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Article

Extension of Honey and Organic Fertilizer as Products of Animal Origin on Elementary School Students in Nagari Saniangbaka, X Koto Singkarak, Regency of Solok, West Sumatra

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Abstract

Community engagement was conducted to introduce food and non-food products of animal origin to elementary school students in Nagari Saniangbaka. Honey was selected as a food of animal origin, while organic fertilizer was selected as a non-food of animal origin. The former extension was conducted in SDN 08 Saniangbaka, while the latter extension was conducted in SDN 10 Saniangbaka. The goal of these activities was to introduce honey and animal fertilizer in order to improve their basic science knowledge and enhance health and environmental awareness. The activities were conducted through short lectures, discussions, quizzes, and the distribution of reward food. Extension of honey began with an introduction to bees as honey-producing insects, types of honey-producing bees, sources of nectar-producing plants, the honey production process, and the health benefits of honey. Extension of organic fertilizer was explained regarding various types of livestock and poultry, the potential for manure to turn into pollution if not utilized, animal manure as a by-product that can be converted into fertilizer, and the role of fertilizer for plants. The first activity significantly broadens participants' insight regarding the important role of bees and honey for humans. The second activity positively increases the interest in utilizing animal by-products for plant growth and fosters environmental concern. Both activities enrich students' science insight toward selected products of animal origin, and improve their awareness of food and the environment.

INTRODUCTION

Animals are important organisms that play a significant role in human life, both when still in the form of wild animals or after being changed into domesticated animals. Animals contribute to diverse food sources, including milk, meat, eggs, honey, and edible by-products. As non-food sources, animal donate their importance as sources of manure, hide/skin, wool, hair; in addition, their transportation and draft power services are also significant for this source type. In fact, among such roles mentioned, domesticated animals are dominantly found in our daily food and non-food systems.

Bees are unique animals that are part of the natural ecosystem. This insect can be found as wild animals in forests, plantations, and agricultural ecosystems, or integrated naturally near human settlements or conditioned in a bee stub. The latter aims to increase the bee population, which can then be easily observed by humans. Bees are involved in pollination and also provide honey for consumption. Bees are

sometimes chosen as the learning object of science in elementary school. Rodríguez-Loinaz et al. (2018) highlighted the relationship between bees and plants in learning about nature and the environment among school children.

Livestock and poultry are significant for their manure production, besides being important for their food sources. Cattle are ruminant livestock with high daily production in both feces and urine, with or without separation. Chicken is one important poultry species for manure without feces and urine separation. Manure of these animals, which are intensively caged, is easier to collect. However, improper animal manure management can negatively impact the environment, such as air pollution and pathogen transfer. Regarding children's learning, Alessandra and Maissa (2023) point out the use of animal manure as organic fertilizer in public school gardens.

Saniangkaba is a nagari (sub-district) in the Regency of Solok, situated directly adjacent to a small part of Lake Singkarak. School-age students from six jorong, i.e., Kapalo Labuah, Balai Gadang, Balai Lalang, Balai Batingkah, Balai Panjang, and Aia Angek, were primarily distributed in seven elementary schools, two junior high schools, and two senior high schools. School students can consider enrichment materials in class activities from an external learning approach, including topics related to food and non-food of animal origin. The topics are relevant to science subjects and can instill attentiveness to socially connected issues.

Science for elementary school students significantly improves their awareness of the natural ecosystem and the environment. Previous studies implied increasing interest and awareness of students when science is linked to their daily lives (Eady, 2008). Educational science could be stressed regarding integrating students with socio-scientific issues (Baptista et al., 2018). By connecting it with nature, interestingly, elementary school students typically have more knowledge of animals than plants (Schussler et al., 2010). In fact, class discussion is one of the important parts determining student interest in science, although textbooks and teacher explanations are two standard models in science learning (Agranovich and Assaraf, 2013). However, grade level and out-of-class personal experience determine students' responses toward food production and origin (Brophy et al., 2003).

Honey bees could be used as educational objects to increase pupils' concern toward the natural environment, while at the same time eliminating their fear of this insect (Cho and Lee, 2017). Bees are a popular insect species for the positive feelings of elementary school students. Classified as the Hymenoptera order, this insect type could be used to improve the students' educational experience, particularly to describe the order and its role in the ecosystem (de Jesus Portugal et al., 2025). A previous study revealed the importance of bees as an interdisciplinary study introduced to elementary school students, particularly on bee biology and their benefits (Johnson et al., 2014). Bee can be used as an object to explain pollination and pollinators to elementary school students (Stanisavljević et al., 2022). At the same time, honey produced by the bees can be consumed at all levels of consumers, from older people, adults, to children, with its various nutrient intake and healthy effects (Kumar et al., 2024). Thus, besides being an insect, their honey can also be used to educate students as supplementary food.

On the other hand, improper manure management from livestock and poultry might result in severe environmental pollution and increase health risks (Yugao et al., 2021). Utilizing animal manure as fertilizer will improve soil quality, increase crop productivity, and positively impact the environment (Loss et al., 2019). Besides its naturalness and usefulness, organic fertilizer is a favorite among school students due to its safety issues for the environment and living organisms (Ayaz and Cebesoy, 2018). Previous studies reported that animal manure is more frequently used as organic fertilizer in school garden programs (Ibañez, Jr., et al., 2022; Ibañez, Jr., et al., 2023).

Community engagement from a university can provide another learning approach for school students. This activity aims to introduce the honeybees and their honey as a food of animal origin. Besides, it also introduces the ruminant and poultry and their manure as non-food of animal origin. Both objects are targeted to improve elementary school students' awareness of health and environmental issues. To obtain the goal, education through extension service in selected schools could be an initial stage to provide basic knowledge about particular food and non-food of animal origin.

METHOD

Extension was used as a method of this community engagement activity, as adapted from Putra et al. (2023). The extension was divided into short lectures, discussions, quizzes, and product rewards. Short lectures were delivered in simple language to ensure the topic was appropriate for the students' age level. The discussion session was opened by encouraging the student to convey their questions, opinions, and experiences confidently, and then get responses from the community engagement team. A quiz was conducted to motivate students to respond to the question effectively. Product rewards were awarded to students for both those who had the correct answer to the question and all participants with various food products.

The elementary school students involved in extension came from several grade levels and were gathered in one room for each outreach event. About 30 students from SDN 08 Saniangbaka participated in the extension of honey, and 40 students from SDN 10 Saniangbaka participated in the extension of animal fertilizer. Several university students assisted in its implementation.

RESULT AND DISCUSSION

Extension of honey

This activity began with an explanation of bees, honey as a main bee product, the source of nectar that will be converted into honey, and its benefits for the body. Regarding the types of honey-producing bees, the community service team also described the types of stingbees and stingless bees. Stingbees are usually the producers of forest honey and stingless bees (known locally as galo-galo), recently popularly bred in hives, a special box where honey production is easier to control and collect. After that, an explanation was also given regarding the source of nectar that the bees collect and then bring to their hives, thus clarifying how bees produce honey. In addition, the team also explained the importance of this carbohydrate-rich honey as a source of energy and supplement for a healthy body, as well as a natural ingredient for medicine/supplements.

Honey production varies among bee species. In general, sting bees produce a higher honey yield than stingless bees. This might be associated with their body size and thus also influences the distance the bees need to move for forage, as well as the total amount of nectar that can be obtained and converted into honey. In fact, honey from stingless bees can be distinguished by its higher moisture content, and sometimes it has a typically sweet-acidic taste compared to honey from sting bees. However, both honey from sting bees and stingless bees are rich in nutrient sources, not only sugar but also varying amounts of minerals, vitamins, and enzymes. In practice, honey can be consumed in its original form alone, mixed with herbs, or combined with other food products.

Honey is interesting for elementary school students to use in science, especially when discussing biological ecosystems. This will cover the bees, nectar-source plants, and environmental conditions. Mutualism between bees and plants is significant. Bees get the advantage from the nectar of the plant flowers; plants obtain the benefit from pollination involving bees. In the end, humans obtained the usefulness of honey for consumption.

After a short presentation, the event continued with a question-and-answer session, where participants were asked to ask questions, which were then answered by the community service team. When the socialization activity continued with a quiz session, participants who were able to answer the questions were awarded prizes in the form of small plastic honey packages or honey sachets. At the end of the event, honey sachets were distributed to all participants, both in original flavor and in several fruit-flavored honey sachets. Several questions emerged during the discussion, as well as answers during the quiz session, indirectly encouraging students at this school to learn to express their perspectives and increasing their confidence in speaking in front of the forum.



Figure 1. Documentation of honey extension activity at SDN 8 Saniangbaka

Through this activity, students understood their natural environment, particularly in the context of the insects they are expected to encounter. It also demonstrated that the presentation of honey and honey-producing bees was highly appropriate and could serve as a basis for future considerations regarding including bee-related topics in the school curriculum. Furthermore, this introduction to honey will shift participants' mindsets to utilize natural resources, such as honey, as a medicinal ingredient and a natural supplement. It parallels a previous publication, which underlined the importance of bees as an object in teaching children about environmental and ecosystem conservation. In addition, by focusing on their main product, honey acts as a nutritional source and health protection for children (Esper et al., 2013).

Previous reports underlined the significance of honey in enhancing the eating frequency of pre-school children (Ratnaningrum and Wulandari, 2023) and the nutritional status of children under five years old (Harmiyati et al., 2017; Widowati et al., 2021). Previous study reported that the pattern of honey consumption can be combined with various foods (Kowalczuk et al., 2023), which can be adapted by elementary school students by combining it with local food. Due to its glucose and fructose components, honey serves as an energy booster for consumers and is thus suitable for school-age children, besides the elderly and sportsmen (Baglio, 2018).

Extension of organic fertilizer

The lecture covered the field of animal husbandry and its diverse livestock species, livestock waste in the form of feces and urine, pollution caused by unutilized feces, the use of livestock manure as fertilizer, and the benefits of fertilizer use for plant growth. Manure production by various livestock species occurs daily. This differs from food-based livestock products such as milk, meat, and eggs, which typically have a production period. Regarding livestock type, cattle are generally considered the species with the high fecal production, given their population size among ruminants. Furthermore, among poultry, high-yield manure production in chicken was also noticed, particularly in the broiler and layer chicken industries, which operate in a closed-house or semi-closed-house system, where the population is generally quite large.

The explanation of pollution caused by improperly managed livestock manure is also highlighted as part of a scientific approach to the environment. Livestock manure can be a source of air pollution, attracting flies that can transmit disease to humans, and making the surrounding environment unhealthy. Therefore, through this activity, the community service team attempted to transform students' critical thinking to address this problem by converting livestock manure into fertilizer.

Fertilizer is certainly a key topic in science lessons, as it relates to plant growth, both for plants that serve as a food source for humans and for plants intended as beauty floral, such as flowers and other ornamental plants. This section explains the role of nutrients in fertilizer in plant growth and development, analogizing the role of nutrients in human food. This activity enriches participants' knowledge beyond the scientific content learned in the required classroom lessons.

The event continued with a discussion and a quiz. Food prizes were provided to motivate participants to answer the questions posed during the quiz session actively. Participants revealed positive enthusiasm in the discussion and quiz, demonstrating their understanding of the material presented and discussed. Hands raising and question scrambling confirmed the students' confidence in participating in the session.



Figure 2. Documentation of organic fertilizer extension activity in SDN 10 Saniangbaka

Overall, this activity significantly contributed to increasing environmental awareness and concern. In line with what was highlighted in the previous report, education is significant in promoting awareness of environmental risks among elementary school students (Arani et al., 2016). Instilling awareness of environmental aspects in primary school students is a tremendous and significant investment for environmental sustainability (Simsekli, 2014). As underlined in a reference, managing animal manure with various strategies is required to provide benefits not only for farmers, but also for the wider community (Malomo et al., 2022), including school-age students as part of the school community.

The introduction of animal manure as a source of organic fertilizer provides basic knowledge about the benefits of this animal by-product. It could be used to support the school garden program in the future. Moreover, as understood from a previous study, students' knowledge of composting parallels their experience in composting activities at school and home (Tsang et al., 2025). Also, introducing composting practice in school can teach students to increase sanitation levels and foster environmental awareness (Mpuangnan et al., 2023).

CONCLUSION

Extension of honey as a representative of food of animal origin has fostered increased understanding of honey and the bees as the producing insect species. This activity indirectly encourages students to consume honey as a natural supplement and alternative treatment. The extension of organic fertilizer from animal manure, as a representative of non-food of animal origin, increased students' understanding of

livestock and the positive effect of their manure on the plant. At the same time, this activity also instills in them a commitment to pollution prevention, thus fostering students' environmental awareness. Further activities are needed to raise stingless bees in a stub around the school environment and involve student activity in the school farm using organic fertilizer.

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REFERENCES

Agranovich, S., & Assaraf, O. B.-Z. (2013). What makes children like learning science? An examination of the attitudes of primary school students towards science lessons. Journal of Education and Learning, 2(1), 55-69. https://doi.org/10.5539/jel.v2n1p55

Alessandra, R., & Maissa, M. D. S. (2023). Characterization and agroecological management of school gardens in the Serra Gaúcha region, Brazil. Agroalimentaria, 29(57), 213-226. https://doi.org/10.22004/ag.econ.347643

Arani, M. H., Bagheri, S., & Ghaneian, M. T. (2016). The role of environmental education in increasing the awareness of primary school students and reducing environmental risks. Journal of Environmental Health and Sustainable Development, 1(1), 9-17.

Ayaz, B., & Cebesoy, Ü. B. (2018). Investigation of 5th grade students' awareness about chemical and organic fertilizers: An action research. Inonu University Journal of the Faculty of Education, 19(1), 297-314. https://doi.org/10.17679/inuefd.330752

Baglio, E. (2018). Chemistry and Technology of Honey Production. SpringerBriefs in Molecular Science. Springer, Cham. https://doi.org/10.1007/978-3-319-65751-6_1

Baptista, M., Reis, P., & de Andrade, V. (2018). Let's save the bees! An environmental activism initiative in elementary school. Visions for Sustainability, 9, 41-48. https://doi.org/10.13135/2384-8677/2772

Brophy, J., Alleman, J., & O'Mahony, C. (2003). Primary-grade students' knowledge and thinking about food production and the origins of common foods. Theory & Research in Social Education, 31(1), 10-50. https://psycnet.apa.org/doi/10.1080/00933104.2003.10473214

Cho, Y., & Lee, D. (2017). 'Love honey, hate honey bees': reviving biophilia of elementary school students through environmental education program. Environmental Education Research, 24(3), 445-460. https://doi.org/10.1080/13504622.2017.1279277

de Jesus Portugal, E., Martins, J. C., Santos, A. L., Santana, E. P., de Jesus, L. M., and de Lourdes Lopes Araújo, M. (2025). Educational experiences for Elementary School students learning about the characteristics and importance of insects. Research, Society and Development, 14(6), e4314648994. http://dx.doi.org/10.33448/rsd-v14i6.48994

Eady, S. (2008). What is the purpose of learning science? An analysis of policy and practice in the primary school. British Journal of Educational Studies, 56(1), 4-19. https://doi.org/10.1111/j.1467-8527.2007.00391.x

Esper, H., London, T., & Kanchwala, Y. (2013). Diversified Farm Income, Market Facilitation, and their Impact on Children: An Exploration of Honey Care Africa. Impact Case Study No. 3. Ann Arbor: The William Davidson Institute.

Harmiyati, Soejoenoes, A., Wahyuni, S., Aristiati, K., and Hadisaputro, S. (2017). The impact of honey on change in nutritional status in children with poor nutrition. Belitung Nursing Journal, 3(2), 110-119. https://doi.org/10.33546/bnj.71

Ibañez, Jr., R. Y., Frederick, J., Velza, P., Castillo, I. B., & Bartolay, R. A. (2022). Status of gulayan sa paaralan (school garden) program in public elementary and secondary schools of cawayan, masbate, philippines: Basis for extension activities. International Journal of Multidisciplinary: Applied Business and Education Research, 3(12), 2574-2588. https://doi.org/10.11594/ijmaber.03.12.11

Ibañez, Jr., R. Y., Velza, J. F. P., & Bartolay, R. A. (2023). Gulayan sa paaralan (school garden) program coordinators production practices: basis for capacity-building program. International Journal of Multidisciplinary: Applied Business and Education Research, 4(5), 1668-1681. https://doi.org/10.11594/ijmaber.04.05.28

Johnson, B., Kil, J., Evans, E., & Koomen, M. H. (2014) Bee-wild about pollinators!: An interdisciplinary study introduces primary students to the importance of bees. Science and Children, 52(4), 44-48. https://doi.org/10.2505/4/sc14_052_04_44

Kowalczuk, I., Stangierska, D., Widera, K., Fornal-Pieniak, B., & Latocha, P. (2023). Determinants of honey consumption with special reference to the influence of nutritional knowledge and health status on consumption habits. Applied Sciences, 13, 979. https://doi.org/10.3390/app13020979

Kumar, R., Kumari, I., & Hajam, Y.A. (2024). Honey beyond medicine. In: Kumar, R., Hajam, Y.A., Bala Dhull, S., Giri, A. (eds) Honey in Food Science and Physiology. Springer, Singapore. https://doi.org/10.1007/978-981-97-3565-5_10

Loss, A., da Rosa Couto, R., Brunetto, G., da Veiga, M., Toselli, M., & Baldi, E. (2019). Animal manure as fertilizer: Changes in soil attributes, productivity and food composition. International Journal of Research - Granthaalayah, 7(9), 307-331. https://doi.org/10.29121/granthaalayah.v7.i9.2019.615

Malomo, G. A., Madugu, A. S., & Bolu, S. A. (2022). Sustainable animal manure management strategies and practices. In: A. Aladjadjiyan. Agricultural Waste and Residues. Intechopen. London. pp. 119-137. https://doi.org/10.5772/intechopen.78645

Mpuangnan, K. N., Mhlongo, H. R., & Govender, S. (2023). Managing solid waste in school environment through composting approach. Journal of Integrated Elementary Education, 3(1), 34-57. https://doi.org/10.21580/jieed.v3i1.16003

Putra, A. A., Sandra, A., Novia, D., Sari, R. P., & Putri, A. V. 2023. Community service focused on food of animal products in Nagari Saniangbaka, X Koto Singkarak, Regency of Solok, West Sumatra. Warta Pengabdian Andalas, 30(4), 837-843. https://doi.org/10.25077/jwa.30.4.837-843.2023

Ratnaningrum, A., & Wulandari, S. 2023. The influence of consuming honey on the eating frequency of children under five years (3-5 years). Women, Midwives and Midwifery, 3(1), 77-83. https://doi.org/10.36749/wmm.3.1.77-83.2023

Rodríguez-Loinaz, G., Toral, N., & Palacios-Agundez, I. (2018). Bee-plant relationship in early childhood: A study through the analysis of children's drawings. Proceedings 2018, 2, 1351. https://doi.org/10.3390/proceedings2211351

Schussler, E. E., Link-Pérez, M. A., Weber, K. M., & Dollo, V. H. (2010). Exploring plant and animal content in elementary science textbooks. Journal of Biological Education, 44(3), 123-128. https://doi.org/10.1080/00219266.2010.9656208

Simsekli, Y. (2014). An implementation to raise environmental awareness of elementary education students. Procedia - Social and Behavioral Sciences, 191, 222-226. https://doi.org/10.1016/j.sbspro.2015.04.449

Stanisavljević, J. D., Mijakovac, M. M., Sumatokhin, S. V., & Stanisavljević, L. Ž. (2022). Comparative analysis of knowledge of concepts of pollination and bee pollinators among elementary school students. Society and Animals 31(9), 1-20. https://doi.org/10.1163/15685306-bja10077

Tsang, S. W. R., Sharp, E. L., & Egli, V. (2025). Children's knowledge and experience of compost/ing. Journal of Geoscience Education. https://doi.org/10.1080/10899995.2025.2537996

Widowati, R., Rosana, Y. M., Silawati, V., & Raushanfikri, A. (2021). Honey and children: The effect of honey from Apis cerana bees on children' nutritional status in East Nusa Tenggara-Indonesia. Journal of Agrobiotechnology, 12(1), 49-56. https://doi.org/10.37231/jab.2021.12.1.219

Yugao, W., Zhuoyang, L., & Jing, F. (2021). Environmental pollution and health hazards caused by animal agriculture manure. Journal of Environmental and Occupational Medicine, 38(11), 1284-1290. https://doi.org/10.13213/j.cnki.jeom.2021.21133

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