

## Hazelnut skin as sustainable feed ingredient in livestock diets: preliminary results

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### Abstract

Environmental impacts of the livestock sector and overall waste production associated to the food industry are recognised as two of the major issues undermining worldwide food security. In this scenario, the employment of agro-industrial by-products as animal feed has been widely investigated as an effective way to increase sustainability within the sector<sup>1</sup>. In the hazelnut industry, the only product currently classified as waste is represented by the skins (HS), currently involved in a revalorization process driven by their richness in dietary fibres, polyunsaturated fatty acids, and phenols, making them a promising source of bioactive compounds at low cost. In addition, the extracts of these components have been proven to be responsible for antioxidant and antimicrobial activities, especially against gram-positive bacteria<sup>2</sup>. Using HS in livestock feed could significantly decrease the post-harvesting wastes, while adding economic value to the whole productive chain and potentially enhancing the animals' health and productivity<sup>3</sup>. Such elements represent the base of this study, which aims at evaluating the effects of HS' inclusion in beef cattle. After an in vitro characterization of the HS' bioactive potential, a total of 80 Piedmontese bulls aged 7-9 months and with an average weight of  $282 \pm 65$  kg was involved in a trial (ongoing). The animals were divided into two dietary groups (control - CTR, test - T; 4 replicates/group), and subjected to a two-phases feeding program, composed of a fattening (5 months) and a finishing phase (2 months). Both groups receive iso-energetic and iso-nitrogenous diets composed of straw/hay combined with standard concentrate feed, with an 8% inclusion of HS as partial substitute of corn and barley (fattening) and exclusively of corn (finishing) for the test group. Animals' individual weight was recorded before allocation (Ti), at diet shift (fattening to finishing) (T1/2), and on slaughter day (Tf). Feed intake (FI) was measured by-weekly. Recorded data were used to calculate the average daily gain (ADG) and individual feed intake (iFI), analysed through one-way ANOVA (RStudio software, library 'stats') to evaluate differences across treatments. Preliminary results obtained reported no difference among groups in terms of ADG (CTR average= 1.223 kg; T average= 1.081 kg; p-value= 0.2299), on the contrary of the FI (CTR average= 9.61 kg; T average= 11.21

kg; p-value= 0.0003). These results will be eventually confirmed at the end of the data collection. To the best of the authors' knowledge, no other study has ever investigated the effects of HS dietary inclusion in livestock for longer than two months, nor performed such evaluations specifically in beef cattle. Our initial findings seem to support the possibility of re-assessing the skins' economic and nutritional value through the inclusion in farm animals' feed, ultimately answering the public's growing request for a more sustainable food supply chain.

**Keywords:** hazelnut, beef cattle, sustainability, circular economy, re-evaluation

### References

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