

Utilization of Alternative Food Plants in Biology Practicum to Raise Awareness of Food Security

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ABSTRACT

ABSTRACT Food security has emerged as a critical global issue due to climate change, population growth, and unsustainable agricultural practices. Biology education plays a strategic role in cultivating students' awareness of food-related issues. This study explores the integration of alternative food plants—such as taro, cassava, and sorghum—into biology practicum activities to enhance students' understanding of food diversity and sustainability. Through a qualitative descriptive approach, this research highlights how practical engagement with underutilized crops fosters scientific inquiry, problem-solving, and ecological awareness. Findings suggest that utilizing alternative food plants in school laboratories not only enriches the learning experience but also contributes to shaping students' environmental attitudes and food security literacy.

Keywords: Food security, alternative food plants, biology practicum, sustainability education, Zero Hunger

160 Introduction

Food security, defined as access to sufficient, safe, and nutritious food for all people at all times, is an increasingly pressing concern. Traditional food systems, largely dependent on a narrow range of staple crops, are vulnerable to disruptions. Consequently, education—particularly biology education—must play an active role in promoting awareness of food diversity and sustainable consumption.

Alternative food plants, such as tubers and cereals outside the global mainstream (e.g., taro, sweet potato, sorghum), offer ecological and nutritional advantages. Despite their potential, these plants remain underutilized in both agriculture and education. Integrating them into biology practicum presents an innovative opportunity to align scientific learning with local food resilience and environmental consciousness.

This article investigates how the inclusion of alternative food plants in biology practicum can foster students' scientific skills while simultaneously raising awareness of food security challenges and solutions.

161 Research Methods

This study employed a qualitative descriptive method through literature review, observation, and documentation of classroom practices in secondary schools. Data were collected from lesson plans, student worksheets, and reflective journals. The analysis followed thematic coding to identify learning outcomes related to food security awareness.

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162 Result and Discussion

1. Alternative Food Plants as Learning Media

Plants such as cassava (*Manihot esculenta*), taro (*Colocasia esculenta*), breadfruit (*Artocarpus altilis*), and sorghum (*Sorghum bicolor*) were introduced in biology lessons on plant anatomy, physiology, and photosynthesis. Their physical characteristics and adaptive strategies in marginal environments served as practical examples of biodiversity and resilience.

2. Scientific Skills Development

Activities included starch extraction, comparative root structure analysis, and seed germination tests under various conditions. Students reported increased engagement and curiosity when working with unfamiliar yet culturally significant plant species.

3. Food Security Awareness

Students showed improved understanding of food scarcity issues, the importance of crop diversification, and the role of indigenous knowledge in agriculture. Discussions and reflections indicated that students recognized the value of utilizing local plant resources and reducing dependence on imported staples.

4. Environmental and Ethical Insights

Many students proposed ideas for community gardens or urban farming projects using alternative food plants, suggesting a shift toward proactive and sustainable behavior.

163 Conclusion

The incorporation of alternative food plants into biology practicum contributes meaningfully to science education by bridging ecological content with real-world relevance. Students not only gain biological knowledge but also develop critical awareness of global food challenges and sustainable practices. This model promotes interdisciplinary learning that supports food security, environmental stewardship, and community engagement.

Recommendations

1. Curriculum Development: Educational authorities should integrate local food plant knowledge into national biology curricula.
2. Teacher Training: Professional development programs must equip teachers with the skills to design and implement food-based learning modules.
3. Community Involvement: Schools can collaborate with local farmers and food experts to deepen the impact of practical lessons.
4. Appendix: Sample Practicum Activity

Title: Starch Extraction and Identification in Alternative Food Plants

Objectives:

1. Identify the presence and concentration of starch in cassava, taro, and sweet potato.
2. Compare starch yield and draw conclusions about nutritional potential.

Materials:

1. Samples of cassava, taro, sweet potato
2. Blender/grater, beaker, filter paper, iodine solution, microscope
3. Labels and worksheet for observations

Procedure:

1. Wash and grate each tuber separately.
2. Mix with water and filter to extract starch.
3. Let the extract settle and observe starch sediment.
4. Add iodine solution to a drop of extract and observe color changes (blue-black indicates starch).

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