



# Stinging Nettle (*Urtica dioica* L.) in Sustainable Poultry Production: Phytochemistry, Biological Activities, and Practical Applications

Teeb A. Altabtabaai<sup>1</sup>, Caterin A. M. Ismail<sup>2</sup>, Jamal Al-Din D. H. Jasim<sup>3</sup>, Arshed H. Alhafadhi<sup>4</sup>, Mohammed A. Alrubae<sup>5</sup>, Ahmed F. Alobaidi<sup>6</sup>, Asawer H. Sharif<sup>7\*</sup>

<sup>1</sup> Department of Field Crops, College of Agriculture, Al-Qasim Green University, Babylon, Iraq.

<sup>2,3</sup> Department of Horticulture and Landscape Gardening, College of Agriculture, University of Diyala, Iraq.

<sup>4</sup> Medical Laboratories Department, College of Health and Medical Technologies, Al-Ayen University, Thi-Qar, Iraq.

<sup>5</sup> Department of Animal Production, College of Agriculture, Wasit University, Iraq.

<sup>6</sup> Department of Horticulture and Landscape Planning, College of Agriculture, University of Tikrit, Iraq.

<sup>7</sup> Department of Pharmacology and Medicinal Plants, College of Pharmacy, University of Thi Qar, Iraq.

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\*Correspondence: Asawer H. Sharif

Email: [asawerhas96@gmail.com](mailto:asawerhas96@gmail.com)

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**Abstract:** The present review aims to compile and critically analyze the available information on stinging nettle (*Urtica dioica* L.) due to its wide distribution and significant medicinal and nutritional importance. The study focuses on summarizing its botanical characteristics, phytochemical composition, and major bioactive constituents, with particular emphasis on phenolic compounds, flavonoids, saponins, tannins, and terpenes. In addition, this review highlights the potential applications of stinging nettle in poultry nutrition as a natural feed additive. It also evaluates its reported effects on growth performance, gut health, immune response, and oxidative status in poultry species, based on previously published experimental and review studies. Furthermore, the study seeks to provide a comprehensive scientific overview that supports the use of stinging nettle as a sustainable alternative to antibiotic growth promoters in modern poultry production systems. By integrating existing literature, this review aims to identify knowledge gaps and propose directions for future research regarding optimal inclusion levels, processing methods, and practical applications under commercial conditions.

**Keywords:** Antioxidant Activity, Flavonoids, Gut Health, Immunomodulation, Natural Feed Additives

## Introduction

Stinging nettle (*Urtica dioica* L.) is a perennial herbaceous plant belonging to the family Urticaceae and is considered one of the most widely distributed medicinal plants worldwide. The genus *Urtica* comprises several species, including *Urtica dioica*, *Urtica urens*, and *Urtica pilulifera*, which have been traditionally utilized for nutritional, medicinal, and agricultural purposes. For centuries, nettle has occupied an important position in folk medicine due to its therapeutic potential against various disorders, including anemia, inflammatory diseases, metabolic disturbances, and benign prostatic

hyperplasia ([AL-Rawi & Chakravarty, 1988](#); [Hughes, 1980](#); [Chrubasik et al., 2007](#)). In recent decades, increasing scientific attention has been directed toward stinging nettle because of its remarkable nutritional value and its abundance of biologically active compounds that may provide significant benefits for both human and animal health.

The growing interest in stinging nettle is largely attributed to its rich phytochemical composition. Different parts of the plant contain numerous bioactive constituents, including flavonoids, polyphenols, phenolic acids, tannins, saponins, terpenoids, carotenoids, essential oils, vitamins, and minerals ([Djeridane et al., 2007](#); [Cicerale et al., 2010](#); [Bisht et al., 2012](#)). These compounds possess a wide range of biological activities, such as antioxidant, antimicrobial, anti-inflammatory, immunomodulatory, and growth-promoting effects. Furthermore, nettle leaves are considered valuable sources of vitamins A, C, E, and several B-complex vitamins, in addition to essential minerals such as calcium, phosphorus, magnesium, potassium, and iron, which contribute to the nutritional quality of the plant ([Eskedar et al., 2013](#); [Bekele et al., 2015](#)). The synergistic action of these phytochemicals and nutrients has made stinging nettle an attractive natural resource for applications in animal nutrition and health management.

Stinging nettle is naturally distributed throughout Europe, Asia, North Africa, and parts of North America. Several species of the genus *Urtica* are also found in the Middle East, including Iraq, where *Urtica dioica*, *Urtica urens*, and *Urtica pilulifera* have been documented among the indigenous medicinal flora ([AL-Rawi & Chakravarty, 1988](#)). The ability of nettle to grow under diverse environmental conditions, coupled with its availability and relatively low production cost, enhances its potential as a sustainable agricultural resource. In addition, the widespread occurrence of nettle in many regions provides opportunities for its utilization as a locally available feed ingredient and phytogenic additive, thereby reducing dependence on imported feed supplements and synthetic growth promoters.

In poultry production, the search for safe and effective natural feed additives has intensified during the last two decades. This trend has been driven by increasing concerns regarding the extensive use of antibiotic growth promoters (AGPs), which have been associated with the development of antimicrobial-resistant bacteria and the presence of antibiotic residues in animal-derived food products. Consequently, many countries have imposed restrictions on the routine use of antibiotics in animal feeds, creating an urgent need for alternative strategies capable of maintaining bird health and productivity while ensuring food safety and environmental sustainability. Among the various phytogenic feed additives investigated, stinging nettle has emerged as a promising candidate because of its multifunctional biological properties and nutritional richness.

Numerous studies have demonstrated the beneficial effects of stinging nettle supplementation on poultry performance and health. Dietary inclusion of nettle or its extracts has been reported to improve growth performance, feed conversion ratio, carcass characteristics, immune responses, hematological parameters, antioxidant status, and intestinal health in broiler chickens and laying hens ([Ali et al., 2011](#); [Alireza et al., 2012](#);

[Ghasemi et al., 2014](#); [Bwana et al., 2016](#)). These positive effects are believed to result from the combined action of phytochemicals that enhance digestive efficiency, stimulate beneficial intestinal microbiota, improve nutrient utilization, strengthen immune function, and reduce oxidative stress. Moreover, the antimicrobial and anti-inflammatory activities of nettle may contribute to maintaining intestinal integrity and reducing the negative impacts of pathogenic microorganisms, making it a potential natural alternative to conventional antibiotic growth promoters.

The increasing demand for sustainable poultry production systems has further highlighted the importance of plant-derived feed additives. Although several reviews have described the medicinal properties, phytochemical composition, and traditional uses of stinging nettle (*Urtica dioica* L.), most have primarily focused on its applications in human health or on general botanical and pharmacological aspects. Moreover, the available literature lacks a comprehensive synthesis that specifically integrates recent findings regarding the role of stinging nettle in poultry production, particularly its effects on growth performance, gut health, immune function, oxidative status, and its potential as a sustainable alternative to antibiotic growth promoters.

This review addresses this gap by providing an updated and poultry-oriented evaluation of stinging nettle, combining information on its phytochemical profile, biological activities, nutritional significance, and practical applications in modern poultry production systems. The novelty of this review lies in its integrated approach, which links the bioactive constituents of stinging nettle with their physiological and productive effects in poultry, while also discussing its relevance to sustainable livestock production and antibiotic-free feeding strategies. Therefore, the present review aims to provide a comprehensive scientific framework for understanding the potential of stinging nettle as a multifunctional phytogenic feed additive and to identify future research directions regarding optimal inclusion levels, processing methods, and commercial-scale applications.

## Methodology

This review was conducted following the general principles of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A comprehensive literature search was performed using major scientific databases, including PubMed, Scopus, Web of Science, Google Scholar, and ScienceDirect.

The search was conducted using combinations of the following keywords: "Urtica dioica", "stinging nettle", "poultry nutrition", "broiler chickens", "laying hens", "phytogenic feed additives", "gut health", "immune response", "antioxidant activity", and "growth performance". Boolean operators (AND, OR) were used to refine the search strategy.

Studies published in English between 2000 and 2026 were considered. Inclusion criteria comprised original research articles, review papers, and scientific reports investigating the phytochemical composition, biological activities, nutritional value, or poultry-related applications of *Urtica dioica*. Studies focusing on growth performance, feed efficiency, intestinal health, immune response, antioxidant status, and sustainable poultry production were prioritized.

Exclusion criteria included duplicate publications, conference abstracts without full text, non-peer-reviewed documents, studies lacking sufficient methodological information, and publications unrelated to poultry production or the biological properties of stinging nettle.

After screening titles, abstracts, and full texts, the most relevant studies were selected and critically analyzed to synthesize current knowledge and identify future research needs regarding the use of stinging nettle in sustainable poultry production systems.

### General Description of Stinging Nettle (*Urtica dioica* L.)

Stinging nettle (*Urtica dioica* L.) is a perennial herbaceous plant belonging to the family Urticaceae. It is widely known for its characteristic stinging hairs on the leaves and stems, which can cause irritation upon contact with skin. The plant typically grows in dense clusters and can reach moderate heights depending on environmental conditions.

The leaves of stinging nettle are green, serrated, and opposite in arrangement, while the stem is upright and covered with fine hairs. The plant is commonly found in fertile, nitrogen-rich soils and can grow in a wide range of habitats including agricultural fields, riverbanks, forest edges, and disturbed lands. It is highly adaptable and can survive in different climatic conditions, which explains its wide distribution in many parts of the world. Stinging nettle has long been used in traditional medicine and animal feeding due to its rich nutritional and biological properties. Its leaves are particularly important because they contain various bioactive compounds that contribute to its medicinal and nutritional value. The morphological structure of the plant is illustrated in Figure 1.

The taxonomic classification of stinging nettle (*Urtica dioica* L.) is presented in Table 1, which summarizes its systematic position from kingdom to species level.



**Figure 1.** Morphological illustration of stinging nettle (*Urtica dioica* L.), showing stem, leaves, flowers, and seeds.

**Table 1.** Botanical Classification, Distribution and Morphological Characteristics of Stinging Nettle

Taxonomic Rank	Classification
Kingdom	Plantae
Phylum	Tracheophyta
Class	Magnoliopsida
Order	Urticales
Family	Urticaceae
Genus	Urtica
Species	<i>Urtica dioica</i> L.

### Original Habitat and Geographical Distribution of Stinging Nettle

Stinging nettle (*Urtica dioica* L.) is widely distributed throughout temperate regions of the world and is considered one of the most adaptable medicinal plant species. The plant occurs naturally across Europe, Asia, North Africa, and parts of North America, where it thrives in fertile soils with adequate moisture. Nettle commonly grows in grasslands, forest margins, riverbanks, agricultural fields, and disturbed habitats rich in nitrogenous compounds. Due to its ecological adaptability, the species has become naturalized in numerous regions beyond its original distribution range.

Several species belonging to the genus *Urtica* have been reported in the Middle East, including *Urtica dioica*, *Urtica urens*, and *Urtica pilulifera*. These species have been documented as part of the native flora of Iraq and neighboring countries, where they grow under a wide range of environmental conditions. The widespread occurrence of nettle in these regions highlights its potential as a locally available medicinal and nutritional resource. Furthermore, its abundance and ease of cultivation make it an attractive candidate for sustainable agricultural and livestock production systems ([AL-Rawi & Chakravarty, 1988](#); [Bombardelli & Morazzoni, 1997](#)).

### Original Habitat of Stinging Nettle (*Urtica dioica* L.)

Stinging nettle (*Urtica dioica* L.) is native to temperate regions and is widely distributed across Europe, Asia, North Africa, and parts of North America ([Bombardelli & Morazzoni, 1997](#); [Kew Science, 2015](#)). The plant grows naturally in areas characterized by fertile and nitrogen-rich soils, particularly in moist environments such as riverbanks, forest margins, grasslands, agricultural lands, and disturbed habitats. Its ecological adaptability allows it to thrive under a wide range of environmental conditions, which has contributed to its extensive geographical distribution ([AL-Rawi & Chakravarty, 1988](#)).

In addition to its global distribution, stinging nettle species have been documented in several regions of the Middle East, including Iraq, where different *Urtica* species such as *Urtica dioica*, *Urtica urens*, and *Urtica pilulifera* are commonly found ([AL-Rawi & Chakravarty, 1988](#)). The presence of these species in natural and semi-natural ecosystems indicates their ability to adapt to local climatic and soil conditions. In Iraq, nettle is considered part of the indigenous flora and grows abundantly in suitable habitats, making it a readily available plant resource for traditional and agricultural use.

The wide distribution and adaptability of stinging nettle make it an important plant species with potential applications in medicinal use, animal feeding, and sustainable agricultural systems ([Bombardelli & Morazzoni, 1997](#); [Chrubasik et al., 2007](#)).

Stinging nettle (*Urtica dioica* L.) is known by a wide variety of common names across different regions and languages due to its extensive geographical distribution and long history of use. The plant is commonly referred to as “stinging nettle” or “common nettle” in English-speaking countries ([USDA, 2015](#)). In Europe, it is known as “great nettle” and “European nettle,” while in Germany it is called “Brennnessel,” and in France it is referred to as “grande ortie” ([USDA, 2015](#)).

### **Names of Stinging Nettle (*Urtica dioica* L.)**

In various Asian and Middle Eastern regions, nettle is also known by different local names depending on cultural and linguistic diversity. In Arabic-speaking countries, it is commonly referred to as “قَرَبِص” or “حريق,” reflecting its stinging property upon contact with skin ([AL-Rawi & Chakravarty, 1988](#)). In some regions of Central Asia and Turkey, it is known by names such as “ısırgan otu,” while in Persian-speaking areas it may be referred to as “gazaneh.”

The diversity of names highlights the widespread recognition of stinging nettle as a medicinal and nutritional plant across different cultures. Despite the variation in nomenclature, all names generally refer to the same biological species, *Urtica dioica* L., which remains one of the most important medicinal and feed plants in traditional and modern applications.

### **Chemical Composition of Stinging Nettle Leaf Powder**

The chemical composition of stinging nettle (*Urtica dioica* L.) leaf powder reflects its high nutritional and functional value as a potential feed additive in poultry production systems. The plant contains a wide range of primary and secondary metabolites that contribute to its biological and nutritional properties. According to the reported literature, nettle leaves are rich in bioactive phytochemicals including flavonoids, phenolic compounds, phenolic acids, tannins, saponins, and terpenes ([Harborne, 1984](#); [Djeridane et al., 2007](#); [Wang et al., 2009](#)).

Phenolic compounds represent one of the most important groups in nettle leaf powder, including polyphenols and phenolic acids, which are strongly associated with antioxidant activity and free radical scavenging capacity ([Lapornik et al., 2005](#); [Cicerale et al., 2010](#)). Flavonoids are also abundant and play a significant role in reducing oxidative stress and enhancing immune response in animals (Harborne, 1984). Tannins are present and contribute to the astringent properties of the plant, which may help in controlling intestinal pathogens and improving gut health ([Riaz, 1996](#)).

Saponins are another important group of compounds identified in nettle leaves, known for their antimicrobial activity and their role in improving nutrient absorption and immune modulation in poultry species ([Omar, 2010](#); [Harisaranraj et al., 2009](#)). Terpenes, including essential oils and volatile aromatic compounds, contribute to the antimicrobial

and antioxidant properties of the plant ([Adams, 1995](#); [Leigh et al., 1952](#)). In addition, carotenoids and other related pigments have been reported in nettle leaves, which may contribute to vitamin A activity and antioxidant defense mechanisms ([Newman, 1972](#)).

In addition to the phytochemical constituents present in nettle leaves, the extraction process plays an important role in obtaining concentrated bioactive compounds for nutritional and experimental applications. A simplified schematic illustration of the general preparation procedure for aqueous nettle leaf extract is presented in Figure 2.

Overall, the chemical profile of stinging nettle leaf powder indicates that it is a rich source of biologically active compounds that can support physiological functions, improve health status, and enhance productive performance in poultry when used as a dietary supplement.

A summarized overview of the major phytochemical constituents identified in stinging nettle (*Urtica dioica* L.), their reported biological functions, and their potential relevance to poultry production is presented in Table 2. This table provides a concise comparison of the principal bioactive compounds and highlights their possible contributions to antioxidant activity, immune modulation, gut health, and productive performance in poultry species.



**Figure 2.** General procedure for aqueous extraction of stinging nettle (*Urtica dioica* L.) leaves.

**Table 2.** Major phytochemical constituents of stinging nettle (*Urtica dioica* L.), their biological functions, and relevance to poultry production.

Phytochemical Group	Major Compounds/Examples	Reported Concentration*	Main Biological Functions	Potential Benefits in Poultry
Phenolic compounds	Phenolic acids, polyphenols	Variable depending on plant part and	Antioxidant, free radical scavenging	Reduction of oxidative stress and improved physiological status

		extraction method		
<b>Flavonoids</b>	Quercetin, kaempferol, rutin	High abundance in leaves	Antioxidant, anti-inflammatory, immunomodulatory	Enhanced immune response and disease resistance
<b>Saponins</b>	Steroidal and triterpenoid saponins	Moderate levels	Antimicrobial, immune stimulation, improved nutrient absorption	Better gut health and feed efficiency
<b>Tannins</b>	Hydrolyzable and condensed tannins	Low to moderate levels	Antimicrobial, astringent, antioxidant	Improved intestinal integrity and pathogen control
<b>Terpenes</b>	Essential oils and volatile compounds	Trace to moderate levels	Antimicrobial, antifungal, antioxidant	Reduced microbial challenge and enhanced health status
<b>Carotenoids</b>	$\beta$ -carotene and related pigments	Variable	Antioxidant, provitamin A activity	Improved antioxidant defense and productivity
<b>Vitamins</b>	Vitamins A, C, E, and B-complex	Relatively abundant	Metabolic regulation and immune support	Improved growth and health performance
<b>Minerals</b>	Ca, P, Mg, K, Fe	Relatively abundant	Structural and physiological functions	Enhanced nutrient utilization and metabolic efficiency

Source: Concentrations vary according to plant origin, growth stage, environmental conditions, and extraction procedures.

### 1. Phenolic Compounds of Stinging Nettle (*Urtica dioica* L.)

Phenolic compounds represent one of the most important groups of bioactive constituents in stinging nettle (*Urtica dioica* L.), and they are primarily responsible for the plant's strong antioxidant and biological activities. These compounds include phenolic acids, flavonoids, and polyphenols, which are widely distributed in different parts of the plant ([Harborne, 1984](#); [Djeridane et al., 2007](#)).

Flavonoids are among the most abundant phenolic constituents in nettle leaves and have been reported to exhibit strong antioxidant, anti-inflammatory, and antimicrobial properties. These compounds contribute significantly to the plant's ability to neutralize free radicals and protect biological systems from oxidative stress ([Cicerale et al., 2010](#); [Wang et al., 2009](#)). Phenolic acids and polyphenols also play an essential role in enhancing the biological activity of nettle, particularly in relation to immune modulation and metabolic regulation ([Lapornik et al., 2005](#)).

The presence of these phenolic compounds makes stinging nettle a valuable phyto-genetic resource in animal nutrition, especially in poultry production systems, where oxidative stress and immune suppression are common challenges. The

synergistic action of flavonoids and other phenolic constituents enhances the overall biological efficiency of the plant and supports its use as a natural feed additive ([Djeridane et al., 2007](#); [Cicerale et al., 2010](#)).

## 2. Saponins of Stinging Nettle (*Urtica dioica* L.)

Saponins are important bioactive compounds present in stinging nettle (*Urtica dioica* L.), and they are widely recognized for their diverse biological activities, particularly in animal nutrition and health. These compounds are naturally occurring glycosides characterized by their ability to form foam in aqueous solutions and are commonly associated with antimicrobial, immune-stimulating, and growth-promoting effects ([Harisaranraj et al., 2009](#); [Omar, 2010](#)).

In stinging nettle, saponins contribute significantly to the plant's medicinal value by enhancing nutrient absorption and improving gut health. They have been reported to exhibit antimicrobial activity against a wide range of pathogenic microorganisms, thereby supporting intestinal balance and reducing the risk of infections ([Harisaranraj et al., 2009](#)). In addition, saponins are known to stimulate the immune system, which makes them particularly useful in poultry production systems where disease resistance is a critical factor ([Omar, 2010](#)).

The presence of saponins in nettle leaf powder further supports its potential application as a natural feed additive. Their combined biological effects contribute to improved animal performance, better feed efficiency, and enhanced health status, making stinging nettle a promising alternative to synthetic growth promoters in poultry nutrition.

## 3. Tannins of Stinging Nettle (*Urtica dioica* L.)

Tannins are important phenolic compounds present in stinging nettle (*Urtica dioica* L.), and they contribute significantly to its biological and pharmacological activities. These compounds are known for their astringent properties and their ability to interact with proteins and other macromolecules, which gives them important roles in medicinal and nutritional applications ([Riaz, 1996](#); [Harborne, 1984](#)).

In stinging nettle, tannins are associated with antimicrobial and antiseptic activities, which help in inhibiting the growth of pathogenic microorganisms and supporting gut health ([Osamudiamen & Aiyelaagbe, 2009](#)). These properties make tannins valuable in animal nutrition, particularly in poultry production systems where they may contribute to improving intestinal integrity and reducing the incidence of enteric diseases.

Furthermore, tannins may also play a role in enhancing the overall antioxidant capacity of the plant, thereby contributing to its protective effects against oxidative stress. Despite their beneficial biological activities, high levels of tannins may sometimes reduce nutrient digestibility; however, in moderate amounts as found in nettle, they contribute positively to the physiological functions of animals ([Riaz, 1996](#); [Osamudiamen & Aiyelaagbe, 2009](#)).

## 4. Terpenes of Stinging Nettle (*Urtica dioica* L.)

Terpenes represent an important group of bioactive secondary metabolites present in stinging nettle (*Urtica dioica* L.), contributing significantly to its antimicrobial and antioxidant properties. These compounds are widely distributed in plants and are known for their diverse chemical structures and biological activities, particularly in relation to plant defense mechanisms ([Adams, 1995](#); [Leigh et al., 1952](#)).

In stinging nettle, terpenes include volatile constituents and essential oil components that play a key role in providing antimicrobial and antifungal activities. These compounds help protect the plant against microbial infections and environmental stress factors. The biological activity of terpenes is mainly attributed to their ability to interact with microbial cell membranes, leading to growth inhibition and cellular disruption ([Adams, 1995](#)).

Moreover, terpenes contribute to the overall pharmacological value of stinging nettle, enhancing its potential use as a natural feed additive in animal nutrition. Their synergistic interaction with other phytochemicals such as phenolics and flavonoids further strengthens the plant's antioxidant capacity and biological efficiency in poultry production systems.

### **Medicinal and Food Importance of Stinging Nettle (*Urtica dioica* L.)**

Stinging nettle (*Urtica dioica* L.) has been widely recognized as an important medicinal and nutritional plant due to its rich phytochemical composition and diverse biological activities. Traditionally, it has been used in folk medicine for the treatment of various ailments, including inflammatory disorders, anemia, and metabolic diseases, owing to its high content of vitamins, minerals, and bioactive compounds ([Bombardelli & Morazzoni, 1997](#); [Chrubasik et al., 2007](#)).

From a nutritional perspective, stinging nettle serves as a valuable edible plant, particularly its young leaves, which are consumed as food in different cultures either cooked or dried. The plant is rich in essential nutrients such as proteins, minerals (iron, calcium, magnesium), and vitamins (A, C, and K), which contribute to its high nutritional value and make it a potential functional food ([Kavalali, 2003](#)). In addition to its direct use as food, stinging nettle has gained attention as a medicinal plant with antioxidant, anti-inflammatory, and antimicrobial properties. These biological effects are mainly attributed to its diverse phytochemical constituents, including flavonoids, phenolic compounds, and other secondary metabolites, which support its traditional and modern therapeutic applications ([Chrubasik et al., 2007](#)). Overall, stinging nettle represents a multifunctional plant species that bridges the gap between medicine and nutrition, making it a promising natural resource for both human health and animal production systems.

### **Importance of Stinging Nettle (*Urtica dioica* L.) in Poultry Production**

Stinging nettle (*Urtica dioica* L.) has gained increasing attention in poultry nutrition as a promising phytochemical feed additive due to its rich content of bioactive compounds, vitamins, minerals, and antioxidant molecules. Recent studies have shown that nettle supplementation can positively influence growth performance, gut health, immune

response, and overall physiological status of poultry, making it a potential natural alternative to antibiotic growth promoters (Table 3).

**Table 3.** Comparative summary of selected studies evaluating the effects of stinging nettle (*Urtica dioica* L.) in poultry production.

Study	Poultry Species	Form of Nettle Supplementation	Main Outcomes
Ali et al. (2011)	Laying hens	Dietary nettle supplementation	Improved productive performance and egg quality traits
Alireza et al. (2012)	Broiler chickens	Nettle medicinal plant supplementation	Enhanced growth performance, immune response, and serum biochemical parameters
Ghasemi et al. (2014)	Broiler chickens	Dietary nettle additive	Improved productive performance and blood lipid profile
Bwana et al. (2016)	Indigenous chickens	Stinging nettle supplementation	Growth-promoting effects and improved productivity
Al-Salihi et al. (2018)	Broiler chickens	Aqueous nettle leaf extract	Improved hematological traits and immune responses
Al-Salhi (2020)	Broiler chickens	Water extract of nettle leaves	Improved intestinal microbial characteristics and gut health
Al-Salhi (2022)	Broiler chickens	Nettle leaf extract in drinking water	Positive effects on serum biochemical parameters and physiological status
Sharma et al. (2018)	Broiler chickens	Dietary nettle supplementation	Enhanced immune competence and immunomodulatory responses
Wlazlak et al. (2026)	Ducks	Dry nettle feed additive	Improved gut microbiota, intestinal health, and productive performance
Milosevic et al. (2021)	Poultry (reviewed studies)	Various supplementation forms	Reported beneficial effects on growth, immunity, antioxidant status, and productivity

## Conclusion

This review concludes that nettle (*Urtica dioica* L.) is a promising plant source for poultry nutrition due to its richness in bioactive compounds such as phenols, flavonoids, saponins, and terpenes. In conclusion, stinging nettle (*Urtica dioica* L.) demonstrates considerable potential as a phytogenic feed additive in poultry production due to its multifunctional biological properties. Its inclusion in poultry diets may contribute to improved growth performance and feed efficiency, alongside enhanced gut health, immune function, and reduced oxidative stress.

From a practical standpoint, nettle represents a promising natural alternative to antibiotic growth promoters within sustainable poultry production systems, particularly in the context of increasing restrictions on antibiotic use and the demand for safer animal products. Nevertheless, its application under commercial production conditions requires further optimization. Key limitations in the current body of research include variability in experimental designs, supplementation levels, and preparation methods, which make direct comparison between studies difficult. Therefore, future research should focus on

standardizing inclusion rates, evaluating long-term effects under field conditions, and assessing economic feasibility to support large-scale application in the poultry industry.

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