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PASTURE-BASED POULTRY FARMING: APPROACH FOR ANIMAL WELFARE, NUTRITIONAL QUALITY AND ENVIRONMENTAL SUSTAINABILITY

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ABSTRACT

Pasture-based poultry farming has emerged as a promising sustainable alternative to conventional indoor farming methods, offering potential benefits in terms of animal welfare, environmental sustainability, and nutritional quality of poultry products. This comprehensive review aims to summarize and analyze the existing literature on pasture-based poultry farming, providing insights into its advantages, challenges, and future research directions. Numerous studies have consistently reported pasture-based system in promoting animal welfare by allowing chickens to exhibit their natural behaviors, reducing stress levels, and enhancing overall health. Moreover, pasture-raised poultry products have demonstrated superior nutritional profiles, characterized by elevated levels of omega-3 fatty acids, vitamins, and antioxidants. The environmental benefits of pasture-based systems include enhanced soil fertility, reduced soil erosion, and lower greenhouse gas emissions compared to conventional indoor systems. However, successful implementation of pasture-based systems requires careful management practices, addressing concerns related to predator control, disease risks, and labor requirements. This review underscores the importance of further research to optimize pasture-based poultry farming, fill knowledge gaps, and promote its sustainable adoption in meeting consumer demand for ethically and sustainably produced poultry products.

Keywords: Animal Welfare, Environmental Impacts, Nutritional Benefits, Pasture-Based Poultry Farming

INTRODUCTION

Poultry farming has traditionally been associated with intensive indoor production systems. However, there is growing evidence that allowing poultry access to sunlight and pasture can have significant positive effects on their well-being, behavior, and overall health (Nasr *et al.*, 2018). Raising poultry with access to pasture has gained substantial recognition as an alternative farming method that offers a range of benefits for animal welfare, product quality, and environmental sustainability. This innovative approach allows birds to engage in natural behaviors, access outdoor environments, and consume a diverse, pasture-based diet. Various studies have examined the diverse aspects of pasture-based poultry farming, shedding light on its advantages and the potential it holds for sustainable agricultural practices. By synthesizing existing knowledge, this review seeks to contribute to a deeper understanding of the advantages and challenges associated with this sustainable farming method.

BENEFITS OF PASTURE-BASED POULTRY FARMING

Animal Welfare in Pasture-Based Poultry Farming

Past studies have consistently indicated that pasture-based poultry farming systems significantly improve

animal welfare compared to conventional indoor farming methods (Bergquist *et al.*, 2016; Whitten *et al.*, 2018). These systems allow birds to engage in natural behaviors such as foraging, scratching, and dust bathing (Dawkins, 2017). Abonyi *et al.* (2018) evaluated the effect of rearing systems on behavior and welfare of laying birds. It found that birds reared in the free-range system exhibited more natural behaviors, such as foraging and dust bathing, compared to birds in a cage system, resulting in improved welfare. The provision of ample space, access to fresh air and sunlight, and opportunities for exercise has been shown to reduce stress and improve overall welfare indicators (Rodríguez *et al.*, 2019). Furthermore, pastured poultry systems promote behaviors that enhance the birds' mental and physical stimulation, leading to healthier and more contented animals.

Product Quality and Health Benefits

Compared to conventional indoor systems, pasture-raised poultry often exhibit improved meat and egg quality. This section examines studies by Oguntade *et al.* (2018) and Ajibefun *et al.* (2021) that assess parameters like nutrient composition, fatty acid profile, and consumer preference. The results demonstrate the potential health benefits and superior product quality associated with pasture-based

systems. The varied diet of grasses, plants, and insects that pasture-raised poultry is exposed to contributes to increased levels of omega-3 fatty acids, vitamins A and E, and beneficial antioxidants (Leheska *et al.*, 2008). Additionally, pasture-raised poultry products tend to have lower levels of overall fat and lower ratios of omega-6 to omega-3 fatty acids, thus offering a healthier alternative for consumers (Whitten *et al.*, 2018). Ogunwole *et al.* (2019) investigated the performance, meat quality, and carcass characteristics of broiler chickens reared on different types of pasture forage species. The findings indicated variations in performance, with certain forage species leading to better growth rates and meat quality attributes, highlighting the importance of forage selection in optimizing production outcomes. These nutritional enhancements provide potential health benefits to consumers and align with the increasing demand for nutritious and sustainably produced food.

Environmental Impacts of Pasture-Based Poultry Farming

Several studies have highlighted the positive environmental impacts of pasture-based poultry farming in comparison to traditional indoor systems (Williams *et al.*, 2010; Choi *et al.*, 2014). Igwe *et al.* (2020) examined the greenhouse gas emissions, physicochemical properties, and fertility status of soils under different land-use systems of poultry production. It found that some land-use systems had higher greenhouse gas emissions and altered soil fertility parameters compared to others, emphasizing the importance of sustainable land management practices. By allowing birds to graze on open pasture, these systems contribute to soil fertility through natural fertilization (Russell *et al.*, 2013). This improves soil health, reduces soil erosion, and increases carbon sequestration (Daigle *et al.*, 2018). The minimized need for artificial heating, lighting, and ventilation in indoor facilities also leads to reduced energy consumption and greenhouse gas emissions (Chupp *et al.*, 2019). Overall, pasture-based poultry farming demonstrates a more sustainable farming practice with positive environmental outcomes.

Product Quality and Health Benefits of Pasture-Raised Poultry

Numerous studies have found that pasture-raised poultry products exhibit superior nutritional profiles compared to conventionally raised counterparts (Karsten *et al.*, 2010; Herrero *et al.*, 2013). Nasir *et al.*, (2018) investigated the meat quality characteristics of free-range reared quail. It found that free-range quail had higher levels of beneficial

omega-3 fatty acids, lower levels of saturated fatty acids, and improved sensory attributes compared to conventionally raised quail, indicating the potential health benefits and superior product quality of pasture-raised poultry. A study by Prayitno *et al.*, (1997) compared the meat quality of broilers raised in free-range systems with different shelter types. It found that free-range broilers had higher meat quality, including lower levels of drip loss and higher pH values, which are indicators of improved meat tenderness and quality. A similar study by Jayasena *et al.* (2013) compared the meat quality of slow-growing and fast-growing broiler chickens. It found that slow-growing broilers, often raised in free-range or pasture-based systems, exhibited superior meat quality traits, including lower drip loss, higher pH values, and improved sensory attributes compared to fast-growing broilers. The varied diet of grasses, plants, and insects that pasture-raised poultry is exposed to contributes to increased levels of omega-3 fatty acids, vitamins A and E, and beneficial antioxidants (Leheska *et al.*, 2008).

Additionally, pasture-raised poultry products tend to have lower levels of overall fat and lower ratios of omega-6 to omega-3 fatty acids, thus offering a healthier alternative for consumers (Whitten *et al.*, 2018). A research by Ajibefun *et al.* (2021) evaluated the nutritional and sensory qualities of eggs from free-range and battery-caged layers. It revealed that eggs from free-range layers had higher levels of certain nutrients and were preferred by consumers, indicating potential health benefits and consumer preference associated with free-range production. Xiao *et al.* (2015) compared the meat quality and health parameters of free-range and confined feeding systems in Wenchang chickens. It found that free-range chickens had lower levels of oxidative stress, higher lymphoid organ indices, and improved meat quality attributes, such as lower shear force values, indicating better tenderness and quality in free-range poultry.

These nutritional enhancements provide potential health benefits to consumers and align with the increasing demand for nutritious and sustainably produced food.

Ethical considerations, Perceived health benefits, Sustainability and environmental consciousness

The rising consumer demand for ethical, sustainable, and high-quality food products has propelled the popularity of pasture-based poultry farming (Lewis *et al.*, 2011; Verbeke, 2015). This system aligns with the values of consumers seeking animal welfare, environmental stewardship, wholesome products and ethical production

practices. These consumers are willing to pay a premium for products that align with their values (Lewis *et al.*, 2011). Pasture-raised poultry resonates with consumers who prioritize sustainable and environmentally-friendly farming practices. It is seen as a more sustainable alternative to intensive, confinement-based production systems (Verbeke, 2015). Pasture-raised poultry often comes from local, independent farms, which appeals to consumers seeking a connection to the source of their food (Dibb *et al.*, 2013). Pasture-raised poultry is often associated with superior taste and quality. Consumers are willing to pay more for products that are perceived to have better flavor, texture, and overall eating experience (Henchion *et al.*, 2014).

MANAGEMENT PRACTICES AND CHALLENGES

Successful implementation of pasture-based poultry farming requires careful management practices. Studies have emphasized the importance of adequate grazing space, rotational grazing for maintaining pasture quality, predator control measures, and shelter availability (Russell *et al.*, 2013; Rodrigues *et al.*, 2019). Challenges identified include the need for skilled labor, increased disease risks associated with outdoor systems, and potential concerns over food safety due to environmental exposure (Straus & Greger, 2012; Vigors *et al.*, 2019). Continued research and fine-tuning of management strategies are necessary to address these challenges and improve the overall efficacy of pasture-based systems.

CONCLUSION

Pasture-based poultry farming offers numerous advantages over conventional indoor systems, promoting animal welfare, environmental sustainability, and enhanced nutritional content in poultry products. Previous research has consistently shown the positive impacts of this farming method. However, certain challenges and gaps in knowledge remain, requiring continued research to optimize pasture-based systems. With growing consumer demand for sustainable and ethically produced poultry, pasture-based farming represents an important avenue for farmers to meet market preferences while ensuring a more sustainable and humane food system.

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