



## ORIGINAL ARTICLE

Food Chemistry, Engineering, Processing and Packaging

# The Impact of Outdoor Grazing on *Launaea taraxacifolia* on the Nutritional Profile, Fatty Acid Composition, and Sensory Attributes of Goliath Chicken Meat in Benin

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## ABSTRACT

**Background:** In Benin, poultry nutrition predominantly utilizes maize and soybean-based feeds, which significantly influence the concentration of polyunsaturated fatty acids (PUFAs) in the muscle tissue. While high PUFA levels are nutritionally desirable, they increase the meat's susceptibility to lipid peroxidation, potentially compromising shelf-life and quality. The integration of dietary antioxidants through forage consumption—specifically indigenous vegetables—represents a viable strategy to mitigate oxidative stress and enhance the nutritional value of the carcass.

**Aims:** This study was designed to evaluate the influence of outdoor access to *Launaea taraxacifolia* (Wild Lettuce) grazing on the proximate composition, fatty acids profiles, and sensory characteristics of Goliath chicken breast meat.

**Material and Methods:** A total of 40 Goliath broilers (24 weeks of age) were divided into two experimental cohorts (n=20 per group). Group 1 (Treatment) consisted of chickens reared in a conventional system with managed outdoor access to *Launaea taraxacifolia* grazing, while Group 2 (Control) was reared under strict confinement. Following slaughter, breast muscle samples were harvested for comprehensive biochemical and organoleptic analysis.

**Results:** Dietary access to *Launaea taraxacifolia* grazing influenced intramuscular lipid deposition, with higher fat content observed in the confined group (1.9% vs 1.81%;  $p < 0.05$ ). Conversely, dry matter, crude protein, and ash content remained consistent across both cohorts ( $p > 0.05$ ). The fatty acid (FA) profile for both groups was dominated by palmitic and stearic acids (Saturated FAs), oleic acid (Monounsaturated FAs), and linoleic and arachidonic acids (PUFAs). Notably, meat from the grazing cohort exhibited a superior nutritional profile, characterized by a higher n-3 FA concentration (4.03%) a significantly optimized Omega-6/Omega 3 ratio, and enhanced sensory scores ( $p < 0.001$ ).

**Conclusions:** The incorporation of *Launaea taraxacifolia* grazing into the rearing system of Goliath chickens effectively enhances meat quality by improving the fatty acid composition and sensory appeal. These findings underscore the potential of forage-based rearing to produce nutritionally enriched poultry products that offer additional health benefits to consumers.

**Keywords:** Benin, Vegetable Intake, Goliath Chicken Meat, Nutritional Quality, Omega-3 Fatty Acids.

## Article Information

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## 1 INTRODUCTION

The family poultry sector performs a pivotal socio-economic function within Sub-Saharan Africa, serving as a primary driver for rural employment, a vital source of household income, a cornerstone of regional food security (FAO, 2013; Tougan *et al.*, 2014). In West Africa, extensive avian husbandry accounts for approximately 80% of the total poultry flock (FAO, 2020), representing an indispensable livelihoods resource for smallholder farmers (FAO, 2014; Wong *et al.*, 2017). Accelerated demographic shifts in this region have catalyzed a surge in demand for avian products, fundamentally reshaping local market dynamics (Fukase and

Martin, 2020). Similarly, global poultry production exhibited a notable upward trajectory, increasing from 131.6 10<sup>6</sup> tons in 2019 to 133.310<sup>6</sup> tons in 2020 (FAO, 2021).

In Benin, poultry nutrition is predominantly centered on maize and soybean meal. While these feedstocks facilitate the accumulation of nutritionally desirable polyunsaturated fatty acids (PUFA) in the meat—offering significant benefits for human health—their high degree of unsaturation renders the final product highly susceptible to lipid peroxidation. This oxidative degradation not only compromises sensory attributes and reduces nutritional density but also precipitates the formation of deleterious secondary metabolites, such as

lipid hydroperoxides, aldehydes (notably malondialdehyde), ketones, and further secondary oxidation compounds during storage. To mitigate these oxidative risks, recent research has explored the dietary inclusion of botanical additives as natural antioxidant sources. Wallace et al. (2010) demonstrated that vegetable-derived bioactive compounds possess the efficacy to safeguard feed ingredients from oxidative damage, modulate avian oxidative metabolism, and enhance the shelf-stability of meat products.

*Launaea taraxacifolia*, commonly known as African Lettuce, has emerged as a promising candidate due to its potent antioxidant capacity, characterized by its ability to scavenge free radicals and inhibit lipid peroxidation (Adinortey et al., 2012). Proximate analysis indicates a robust nutritional profile rich in crude protein, carbohydrates, and essential minerals—including calcium, potassium, magnesium, iron, and zinc (Adinortey et al., 2012). Furthermore, phytochemical screening a diverse array of bioactive secondary metabolites, such as tannins, flavonoids, terpenoids, steroids, cardiac glycosides, and saponins, recognized for their antioxidant properties. Furthermore, *L. taraxacifolia* leaves contain appreciable levels of essential minerals, including calcium, potassium, magnesium, iron, and zinc, supporting their potential benefits in poultry feeding and management (Adinortey et al., 2012).

Despite the known benefits of botanical supplementation, meat quality remains contingent upon a complex interplay of management factors, including production systems, dietary formulations, and access to pasture (Adinortey et al., 2012; Daszkiewicz et al., 2022; Murawska et al., 2021; Pieterse et al., 2019). Consequently, there is a critical need to elucidate the specific impact of *L. taraxacifolia* on the macronutrient and micronutrient profiles and organoleptic characteristics of indigenous poultry. Given the widespread availability of *L. taraxacifolia* in Benin and the growing economic importance of the indigenous Goliath chicken, the present study aimed to evaluate the effects of *L. taraxacifolia* ingestion on the nutrient composition, fatty acid profile and sensory quality of Goliath chicken meat.

## 2 MATERIAL AND METHODS

### 2.1 Study Area

The study was conducted in Beyerou, a locality within Parakou (Figure 1), situated in the Borgou Department. The experimental lies as latitude 9°21' N and longitude 2°37' E. The municipality of Parakou covers an area of 441 km<sup>2</sup> and has a population of 206,667 inhabitants (Tougan et al., 2020).

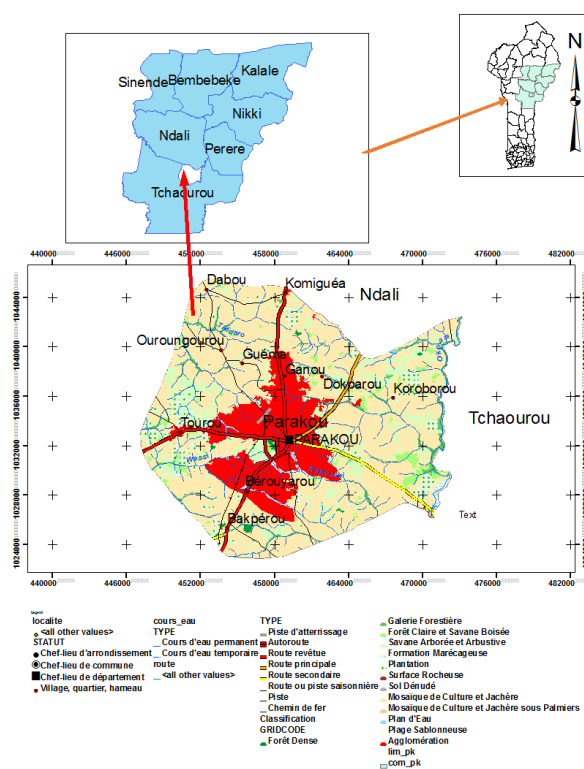


Figure 1. Study Area

### 2.2 Experimental Design and Meat Sample Preparation

The Goliath broilers utilized in this study were obtained from a certified Goliath chick supplier based in Parakou. A total of 44 chicks, aged 12 weeks and reared under uniform initial conditions, were purchased and randomly allocated into two experimental groups. These groups were subjected to distinct rearing systems from 12 to 24 weeks of age.

Group 1 (Figure 2) was reared under a confinement-based conventional system with controlled outdoor access to a fenced grazing area dominated exclusively by *Launaea taraxacifolia* (LT-grazing group). The grazing area was regularly monitored and manually weeded to prevent the growth of other plant species, ensuring that *L. taraxacifolia* constituted the sole available vegetation for consumption.

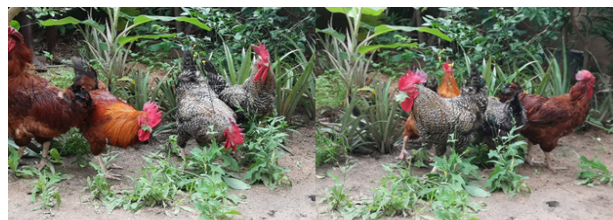


Figure 2. Goliath Chicken Reared in Confinement with Outdoor Access (Group 1)

Group 2 (Figure 3) was maintained under the same confinement-based system but with controlled outdoor access to a fenced, vegetation-free roaming area (free-roaming control group). This area was periodically cleaned to prevent the emergence of grasses or other edible plants, thereby avoiding unintended plant intake.



**Figure 3:** Goliath Chicken Reared in Confinement Without Outdoor Access (Group 2)

In both groups, birds were housed in Californian-type poultry buildings with wood shavings as litter. Outdoor access was provided daily through an open-door system during daylight hours and restricted at night for security and management purposes. Standard feeders and drinkers were utilized. Birds in both groups received the identical grower diet ad libitum, containing 2,965 kcal/kg of metabolizable energy and 18% crude protein, and had free access to drinking water. The starter diet (2,885 kcal/kg ME; 18% crude protein) was gradually replaced by the grower diet at proportions of 25%, 50%, and 75%, as described by Tougan et al., (2014). The nutrient composition of both diets is presented in Table 1.

**Table 1.** Composition and Nutrient Concentration of the Starting and Growth Diets

Composition	Starting diet	Growing diet
Soy cakes (g/kg)	12	7.5
Wheat bran (g/kg)	10	17.5
Corn (g/kg)	60	59
Cotton cakes (g/kg)	8	6.5
Fish meal (g/kg)	7	7
Lysine (g/kg)	0.2	0.2
Methionine (g/kg)	0.2	0.2
Salt (g/kg)	0.2	0.2
Oyster shell (g/kg)	2	1.5
Premix 0.25 (g/kg)	0.25	0.25
<b>Total (g/kg)</b>	<b>100</b>	<b>100</b>
Metabolizable energy (kcal/kg)	2880.5	2969.6
Crude protein (g/kg)	18.6	17.2
Lysine (g/kg)	0.91	0.78
Methionine (g/kg)	0.63	0.58
Calcium (g/kg)	1.11	0.91
Digestible phosphate (g/kg)	0.28	0.27

Health management during the confinement period followed the prophylactic program described by Tougan et al., (2014). All birds were vaccinated against Marek's disease, Newcastle disease, and infectious bronchitis. Coccidiosis was prevented through oral administration of Amprolim® (Laprovect) for five days and Anticox® (Laprovect, Tours, France) for three days. Birds were dewormed monthly, and Amin' Toal® was administered as an antistress supplement upon arrival. Litter was renewed monthly throughout the experimental period.

At 24 weeks of age, 20 male birds from each group were selected and slaughtered. The four female birds present in each group were excluded from the present study. Their breast muscles were sampled for nutritional quality, sensorial attributes and fatty acid composition analysis.

### 2.3 Proximate Composition Analysis

Proximate composition analysis of Goliath chicken meat samples was performed according to the procedures of AOAC (2006). The content of dry matter was assessed by gravimetry through kiln drying at 105 °C until constant weight of the sample by using the standard NF V 04-401 (AFNOR, 2001). Ash concentration was measured according to the procedure of the standard NF V 04-2018 (Tougan et al., 2025). The fat content was determined according the procedure of Folch et al. (1957) The evaluation of the concentration of crude protein was performed by Kjeldal method according to the standard NF V04-211. Each macronutrient analysis was performed in duplicate and the mean values were used for data analysis and interpretation.

### 2.4 Fatty Acids Profile Analysis

The Goliath chicken breast muscle samples of each group were frozen with liquid nitrogen and homogenized by using IKA A11B cryogrinder prior to extraction. Total fat extraction was performed directly using chloroform-methanol mixture (2:1 v/v) for 24 hours, following the method of Folch et al. (1957). A volume of 100 mL of the solvent mixture was used per 2 g of raw Goliath chicken meat. Twenty percent sodium chloride solution (0.58%) was added to the extract, and the mixture was carefully shaken. The recovered chloroformic extract was collected in a vial after separation, evaporated at 35°C and weighed. An amount of 10 mg of crude fat was then sampled and fatty acid methyl esters (FAME) were prepared by transesterification before injection (Stanišić et al., 2023).

Fatty acid analysis was performed on the FAME employing an Agilent Gas Chromatograph (Stabilwax-DA column from Restek). Chromatographic conditions were as described by Stanišić et al. (2023). Helium was utilized as the carrier gas at a flow rate of 1.5 mL/min. FAME were identified based on their retention times by comparison with those of

pure reference (Supelco37 -component FAME Mix - 47885-U).

Confirmation of FAME identifications was performed through GC-MS analysis on 7975C apparatus under identical conditions employing similar column (EI mode at 70eV, scanned mass: 30 to 450 amu). The WILEY 275.L database was utilized for the comparison of the recorded mass spectra. Each analysis was performed in duplicate, and the mean values were also used for data analysis and interpretation.

## 2.5 Sensory Analysis

Sensory evaluation was conducted with 20 panelists (10 men and 10 women) randomly selected among regular consumers of chicken who agreed to participate in the study.

**Table 2.** Effect of Outdoor Access to *Launaea taraxacifolia* Grazing on the Proximate Composition of Goliath Chicken Meat

Variables	Goliath of group1		Goliath of Group2		ANOVA (Probability value)
	Mean	Standard error	Mean	Standard error	
Dry matter (g/100g of raw meat)	23.8	0.048	23.86	0.043	NS
Total ash (g/100g of raw meat)	0.98	0.019	0.94	0.01	NS
Fat (g/100g of raw meat)	1.81	0.022	1.9	0.026	*
Protein (g/100g of raw meat)	21.05	0.06	21.2	0.029	NS

Unseasoned *Pectoralis major* muscle samples of each Goliath chicken group were wrapped in aluminum foil and baked at 180 °C during for one hour. The cooked meat samples were then cut and randomly presented on plates coded with two-digit numbers to each panelist. Drinkable water was used as palate cleansers during the sensorial analysis between samples. The sensory attributes of color, flavor, taste, texture, and overall acceptability were assessed employing a structured scale of 5-point scale, where 1 corresponded to “disliked very much” and 5 to “liked very much” (Amerine, 1965; Tougan et al., 2025).

## 2.6 Statistical Analysis

Data on nutrient content, fatty acid composition, and sensory quality of Goliath chicken meat were analyzed using SAS software (SAS, 2006). Analysis of variance was performed using the PROC GLM procedure. Means were compared by the student T test.

## 3 RESULTS

### 3.1 Proximate Composition of Goliath Chicken Meat Reared with and without Outdoor Access to *Launaea taraxacifolia* Grazing

Proximate composition analysis revealed that outdoor access to *Launaea taraxacifolia* grazing significantly affected only the fat content of the meat, which was higher in the

group reared in confinement without such access (1.81% vs 1.9%;  $p < 0.05$ ). In contrast, the dry matter, crude protein, and ash contents did not differ significantly between the two groups ( $p > 0.05$ ). Dry matter content ranged from 23.8 to 23.86 g/100g ( $p > 0.05$ ). Similarly, crude protein content was comparable between groups, varying from 21.05 to 21.2 g/100g ( $p > 0.05$ ). Ash concentration also exhibited no significant difference, with values ranging from 0.94 to 0.98 g/100g ( $p > 0.05$ ). Nevertheless, the fat content was significantly greater in Goliath chicken meat produced in confinement without outdoor access to *L. taraxacifolia* grazing ( $p < 0.05$ ). The variability in proximate composition of Goliath chicken meat according to rearing system is presented in Table 2.

### 3.2 Fatty Acid Composition of Goliath Chicken Meat Reared with and without Outdoor Access to *Launaea taraxacifolia* Grazing

The fatty acid (FA) composition of Goliath chicken meat reared with and without outdoor access to *L. taraxacifolia* grazing is presented in Table 3. The results indicate that outdoor access to *L. taraxacifolia* grazing influenced the FA profile. Across both rearing systems, the predominant fatty acids were palmitic and stearic acids among SFAs, oleic acid among monounsaturated fatty acid (MUFA), and linoleic and arachidonic acids among polyunsaturated fatty acids (PUFA). Palmitic and oleic acids were the most abundant fatty acids in both groups.

Total SFA concentration did not differ significantly between rearing systems ( $p > 0.05$ ). However, the proportions of lauric, myristic, and arachidic acids were significantly lower in meat from chickens with access to *L. taraxacifolia* grazing compared to those without ( $p < 0.05$ ). Concentrations of undecanoic acid, palmitic acid, margaric acid, and stearic acid were identical between groups ( $p > 0.05$ ).

No significant difference was observed in total unsaturated fatty acid concentration between groups ( $p > 0.05$ ). Nevertheless, the contents of oleic acid and gadoleic acid were significantly lower in meat from chickens reared with access to *L. taraxacifolia* grazing than in those reared without ( $p <$

**Table 3.** Effect of Outdoor Access to *Launaea taraxacifolia* Grazing on Fatty Acid Profile of Goliath chicken meat

Variables (% of total fatty acids)	Goliath of group1		Goliath of Group2		ANOVA (Probability value)
	Mean	Standard error	Mean	Standard error	
C11:0 (Undecanoic acid)	0.01	0.005	0.002	0.001	NS
C12:0 (Lauric acid)	0.2	0.01	0.63	0.1	*
C14:0 (Myristic acid)	0.53	0.02	0.85	0.1	**
C16:0 (Palmitic acid)	21.4	0.39	21.94	0.37	NS
C17:0 (Margaric acid)	0.08	0.02	0.07	0.01	NS
C18:0 (Stearic acid)	16.54	0.3	15.71	0.45	NS
C20:0 (Arachidic acid)	0.01	0.006	0.06	0.01	*
<b>Σ SFA</b>	<b>38.76</b>	<b>0.49</b>	<b>38.26</b>	<b>0.32</b>	<b>NS</b>
C14:1 (Myristoleic acid)	0.02	0.006	0.04	0.01	NS
C16:1 (Palmitoleic acid)	1.1	0.1	1.2	0.06	NS
C17:1 (Heptaecenoic acid)	0.01	0.005	0.02	0.008	NS
C18:1 n9 (Oleic Acid)	19.43	0.27	20.87	0.61	*
C20:1 n9 (Gadoleic acid)	0.006	0.002	0.03	0.009	*
C24:1 n9	1.35	0.09	1.23	0.08	NS
<b>Σ MUFA</b>	<b>21.93</b>	<b>0.42</b>	<b>23.4</b>	<b>0.61</b>	<b>NS</b>
C18:2 n-6 (LA)	17.78	0.43	19.15	0.39	*
C18:3 n6	0.009	0.005	0.003	0.002	NS
C18:3 n3 (ALA)	0.34	0.18	0.14	0.02	NS
C20:2 n6 (Eicosadienoic acid)	0.25	0.02	0.24	0.018	NS
C20:3 n6 (Eicosatrienoic acid)	0.63	0.03	0.6	0.03	NS
C20:4 n6 (Arachidonic acid)	16.6	0.38	14.93	0.53	*
C20:5 n3 (EPA)	0.33	0.03	0.2	0.02	**
C22:6 n3 (DHA)	3.37	0.14	2.19	0.1	***
<b>Σ PUFA</b>	<b>39.3</b>	<b>0.6</b>	<b>37.5</b>	<b>0.68</b>	<b>*</b>
<b>Σ n-3</b>	<b>4.03</b>	<b>0.14</b>	<b>2.53</b>	<b>0.12</b>	<b>***</b>
<b>Σ n-6</b>	<b>35.27</b>	<b>0.48</b>	<b>34.93</b>	<b>0.69</b>	<b>NS</b>
<b>Σ n-6/Σ n-3</b>	<b>8.83</b>	<b>0.23</b>	<b>14.16</b>	<b>0.78</b>	<b>***</b>
<b>PUFA/SFA</b>	<b>1.01</b>	<b>0.02</b>	<b>0.95</b>	<b>0.02</b>	<b>NS</b>

**ALA:** Alpha linolenic acid; **DHA:** Docosahexaenoic acid; **EPA:** Eicosapentaenoic acid; **LA:** Linoleic acid; **NS:** Non-Significant; \*:  $p < 0.05$ .

0.05). Concentrations of other unsaturated fatty acids were comparable between groups ( $p > 0.05$ ).

Total PUFA proportion was significantly affected by outdoor access to *L. taraxacifolia* grazing, with the highest proportion observed in the group with such access (39.3% vs. 37.5%;  $p < 0.05$ ). Among the major polyunsaturated fatty acids, meat from chickens with access to *L. taraxacifolia* grazing exhibited the lowest linoleic acid concentration, alongside significantly higher proportions of arachidonic acid, docosahexaenoic acid, and eicosapentaenoic acid ( $p < 0.05$ ).

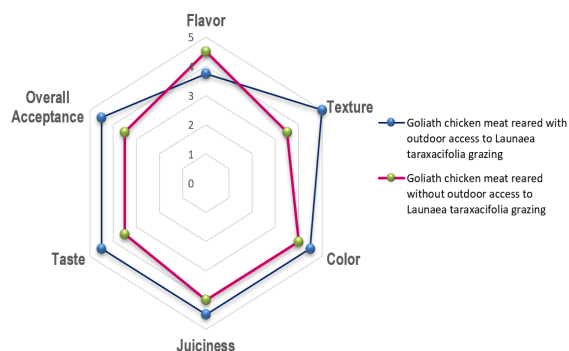
In both groups, omega-3 fatty acids (n-3 FA) proportions were substantially lower than those of omega-6 fatty acids (n-6 FA). The highest n-3 FA content was recorded in meat from chickens reared with access to *L. taraxacifolia* grazing (4.03%;  $p < 0.001$ ) Omega-6 FA concentrations were similar

between groups, ranging from 34.93 to 35.27% ( $p > 0.05$ ). Furthermore, the n-6/n-3 ratio was markedly lower in meat from chickens with access to *L. taraxacifolia* grazing than in those without (8.83 vs 14.16;  $p < 0.001$ ). No significant difference was observed in the PUFA/SFA ratio between groups, which ranged from 0.95 to 1.01 ( $p > 0.05$ ).

### 3.3 Sensory Quality of Goliath Chicken Meat Reared with and without Intake of *Launaea taraxacifolia* Grazing

Figure 4 presents the scores for the six sensory attributes evaluated—color, taste, flavor, appearance, texture, and overall acceptability—in Goliath chicken meat from both rearing systems. The results display that the meat from chickens reared with outdoor access to *L. taraxacifolia* grazing received higher scores for color, taste, appearance, texture, and overall acceptability compared to meat from chickens reared

under confinement without such access. Conversely, from chickens kept under conventional confinement without access to *L. taraxacifolia* grazing exhibited the highest flavor intensity.



**Figure 4.** Sensory Attributes of Goliath Chicken Meat Reared with and without Outdoor Access to *Launaea taraxacifolia* Grazing

## 4 DISCUSSION

### 3.4 Proximate Composition of Goliath Chicken Meat Reared with and without *Launaea taraxacifolia* Grazing

The current study demonstrates that lipid content was significantly higher in Goliath chicken reared in confinement without outdoor access to *L. taraxacifolia* grazing. Conversely, the concentrations of dry matter, ash, and crude protein remained unaffected by the inclusion of *L. taraxacifolia* in the rearing system. The lipid concentrations observed in the *Pectoralis major* muscles (1.56 – 1.75%) are consistent with the findings of Schiavone et al. (2019) regarding broiler chickens. In contrast, Altmann et al. (2018) reported a significantly higher lipid concentration in broiler meat, ranging from 3.40 to 3.41%. The values obtained in this study 1.8 – 1.9 g/100g are also consistent with the ranges (0.68 – 2.78 %) reported for various broiler strains by Abeni and Bergoglio (2001) and Qiao et al. (2002), as well as the levels (0.51 – 2%) observed by Wattanachant et al. (2004) in naked-neck chicken and Thai indigenous chickens.

The moisture and protein content analysis of the breast muscle in Goliath chickens aligned closely with the results of Altmann et al. (2018) (73.88 – 74.29% and 20.52 – 21.07%, respectively) and Schiavone et al. (2019) (75.24 – 76.14% and 22.28 – 23.09%, respectively). However, the ash content recorded in the present study was lower than the values reported by Schiavone et al. (2019) for broiler breast muscles (1.23 – 1.33%). Discrepancies in proximate composition among various studies are often attributable to a confluence of

genetic and environmental factors, including breed, rearing system, muscle type, and nutritional strategies (Daszkiewicz et al., 2022; Murawska et al., 2021; Pieterse et al., 2019; Stanišić et al. 2023). Furthermore, analytical variations—such as whether the skin was included in the sample—significantly influence reported lipid concentrations due to the presence of subcutaneous fat.

The enhancement of Goliath chicken meat quality through the outdoor access to *L. taraxacifolia* grazing substantiates the findings of Giampietro-Ganeco et al. (2020), who reported higher lipid content in the thigh and drumstick meat of grazing broilers compared to confined cohorts. Comparable observations were also performed by Bogosavljevic-Boskovic et al. (2010), Konrød and Gaøl (2009), and Castellini et al. (2002) who noted that organic production systems involving vegetable intake decrease lipid deposition in broiler breast meat, whereas conventional confined system promote higher fat accumulation.

### 3.5 FA Composition and Sensory Quality

The fatty acid profile of Goliath chicken meat was characterized by a predominance of palmitic and stearic acids as SFA, oleic acid as MUFA, and linoleic and arachidonic acids as PUFA. The prevalence of palmitic and oleic acids in both experimental groups is consistent with established literature on both indigenous and commercial poultry breeds (De Marchi et al., 2005; Pereira et al., 1976; Ponte et al., 2008; Sheu and Chen, 2002).

Notably, the concentrations of oleic acid (C18:1 n-9) and gadoleic acid in Goliath chicken meat with access to *L. taraxacifolia* were slightly lower than those in the confined group. This finding is ostensibly paradoxical, as grazing typically correlates with increased MUFA levels. This may be explained by competitive metabolic interactions; specifically, an elevated intake of n-3 PUFA via *L. taraxacifolia* may modulate desaturation and elongation pathways, thereby reducing the synthesis or deposition of oleic acid in muscle tissue (Dal Bosco et al., 2012; Ponte et al., 2008). Although statistically significant, the magnitude of this reduction is biologically modest, suggesting limited practical implications for overall meat quality.

The total PUFA content was significantly enhanced by outdoor access, with grazing chickens exhibiting higher levels (39.3% vs. 37.5%). While linoleic acid was slightly lower in the grazing group, arachidonic acid, docosahexaenoic acid (DHA), and eicosapentaenoic acid (EPA) were significantly higher. These variations are likely attributable to the rearing system and forage consumption, as environmental and management variables remained uniform. Identical findings have been reported by Stanišić et al. (2023), revealing that rearing systems influence fatty acid profiles in indigenous chickens.

The highest n-3 fatty acids content (4.03%) in the present study was observed in chickens reared with access to *L. taraxacifolia*. This proportion exceeds values reported for free-range and conventional broilers (Ponte et al., 2008; Taulescu et al., 2010) and aligns with findings where diets were supplemented with green forage (Küçükyılmaz et al., 2012; Straková et al., 2010). Although the n6/n3 ratio ranged from 8.83 to 14.16, remained above the 4:1 ratio recommended for human health (Benatti et al., 2004; Wood, 2008), it was substantially lower than those reported in slow-growing Hubbard Red-JA broilers (Küçükyılmaz et al., 2012).

Notably, meat from chickens with outdoor access exhibited the lowest oleic acid content but the highest  $\alpha$ -linolenic acid (C18:3 n-3), supporting the notion of competitive metabolism between linoleic and  $\alpha$ -linolenic acids (Dal Bosco et al., 2012; Ponte et al., 2008). Overall, the observed increases in PUFA and n-3 fatty acids in chickens with outdoor access to *L. taraxacifolia* are consistent with other studies on free-range and organic systems (Grashorn and Serini, 2006; Husak et al., 2008; Jahan et al., 2004; Kucheruk et al., 2019; Martino et al., 2008). These effects are likely mediated by the consumption of green forage rich in PUFA (Galvez et al., 2020; Grashorn and Serini, 2006; Husak et al., 2008).

In summary, while the trends observed herein are consistent with previous literature, the data should be interpreted with caution. The reductions in oleic acid, though statistically significant, are reduced, and the overall improvements in PUFA and n-3 content support the beneficial role of *L. taraxacifolia* grazing in enhancing meat lipid quality without over-interpreting the definitiveness of these findings.

## 5 CONCLUSIONS

In conclusion, this study provides critical insights into the impacts of *Launaea taraxacifolia* grazing on the nutritional quality attributes of Goliath chicken meat. The results indicate that outdoor access to this forage significantly reduces lipid content while enhancing the concentrations of polyunsaturated fatty acids (PUFA) and omega-3 fatty acids. Furthermore, this rearing system effectively lowered the n-6/n-3 ratio, improving the meat's nutritional indices.

Overall, our findings contribute to the growing body of evidence supporting the role of pasture-based systems to optimize the lipid profile of poultry products. By incorporating *L. taraxacifolia* grazing, producers can facilitate the promotion of healthier, more nutrient-dense meat, potentially reducing the risk of cardiovascular diseases for consumers and aligning with modern dietary recommendations.

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