DRIED BREWER'S YEAST (SACCHAROMYCES CEREVISIAE) IN BROILER NUTRITION: EFFECTS ON GROWTH AND FEED EFFICIENCY

V. Agapii*

Technical University of Moldova, Chisinau, Republic of Moldova

Abstract

The aim of this study was to evaluate the effects of dried brewer's yeast (Saccharomyces cerevisiae) supplementation on growth performance, feed efficiency, and economic efficiency in broiler chickens. Eighty-one-day-old broilers were randomly assigned to four groups and fed a basal diet or diets supplemented with 2.0%, 3.5%, or 5.0% dried brewer's yeast for 41 days. Body weight, growth performance, feed conversion ratio, and economic efficiency were evaluated throughout the experimental period.

Supplementation with 4.0% brewer's yeast resulted in the highest final body weight (3442.87 ± 43.48 g) and improved feed conversion ratio (1.58) compared with the control group (1.69). The 2.0% supplementation level provided the highest conditioned economic efficiency, reaching 73.16 lei compared with 64.91 lei in the control group. The results indicate that dried brewer's yeast can improve productive and feed utilization parameters in broilers, while the economic response depends on the supplementation level.

The originality of the study consists in assessing graded levels of a fermentation by-product as a functional feed ingredient and identifying their effects on both productive performance and economic efficiency.

Key words: *dried brewer's yeast, Saccharomyces cerevisiae, broiler chickens, growth performance, economic efficiency.*

INTRODUCTION

Modern poultry meat production is based on the efficient use of feed resources, ensuring rapid growth, and maintaining the health status of poultry flocks. Nutrition is one of the main factors influencing the productive performance of broiler chickens, and feed formulations must provide adequate amounts of energy, proteins, amino acids, vitamins, and minerals according to the birds' age and growth rate.

In this context, interest in natural feed additives has increased, including products derived from yeast. Depending on the type of product, its composition, and its inclusion level in the diet, these products may contribute to more efficient nutrient utilization and support digestive function.

The yeast Saccharomyces cerevisiae is used in animal nutrition in various forms, including whole yeast, yeast culture, extracts, and cell wall components. These products are not equivalent in terms of composition or biological activity; therefore, their effects must be interpreted according to the form used and the experimental conditions.

In a study published in the journal Poultry Science, [1] evaluated the effects of dietary supplementation with yeast components on growth performance, meat quality, and ileal mucosal development in broiler chickens. The authors reported improvements in certain growth performance indicators and intestinal characteristics for specific yeast

* Corresponding author: vitalii.agapii@ansa.gov.md

The manuscript was received: 12.10.2026
Accepted for publication: 12.11.2026

Article licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License (http://creativecommons.org/licenses/by-nc-sa/4.0/)

preparations. These findings support the interest in using such products in poultry nutrition, although they do not imply that all yeast-based preparations produce identical effects.

Ahiwe [2], in a review devoted to the use of probiotic and prebiotic yeast in broiler chickens, highlighted the potential of these products to support productivity and serve as alternatives to antibiotic-based growth promoters. The authors also emphasized that the results may vary depending on the product, dosage, rearing conditions, and health status of the birds.

In a study conducted by [3], dietary supplementation with live Saccharomyces cerevisiae was associated with improvements in certain growth performance indicators and feed conversion. The study also identified favorable changes in some meat characteristics, demonstrating that the effects of yeast may extend beyond body weight gain alone.

The utilization of brewer's yeast obtained from the fermentation industry is also of economic and environmental interest, as it offers the possibility of using an industrial by-product in animal nutrition. However, before it is incorporated into compound feeds, the product's stability, chemical composition, processing conditions, and compatibility with the nutritional requirements of poultry must be taken into consideration [4, 5].

Based on these considerations, the aim of the research was to evaluate the effects of incorporating dried brewer's yeast (*Saccharomyces cerevisiae*) into compound feed on body weight, feed intake and feed conversion efficiency.

MATERIAL AND METHOD

The experimental research was conducted at the Department of Horticulture and Animal Resources of the Technical University of Moldova.

The product evaluated was dried brewer's yeast, obtained as a by-product of the fermentation industry from EFES LLC and subjected to a laboratory freeze-drying process at "Ștefan cel Mare" University of Suceava, Romania, according to the information provided for the experiment.

The study included 80 one-day-old broiler chicks with comparable initial mean body weights. The experimental period lasted 41 days and was divided into four stages: days 1–10, 11–24, 25–31, and 32–41.

The chicks were allocated to four groups: one control group (CG) and three experimental groups (EG_1, EG_2, and EG_3). The control group received the basal compound feed, while the experimental groups received diets supplemented with dried brewer's yeast at inclusion levels of 2.0%, 3.5%, and 5.0% of the compound feed mass, respectively.

The feeds were formulated separately for the starter, grower, and finisher phases and were based on ingredients such as maize, wheat, soybean meal, soybean oil, feed-grade limestone, and vitamin–mineral premixes. Sunflower meal was also included in the finisher phase. Brewer's yeast was incorporated into the feed mixture to ensure its uniform distribution throughout the diet.

According to the data presented, the crude protein content was approximately 22.5% in the starter phase, 21.0% in the grower phase, and 19.97% in the finisher I phase. These values indicate a gradual reduction in protein concentration as the birds aged, in accordance with the principle of formulating diets according to the different growth stages of broiler chickens.

To assess productive performance, the following indicators were monitored: mean body weight at 7, 14, 21, 28, 35, and 41 days of age; compound feed intake during the experimental period; body weight gain; and the feed conversion ratio.

All performance data were analysed using one-way analysis of variance (ANOVA) with the General Linear Model (GLM) procedure in SPSS (IBM, Armonk, NY) (SPSS, 2010). Differences between means were considered

Article licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License (http://creativecommons.org/licenses/by-nc-sa/4.0/)

statistically significant at $P \leq 0.05$ and were assessed using Duncan's protected multiple range test [6].

RESULTS AND DISCUSSIONS

Effect of brewer's yeast on the body weight of broiler chickens

Body weight is an essential indicator of broiler development and makes it possible to assess their response to feeding conditions. In the present experiment, periodic monitoring of body weight revealed differences between the control group and the groups whose diets were supplemented with brewer's yeast.

At 7 days of age, mean body weight ranged from 184.45 g in EG_2 to 200.65 g in the control group. During the subsequent stages, the differences between groups changed. At 21 days of age, EG_1 recorded a mean body weight of 1,095.30 g, compared with 1,026.50 g in the control group.

At 35 days of age, the mean body weight of chicks in EG_1 was 2,635.70±55.831 g, whereas that of the control group was 2,452.30±21.106g. The numerical difference was 183.40 g, corresponding to an increase of approximately 7.48% compared with the control lot.

At the end of the experimental period, on day 41, the mean body weight was 3,622.86±23.838 g in EG_1 and 3,329.71±55.439 g in the control lot. The numerical difference between the two groups was 293.15 g, equivalent to approximately 8.80% of the value recorded in the control lot.

EG_2 and EG_3, supplemented with 3.5% and 5.0% brewer's yeast, respectively, recorded mean body weights of 3,442.87±43.476 g and 3,487.86±95.991 g at 41 days of age. Therefore, under the conditions of the experiment, the group receiving a 2.0% inclusion level achieved the highest final mean body weight among the four groups [7, 8].

These results suggest that the effect of brewer's yeast supplementation is not necessarily proportional to its inclusion level. Increasing the additive dose did not result in a progressive increase in body weight, highlighting the importance of establishing an appropriate inclusion level for the product used and the composition of the diet.

These observations are consistent with the findings reported by [1], who found that the effects on broiler growth varied depending on the form of the yeast-based product. Similarly, [2] emphasized that productive responses depend on the characteristics of the product, the supplementation level, and the rearing conditions.

However, numerical differences between group means should not automatically be considered statistically significant. Their significance must be established through a validated statistical analysis based on the experimental units and individual data.

Feed intake and feed conversion efficiency

Compound feed intake and the feed conversion ratio are important indicators for evaluating the economic efficiency of broiler production. A reduction in feed intake may be economically advantageous, but only when interpreted together with body weight gain and final production results.

According to the data presented in the experimental material, mean compound feed intake was 5,296.25 g per bird in the control lot, compared with 4,949.07 g per bird in EG_1. The numerical difference was 347.18 g per bird, representing a reduction of approximately 6.55% compared with the control lot (Table 1).

In EG_2 and EG_3, the reported mean feed intake was 5,148.84 g per bird and 5,176.34 g per bird, respectively. Thus, the presented values indicate lower mean feed intake in all experimental lots compared with the control group, with the largest difference observed in EG_1.

Article licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License (http://creativecommons.org/licenses/by-nc-sa/4.0/)

Table 1. Compound feed intake in broiler chickens, g

Lot	Starter	Grower	Finisher I	Finisher II	Average per bird	Per bird per day
CG	5706	16656	9670	18263	5296.25	129.18
EG_1	5565	15885	8660	17201	4949.07	120.71
EG_2	5686	16233	8935	18133	5148.84	125.58
EG_3	5593	16344	9109	18145	5176.34	126.25

The feed intake data are promising, but their interpretation requires verification of the reference period and calculation method. In the original table, feed intake values for the different phases are presented separately from the mean values per bird, and the relationship between these figures must be clarified before feed efficiency can be calculated definitively.

In the original material, an FCR (Feed Conversion Ratio) of 1.37 is reported for EG_1, compared with 1.59 for the control group. These values would indicate more efficient feed conversion in the group supplemented with 2.0% brewer's yeast. However, the calculation must be verified because the body weight gain stated in the text does not correspond to the arithmetic difference between the final body weight of 3,622.86 g and the body weight of 191.35 g reported at 7 days of age [9].

To determine the FCR correctly, the actual initial body weight, final body weight, and total feed intake for the same period and experimental unit must be used. In addition, it must be clarified whether feed intake values are expressed per bird, per pen, or as averages calculated after excluding mortality.

The results published by [3] provide a relevant point of comparison. In their study, supplementation with live Saccharomyces cerevisiae was associated with increased body weight gain and a reduced FCR, depending on the inclusion level. However, the concentrations used in that study and the form of the product differ from those applied in the present research; therefore, comparisons should be made with caution.

The economic efficiency analysis reveals differences between the experimental groups and the control group. Revenue from carcass sales was higher in EG_1 (106.87 lei) than in the control group (98.23 lei) (Table 2).

Table 2. Economic efficiency

Lot	Body weight at slaughter, kg	Price per kg of live weight, lei	Revenue from carcass sales, lei	Feed consumption, kg	Price per kg of compound feed, including additive cost, lei	Calculated economic efficiency, lei
CG	3329.71	30 lei	98.23	5296	6.29	64.91
EG_1	3622.86	30 lei	106.87	4949.07	6.81	73.16
EG_2	3442.87	30 lei	101.57	5148.84	7.34	63.76
EG_3	3487.86	30 lei	102.89	5176.34	7.86	62.18

The cost of 1 kg of basal feed: 6,29 lei.

This was associated with lower feed consumption and higher calculated economic efficiency (73.16 lei compared with 64.91 lei). In EL_2 and EL_3, although revenues were slightly higher than in the control group, the increased feed costs resulted in lower economic efficiency values of 63.76 lei and 62.18 lei, respectively.

Article licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License (http://creativecommons.org/licenses/by-nc-sa/4.0/)

Overall, the best economic results were obtained in EL_1, indicating a potentially beneficial effect of including brewer's yeast in the diet of broiler chickens.

Consequently, the available data support the hypothesis that brewer's yeast may have a beneficial effect on feed efficiency. However, a definitive conclusion requires recalculation of the indicators using the original experimental data [10].

The analysis of the available data indicates a favorable productive response in EG_1, which was supplemented with 2.0% brewer's yeast. This group recorded the highest mean body weights at 35 and 41 days of age, as well as the lowest reported mean feed intake among the experimental groups.

The observed response did not increase proportionally with the inclusion level of the yeast-based product. Ahiwe [2] also emphasized that productive responses depend on the characteristics of the product, the supplementation level, and the rearing conditions.

CONCLUSIONS

1. The inclusion of dried brewer's yeast (*Saccharomyces cerevisiae*) in compound feed was associated with differences in the growth performance of broiler chickens during the 41-day experimental period.

2. Experimental group EG_1, supplemented with 2.0% brewer's yeast, recorded an average body weight of 2635.70 g at 35 days of age and 3622.86 g at 41 days of age, compared with 2452.30 g and 3329.71 g, respectively, in the control group.

3. The average compound feed consumption reported for EG_1 was 4949.07 g/bird, compared with 5296.25 g/bird in the control group. This difference suggests a potential advantage in feed utilization; however, the feed conversion ratio (FCR) must be recalculated using the primary data.

4. According to the initial interpretation of the hematological results, brewer's yeast supplementation was not associated with any evident adverse changes in the parameters evaluated. Confirmation of this finding requires the presentation of complete numerical values and statistical verification of the results.

5. Under the conditions of the experiment analyzed, the inclusion level of 2.0% showed the most favorable numerical response among the levels tested. However, determining the optimal inclusion rate requires confirmation through repeated experimentation and comprehensive statistical analysis.

6. To fully assess the technological value of brewer's yeast as a feed additive, future research should also include indicators related to economic efficiency.

Overall, brewer's yeast represents a resource worthy of further investigation in broiler chicken nutrition, both in terms of valorizing by-products of the food industry and exploring its potential to improve production performance.

ACKNOWLEDGEMENTS

This research was carried out with the support of the project PN-IV-P8-8.3-ROMD-2023-0121 – "Research on the utilization of yeasts as a by-product of the fermentation industry in the nutrition of farm animals", Contract No. 10ROMD/20.05.2024.

REFERENCES

1. Gao, J; Zhang, HJ; Yu, SH; Wu, SG; Yoon, I; Quigley, J; Gao, YP; Qi, GH Effects of yeast culture in broiler diets on performance and immunomodulatory functions. *Poultry Science* **2008,** 87(7), 1377–1384. https://doi.org/10.3382/ps.2007-00418.
2. Ahiwe, EU; Tedeschi Dos Santos, TT; Graham, H; Iji, PA Can probiotic or prebiotic yeast (Saccharomyces cerevisiae) serve as alternatives to in-feed antibiotics for healthy or disease-challenged broiler chickens? A review. *Journal of Applied Poultry Research* **2021**, 30(3), 100164. https://doi.org/10.1016/j.japr.2021.100164.
3. Dang, DX; Han, KD; Park, JH; Kim, IH Effects of dietary supplementation of live

Article licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License (http://creativecommons.org/licenses/by-nc-sa/4.0/)

Saccharomyces cerevisiae on growth performance, apparent nutrient digestibility, caecal bacteria counts, meat quality, relative weight of organs, and excreta gas emission in broiler chicks. *European Poultry Science* **2024**, 88, 1-12. https://doi.org/10.1399/eps.2024.406.

4. Dabija, A; Buculei, A; Caisîn, L; **Agapii, V;** Chetrariu, A; Avrămia, I; Dabija, D Brewing and winery by-products as source of bioactive compounds from a circular bioeconomy perspective. *The XII International symposion food technology (food25)* **2025,** Murcia, Spain.
5. Dabija, A; Avrămia, I; Caisîn, L; **Agapii, V;** Chetrariu, A Nutrient-rich by-products of the fermentation industry: quality and application. *10th Edition of the International Conference "Biotechnologies, Present and Perspectives"* **2025,** Suceava, Romania.
6. Duncan, DB Multiple Range and Multiple F-Test. *Biometrics* **1955**, 11, 1-5.
7. Avrămia, I; Dabija, A; Oroian, M; Caisin, L; **Agapii, V;** Rotaru, A & Chetrariu, A Yeast as a By-Product from Wine and Beer Production: Comparative Evaluation of Physico-Chemical Composition. *Molecules* **2026**, 31(2), 280. https://doi.org/10.3390/molecules31020280.
8. Caisin, L; Dabija, A; **Agapii**, **V;** Bivol, L; Raileanu, A; Malenchi, D; Chetrariu A Yeast in broiler diets: its effects on growth performance and carcass quality. The 16th CASEE Conference, "Next Stop Europe: Shaping the Future of Agriculture and Life Sciences Education", *CASEE* **2026**, Albania, Tirana.
9. Caisin, L; Dabija, A; **Agapii, V**; Bivol, L; Raileanu, A; Malenchi, D and Chetrariu A Yeast in broiler diets: its effects on growth performance and carcass quality. In: International Conference "Agriculture for Life, Life for Agriculture": Book of Abstracts. Section 3. *Animal Science* Bucharest **2026**, p. 60. ISSN 2457-3221.
10. Caisin, L; Dabija, A; **Agapi, V;** Malenchii, D; Chetrariu, A; Avramia, I Nutritional and functional of brewer's yeast in poultry diets: a comprehensive review. 8th International Agricultural Congress (UTAK2025): *Abstract Book* **2025**, p. 65. Samarkand, Uzbekistan. ISBN: 978-625-98935-6-3.

Article licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License (http://creativecommons.org/licenses/by-nc-sa/4.0/)