RETASTE Conference Abstracts
Vol. 4 RETASTE-AAF-675-In-person Oral
Archanes, Greece, 25-27 September, 2024

DOI:10.5281/zenodo.14164243

retaste rethink food resources, losses, and waste 2024

Commercially processed bakery by-products in broiler diets: impact on performance and meat sensory attributes

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Abstract

The use of commercially processed former foodstuffs based on bakery by-products (cBBP) as circular-sustainable ingredient in animal feed represents a promising alternative to conventional raw materials (Srikanthithasan et al., 2024). This study aimed to assess the effects of incorporating cBBP into broiler diets on the in vivo performance and sensory attributes of broiler chicken meat. Two hundred one-day-old male ROSS 308 chicks, with an average body weight (BW) of 38.0 ± 0.11 g, were divided into four dietary groups (5 replicates/group and 10 birds/pen) and subjected to a two-phase feeding program (starter: d1 to 12 and grower: d12 to 33). The control group (CTR) received a standard commercial feed including corn, soybean meal (SBM), and soybean oil (SBO). The other three groups received diets in which cBBP replaced corn, SBM, and SBO at three substitution levels (6.25%, 12.5%, and 25%, referred to as LBBP, MBBP, and HBBP, respectively) over the 33-day trial period. Throughout the trial, growth performances were registered. On day 33, birds were slaughtered (n=15/dietary group), and chicken breast samples were collected and stored at −20˚C for subsequent analysis, including shear force, drip loss, cooking loss, and sensory attributes. The sensory analysis involved two sessions: a discriminant analysis using a triangle test to compare the meat samples of the four groups. An acceptability test followed, along with a descriptive assessment using the Check-All-That-Apply (CATA) method. Cochran's Q test determined the significance of discrimination among the groups for each CATA attributes. The data showed no differences in BW and average daily gain between the groups. However, there was a linear decrease ($p<0.05$) in average daily feed intake (g/d) and feed conversion

ratio with increasing levels of dietary cBBP inclusion (CTR: 93.9 g/d, 1.55 and H-BBP: 86.4 g/d, 1.38 respectively). Shear force, drip loss, and cooking loss results did not differ significantly among the groups. The inclusion levels of cBBP in the broiler diet did not influence the perception of the final product, with no perceived difference among samples. Both the acceptability test and CATA questionnaire revealed no differences in liking scores among samples, nor for the whole panel or clusters of consumers. While Cochran's Q test on CATA attributes identified two sensory attributes (sour and hard; $p<0.05$) capable of discriminating among the groups, the overall sensory profile and liking remained unaffected by cBBP inclusion compared to the CTR group. The findings of this study suggest that incorporating of cBBP into nutritionally balanced diets for broiler chickens, even up to 25%, is viable. Such inclusion does not adversely affect the overall growth performance of male broiler chickens up to 33 days of age under commercial conditions, nor does it impact consumer perception of the final product.

Keywords: bakery by-product, broiler diet, circular economy, consumer perception, sustainability

References

Srikanthithasan, K., Giorgino, A., Fiorilla, E., Ozella, L., Gariglio, M., Schiavone, A., Marín, A. L. M., Diaz Vicuna, E., Forte, C., 2024. Former foodstuffs in feed: a minireview of recent findings. Environmental Science and Pollution Research, 1–12. DOI: 10.1007/s11356-024-32695-2.