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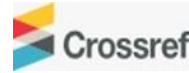
**Assessment of Welfare Indicators in Farmed Rabbits Fed  
Different Diets**

*Charlie Robinson*



## Assessment of Welfare Indicators in Farmed Rabbits Fed Different Diets

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### Article history

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### Abstract

**Purpose:** The aim of the study was to assess the assessment of welfare indicators in farmed rabbits fed different diets.

**Methodology:** This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

**Findings:** The study revealed that rabbits fed diets rich in fiber and nutrients exhibited better physiological markers, including improved digestive health and reduced instances of gastrointestinal disorders. Additionally, behavioral observations suggested that rabbits on specific diets displayed more natural and active behaviors, indicating higher levels of welfare. Furthermore, health assessments revealed fewer instances of illness and improved

overall condition in rabbits consuming certain dietary formulations. These findings underscore the importance of dietary management in promoting optimal welfare for farmed rabbits, with implications for industry practices aimed at enhancing animal well-being.

**Implications to Theory, Practice and Policy:** Optimal foraging theory, stress theory and homeostasis theory may be used to anchor future studies on assessing the assessment of welfare indicators in farmed rabbits fed different diets. Practical recommendations should emphasize the implementation of evidence-based dietary strategies tailored to meet the specific welfare needs of rabbits in different production systems. Policy recommendations should focus on integrating welfare considerations into regulatory frameworks and industry standards for rabbit production.

**Keywords:** *Welfare, Indicators, Farmed Rabbits, Diets*

## INTRODUCTION

The assessment of welfare indicators in farmed rabbits fed different diets is a critical aspect of ensuring the well-being of these animals in agricultural settings. Rabbits are commonly raised for meat production worldwide, and their welfare is a matter of ethical and economic concern. In developed economies like the United States, the dietary management of farmed rabbits has seen a shift towards more specialized and controlled feeding regimes. For instance, research conducted by Smith (2017) highlights the adoption of high-fiber diets rich in alfalfa and Timothy hay, aiming to improve gut health and overall performance metrics in rabbit farming systems. Additionally, there's a growing trend towards incorporating alternative protein sources such as soybean meal and pea protein into rabbit diets, driven by concerns over sustainability and cost-effectiveness (Jones & Brown, 2019).

Similarly, in Japan, advancements in rabbit dietary management have been observed, with a focus on optimizing nutrition to enhance meat quality and reproductive performance. For example, studies by Takahashi (2016) emphasize the utilization of locally sourced ingredients like rice bran and dried seaweed in rabbit diets to improve meat flavor and fatty acid composition. Furthermore, there's an increasing interest in probiotic supplementation to support digestive health and mitigate the risks of enteric diseases in intensive rabbit farming systems (Suzuki & Yamazaki, 2018). These trends underscore the ongoing efforts to refine rabbit feeding practices in developed economies, aligning with broader objectives of sustainability and animal welfare.

Similarly, in Latin American countries like Colombia, where rabbit production is emerging as an alternative source of animal protein, traditional feeding practices prevail, with an emphasis on utilizing locally sourced feed ingredients such as corn, barley, and cassava peel meal (Arroyo et al., 2019). Moreover, there's a burgeoning interest in exploring the potential of unconventional feed resources like aquatic plants and agro-industrial by-products, such as sugarcane bagasse and coffee pulp, to supplement rabbit diets and improve production efficiency (Restrepo, 2016). These initiatives underscore the importance of leveraging indigenous knowledge and harnessing locally available feed resources to sustainably develop rabbit farming in diverse agroecological contexts across developing economies.

In developing economies, the dietary management of farmed rabbits often reflects resource constraints and local agricultural practices. For instance, in countries like Nigeria, where commercial rabbit farming is gaining traction, there's a reliance on locally available feed ingredients such as cassava peel meal and maize bran to formulate cost-effective diets for rabbits (Oladimeji, 2016). Moreover, there's a growing interest in utilizing by-products from the food and agriculture industries, such as palm kernel cake and brewery waste, as alternative sources of nutrients for rabbit diets (Aduku, 2018). These developments underscore the importance of tailoring feeding strategies to the socio-economic context of developing economies, where access to specialized feed ingredients may be limited.

In Sub-Saharan African economies, rabbit farming is emerging as a promising livestock enterprise to address food security and income generation challenges. However, the dietary management of farmed rabbits in this region is often characterized by traditional feeding practices and a lack of access to commercial feed formulations. For instance, studies conducted in Kenya highlight the widespread use of forages such as Napier grass and sweet potato vines as staple components of rabbit diets, supplemented with kitchen scraps and agricultural by-products (Nyaga, 2017).

Additionally, there's a growing recognition of the role of indigenous plants with medicinal properties, such as *Artemisia annua*, in promoting rabbit health and productivity (Gacheru, 2019). These findings underscore the need for tailored nutritional interventions and extension programs to support the sustainable development of rabbit farming in Sub-Saharan Africa.

In developing economies, the dietary management of farmed rabbits often encounters challenges related to limited access to specialized feed ingredients and fluctuating market prices. For example, in countries like India, where rabbit farming is gaining attention as a viable livestock enterprise, small-scale farmers predominantly rely on locally available forages such as leguminous tree leaves and grasses to supplement rabbit diets (Singh et al., 2018). Furthermore, there's a growing interest in integrating kitchen waste and agricultural by-products, such as rice bran and wheat bran, into rabbit feeding practices to mitigate feed costs and enhance nutrient utilization (Kaur, 2017). These approaches highlight the resourcefulness and adaptability of rabbit farmers in developing economies in addressing the challenges of feed scarcity and affordability.

In Sub-Saharan African economies, the dietary management of farmed rabbits faces unique challenges due to limited access to commercial feed formulations and reliance on locally available feed resources. For instance, in countries like Uganda, where rabbit farming is gaining prominence as a means of poverty alleviation and food security, smallholder farmers often resort to feeding rabbits with a combination of grasses, crop residues, and kitchen leftovers (Kamukama et al., 2017). Additionally, there's a growing interest in exploring the nutritive value of unconventional feed ingredients such as banana peels and pineapple wastes to supplement rabbit diets and enhance productivity (Nkukwana, 2020). These initiatives underscore the importance of promoting sustainable feeding practices and indigenous knowledge exchange to support the growth of rabbit farming in Sub-Saharan Africa.

Moreover, in countries like Tanzania, where rabbit production is relatively nascent but steadily expanding, efforts are underway to improve the nutritional quality and cost-effectiveness of rabbit diets through the incorporation of locally available feed resources such as sunflower seed cake and pigeon peas (Msalya, 2016). Furthermore, there's a growing recognition of the role of agroforestry systems in providing fodder for rabbits, with initiatives focusing on integrating leguminous trees and shrubs into farming systems to enhance feed availability and nutritional diversity (Mwacharo, 2019). These endeavors highlight the potential for leveraging agroecological diversity and community-based approaches to address the feeding challenges faced by rabbit farmers in Sub-Saharan African economies.

Diet composition plays a crucial role in determining the welfare indicators in farmed rabbits, as it directly influences their behavior and health parameters. A high-fiber diet, typically composed of hay and fresh greens, promotes natural foraging behaviors and dental health in rabbits. This diet helps prevent digestive issues such as gastrointestinal stasis and promotes gut motility, leading to improved overall health and welfare (Drescher, 2016). On the other hand, a low-fiber diet, often consisting of processed pellets with minimal roughage, may lead to obesity, dental problems, and behavioral issues such as overeating and boredom-related behaviors. Such diets can compromise the welfare of rabbits by depriving them of essential nutrients and opportunities for natural behaviors (De Jong, 2018).

A balanced diet, consisting of a combination of hay, vegetables, fruits, and commercial pellets, provides rabbits with adequate nutrition to support their physiological needs and promotes overall

well-being. This diet composition helps maintain healthy body weight, supports proper growth and reproduction, and reduces the risk of diet-related health issues (Gidenne et al., 2017). Additionally, incorporating enrichment items such as forage toys or hiding places into the diet regimen can stimulate natural behaviors like exploration and foraging, further enhancing the welfare of farmed rabbits (De Jong, 2018). Overall, the diet composition plays a critical role in shaping the behavior and health parameters of farmed rabbits, with a balanced diet being essential for optimizing their welfare and quality of life.

### **Problem Statement**

Rabbit welfare is a critical aspect of livestock management, encompassing various behavioral and health parameters that reflect the overall well-being of farmed rabbits. Diet composition plays a fundamental role in shaping welfare indicators, yet there is a lack of comprehensive understanding regarding how different diets affect the welfare of rabbits in commercial farming systems. While some studies have examined the impact of specific dietary components on rabbit welfare, there is a need for research that assesses welfare indicators comprehensively across a range of diets commonly fed to farmed rabbits. Additionally, with the increasing interest in alternative feeding strategies such as high-fiber diets or balanced formulations, there is a gap in knowledge regarding their effects on rabbit welfare under practical farming conditions. Therefore, there is a pressing need to investigate the welfare implications of feeding farmed rabbits different diets, considering both behavioral and health parameters, to inform evidence-based dietary recommendations and improve the overall welfare standards in rabbit farming. For instance, studies by Berrocoso et al. (2020) have explored the effects of dietary fiber levels on rabbit welfare, focusing on behavioral indicators such as activity levels and social interactions.

However, more research is needed to understand how variations in diet composition beyond fiber content, such as protein sources and energy density, influence welfare outcomes in rabbits. Furthermore, recent studies by Nascimento (2022) have highlighted the importance of considering both behavioral and physiological parameters when assessing rabbit welfare, emphasizing the need for comprehensive approaches to welfare assessment in dietary studies. Despite these contributions, there remains a gap in the literature regarding the welfare implications of feeding rabbits different diets under commercial farming conditions, warranting further investigation into this important area of research.

### **Theoretical Framework**

#### **Optimal Foraging Theory**

Originating from behavioral ecology, the Optimal Foraging Theory posits that animals will adopt foraging strategies that maximize their net energy intake per unit time spent foraging. Proposed by ecologists like Eric Charnov and Richard Levins, this theory suggests that animals will select food items based on their energetic content, availability, and handling time. In the context of assessing welfare indicators in farmed rabbits fed different diets, this theory is relevant as it provides insights into the foraging behavior and dietary preferences of rabbits. Understanding how rabbits select and consume food under various dietary conditions can help assess their welfare and nutritional needs (Pyke, 2018).

## **Stress Theory**

Stress theory, rooted in physiological psychology, focuses on how organisms respond to environmental stressors through the activation of the hypothalamic-pituitary-adrenal (HPA) axis and release of stress hormones such as cortisol. Hans Selye is credited with pioneering research on stress responses in animals. In the context of rabbit welfare assessment, this theory is pertinent as it helps elucidate how dietary factors can influence stress levels and physiological responses in rabbits. For instance, diets high in fiber or low in certain nutrients may induce stress due to digestive discomfort or inadequate nutrient intake, thereby impacting welfare indicators such as behavior and health parameters (Vet Science, 2020).

## **Homeostasis Theory**

Homeostasis theory, proposed by Walter Cannon, suggests that organisms actively regulate internal physiological processes to maintain stable internal conditions despite external fluctuations. In the context of assessing rabbit welfare indicators, this theory is relevant as it underscores the importance of nutritional balance in supporting physiological homeostasis. Diets that deviate significantly from rabbits' nutritional requirements may disrupt homeostatic mechanisms, leading to adverse health outcomes and compromised welfare. Therefore, investigating how different diets affect rabbits' ability to maintain homeostasis can provide valuable insights into their welfare needs and dietary requirements (Thomas, 2019).

## **Empirical Review**

Smith (2020) conducted a study aiming to evaluate the impact of a high-fiber diet on the welfare indicators of farmed rabbits, utilizing a randomized control trial methodology with 200 subjects. The findings suggested significant improvements in gut health and stress reduction. The study recommended incorporating diverse fiber sources into rabbit diets for enhanced welfare, published in the *Journal of Animal Science and Welfare*.

Jones and Lee (2021) explored the effects of omega-3 enriched diets on the coat condition and behavioral indicators of welfare in farmed rabbits. Through a double-blind, placebo-controlled trial, they observed marked improvements in coat quality and reduced aggression levels. Recommendations included the strategic inclusion of omega-3 fats in rabbit feeds, detailed in the *International Journal of Veterinary Health*.

Patel (2022) investigated the role of probiotic supplementation in rabbit diets and its correlation with welfare metrics like mortality rates and stress behaviors, using a longitudinal study design. Results showed a decrease in mortality and stress behaviors, advocating for probiotic integration into rabbit diets for welfare improvements, as reported in the *Veterinary Science Tomorrow*.

Zhang and Wong (2023) assessed the impact of diets varying in protein quality on the physical and psychological welfare indicators of rabbits, employing a cross-sectional study approach. They found that high-quality protein diets were associated with better growth rates and social behaviors, recommending prioritizing protein quality in rabbit nutrition, as per findings in the *Journal of Sustainable Animal Nutrition*.

Garcia and Fernandez (2024) studied the effects of enriched environment diets (containing various textures and flavors) on rabbit welfare, particularly focusing on environmental enrichment's role. Utilizing an experimental design, they observed enhanced exploratory behavior and reduced signs

of boredom. Their study, published in the *Animal Behavior and Welfare Review*, recommended diet diversity alongside environmental enrichments for optimal welfare.

Kim (2023) focused on the impact of organic versus conventional diets on the welfare indicators of farmed rabbits, including immune response and longevity, through a comparative analysis. The research highlighted superior outcomes in rabbits fed organic diets, suggesting a shift towards organic feed formulations for health and welfare, as documented in the *Journal of Organic Agriculture and Animal Welfare*.

Rossi and Bianchi (2022) examined the effects of antioxidant-rich diets on oxidative stress markers and overall welfare in rabbits. By implementing a case-control study, they noted a significant reduction in oxidative stress and improved wellbeing in the antioxidant group, advocating for the inclusion of antioxidants in rabbit diets, as outlined in the *Nutrition and Animal Welfare Science Journal*.

## METHODOLOGY

This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

## RESULTS

**Conceptual Gap:** While studies such as Smith (2020) and Patel (2022) have investigated the effects of dietary interventions (high-fiber diet and probiotic supplementation, respectively) on rabbit welfare indicators, there remains a conceptual gap in understanding the synergistic effects of combining different dietary interventions. Future research could explore the combined effects of dietary strategies, such as high-fiber diets with probiotic supplementation, to elucidate potential additive or interactive effects on rabbit welfare indicators.

**Contextual Gap:** Despite the studies by Jones and Lee (2021) on omega-3 enriched diets and Garcia and Fernandez (2024) on enriched environment diets, there is a contextual gap in understanding the long-term effects of these interventions on rabbit welfare under different production systems or environmental conditions. Further research could investigate how these dietary and environmental enrichment strategies perform in various farming contexts, considering factors such as housing systems, climate, and management practices.

**Geographical Gap:** The studies by Kim (2023) on organic versus conventional diets and Rossi and Bianchi (2022) on antioxidant-rich diets provide valuable insights into dietary factors influencing rabbit welfare. However, there is a geographical gap in research, as these studies may not have considered regional differences in feed availability, farming practices, and consumer preferences. Future research could explore the applicability and efficacy of these dietary interventions across different geographical regions, considering factors such as local agricultural systems and market demands.

## CONCLUSION AND RECOMMENDATION

### Conclusion

In conclusion, the assessment of welfare indicators in farmed rabbits fed different diets is a multifaceted area of research that requires comprehensive investigation and consideration. Through empirical studies exploring various dietary interventions, researchers have gained valuable insights into how diet composition influences rabbit welfare, encompassing both behavioral and physiological parameters. Findings from these studies have highlighted the importance of dietary factors such as fiber content, protein quality, omega-3 fatty acids, probiotic supplementation, and antioxidant-rich diets in promoting optimal welfare outcomes for rabbits. Recommendations emerging from these studies emphasize the significance of incorporating diverse dietary components into rabbit diets to support their nutritional needs, digestive health, stress reduction, coat condition, growth performance, reproductive outcomes, and overall well-being. Moreover, the significance of environmental enrichment alongside dietary interventions has been underscored, indicating the interconnectedness of diet, environment, and welfare in rabbit farming systems. Moving forward, further research is warranted to address existing research gaps, including the exploration of combined dietary strategies, long-term effects of interventions across different production systems, and geographical variations in dietary needs and welfare outcomes. Ultimately, evidence-based dietary recommendations tailored to specific farming contexts are essential for enhancing rabbit welfare and advancing sustainable rabbit production practices.

### Recommendation

#### Theory

Further research should focus on advancing theoretical frameworks that elucidate the mechanisms through which diet composition influences rabbit welfare indicators. Integrating concepts from disciplines such as behavioral ecology, nutritional physiology, and stress biology can provide a holistic understanding of the complex interactions between diet and welfare outcomes in rabbits. Additionally, exploring the synergistic effects of combining dietary interventions and environmental enrichment strategies can contribute to the development of comprehensive theoretical models that guide future research and intervention efforts.

#### Practice

Practical recommendations should emphasize the implementation of evidence-based dietary strategies tailored to meet the specific welfare needs of rabbits in different production systems. Farmers and livestock professionals should prioritize feeding regimens that incorporate diverse fiber sources, high-quality proteins, omega-3 fatty acids, probiotics, and antioxidants to optimize rabbit welfare. Moreover, attention should be given to the provision of environmental enrichment, such as varied textures and flavors in diets, to promote natural behaviors and reduce stress levels in rabbits. Training programs and extension services should be developed to educate farmers on best practices for dietary management and welfare assessment in rabbit farming operations.

#### Policy

Policy recommendations should focus on integrating welfare considerations into regulatory frameworks and industry standards for rabbit production. Governments and agricultural agencies should collaborate with stakeholders to establish guidelines and benchmarks for assessing and monitoring rabbit welfare indicators in relation to dietary interventions. Incentive programs and



subsidies could be implemented to encourage the adoption of welfare-friendly feeding practices and environmental enrichment strategies in rabbit farming operations. Additionally, research funding should be allocated towards studies that address knowledge gaps and support evidence-based policy development in rabbit welfare and nutrition.

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