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Discovering Bioactive Compounds in Silkie Chickens Impact on Meat Quality and Gene Regulation Network

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Introduction

Silkie chickens, renowned for their distinctive appearance and unique traits, have long captivated the interest of poultry enthusiasts worldwide. Beyond their ornamental value, Silkie chickens have gained recognition for their potential health benefits, particularly in traditional Chinese medicine, where they are prized for their purported medicinal properties. Recent research has delved deeper into the bioactive compounds present in Silkie chickens, uncovering their impact on meat quality and elucidating the underlying gene regulation networks. This article embarks on a journey to discover the hidden treasures within Silkie chickens and explores their significance in modern agriculture and human health. Originating from China, Silkie chickens are distinctive breeds characterized by their fluffy plumage, dark skin, blue earlobes and five toes instead of the usual four. Revered for centuries in Asian cultures for their unique appearance and perceived medicinal properties, Silkie chickens have garnered attention in Western countries as well, both as ornamental birds and as sources of nutritious meat [1].

Description

Silkie chicken meat is not just a source of protein; it also contains an array of bioactive compounds with potential health benefits. Studies have identified various bioactive components in Silkie chicken meat, including carnosine, anserine, collagen and unique peptides. Carnosine and anserine are dipeptides found in significant concentrations in Silkie chicken meat. These compounds have been linked to various health benefits, including antioxidant properties, anti-inflammatory effects and potential neuroprotective properties. The high levels of carnosine and anserine in Silkie chicken meat make it a valuable dietary source for promoting overall health and well-being. Collagen is another prominent bioactive compound abundant in Silkie chicken meat. Collagen plays a crucial role in maintaining skin health, promoting joint function and supporting overall tissue integrity. Consuming Silkie chicken meat may contribute to improved skin elasticity, joint health and wound healing, making it a valuable addition to the diet for individuals seeking to enhance their overall health and vitality [2].

Silkie chicken meat contains unique peptides that exhibit various bioactive properties, including antimicrobial, antihypertensive and immunomodulatory effects. These peptides hold promise for the development of functional foods and nutraceuticals aimed at promoting human health and preventing disease. In addition to their health-promoting properties, the bioactive compounds present in Silkie chicken meat also play a significant role in determining meat quality. Studies have shown that Silkie chicken meat possesses desirable characteristics such as tenderness, juiciness and flavour due to its unique composition of bioactive compounds. The high levels of collagen in Silkie chicken meat contribute to its tender texture, making it a preferred choice for culinary purposes. Collagen undergoes hydrolysis during cooking, resulting in the formation of gelatin, which enhances the tenderness and succulence of the meat [3].

The presence of carnosine and anserine in Silkie chicken meat helps retain moisture during cooking, thereby imparting a juicy and flavourful eating experience. These compounds act as natural water-binding agents, preventing moisture loss and ensuring a moist and tender final product. The bioactive compounds present in Silkie chicken meat also contribute to its distinctive flavor profile. Carnosine, in particular, has been associated with umami taste, adding depth and richness to the overall flavor of the meat. The combination of unique peptides and amino acids further enhances the sensory attributes of Silkie chicken meat, making it a highly sought-after culinary ingredient. Recent advances in molecular biology have enabled researchers to investigate the underlying gene regulation networks associated with the bioactive compounds present in Silkie chicken meat. By elucidating the molecular mechanisms involved, scientists aim to gain insights into how these compounds influence meat quality and potentially modulate physiological processes in consumers.

Using techniques such as RNA sequencing and gene expression profiling, researchers have identified genes and pathways associated with the synthesis and metabolism of bioactive compounds in Silkie chicken tissues. These studies have provided valuable information regarding the genetic basis of meat quality traits and the regulation of key metabolic pathways involved in bioactive compound biosynthesis. Transcription factors play a central role in regulating the expression of genes involved in bioactive compound biosynthesis and metabolism. By characterizing the transcriptional regulatory networks governing these processes, researchers can identify potential targets for genetic manipulation to enhance the production of desirable bioactive compounds in Silkie chicken meat. Epigenetic modifications, such as DNA methylation and histone modifications, also influence gene expression patterns and contribute to the regulation of bioactive compound biosynthesis in Silkie chicken tissues. Understanding the epigenetic mechanisms underlying these processes may offer new avenues for improving meat quality and enhancing the nutritional value of Silkie chicken products. The discovery of bioactive compounds in Silkie chickens and the elucidation of their impact on meat quality and gene regulation networks have significant implications for both agriculture and human health. Insights gained from research on Silkie chickens can inform breeding programs aimed at producing poultry with enhanced meat quality and nutritional value. By selectively breeding birds with favourable genetic traits associated with bioactive compound synthesis, farmers can produce poultry products that meet consumer demand for healthier and more flavourful options [4,5].

Conclusion

Consuming Silkie chicken meat enriched with bioactive compounds offers potential health benefits, including antioxidant protection, anti-inflammatory effects and support for skin and joint health. Incorporating Silkie chicken products into the diet may help reduce the risk of chronic diseases such as cardiovascular disease, neurodegenerative disorders and osteoarthritis, thereby improving overall health and well-being. Silkie chickens represent more than just a visually striking breed; they are reservoirs of bioactive

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compounds with diverse health-promoting properties. The discovery of these compounds and their impact on meat quality and gene regulation networks underscores the importance of exploring traditional livestock breeds for their potential contributions to agriculture and human health. As research in this field continues to advance, the integration of Silkie chicken products into the global food market holds promise for providing consumers with nutritious and flavourful options that support optimal health and wellness.

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Conflict of Interest

There are no conflicts of interest by author.

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