process of making traditional food and its social significance.

CONCLUSION

The tedak siten tradition with iwel-iwel cuisine represents the richness of local culture, which is not only ritualistic but also full of scientific and philosophical meaning. Iwel-iwel, as part of ethnosociofood practices, contains the symbolization of spiritual, ecological, and social values, as well as basic scientific concepts such as material structure, substance

transformation, natural material properties, and local resource sustainability. This study shows that the traditional practices of the people of East Java, particularly in the use of natural ingredients such as sticky rice, coconut, brown sugar, and banana leaves, contain scientific principles that can be contextualized into science learning. The ethno-socio-science approach is able to ground science through real practices in society, making learning not merely theoretical, but more applicable, closer to the lives of students, and enriching the dimension of science literacy with a cultural perspective. The integration of ethno-socio-food concepts such as iwel-iwel into science learning can increase students' interest in learning, strengthen their contextual understanding of scientific concepts, and instill character values such as gratitude, mutual cooperation, and environmental awareness. Science learning can use local traditions as alternative learning resources, develop culture-based science literacy, and simultaneously preserve the nation's cultural heritage in the era of globalization.

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