



The PRIMA programme is supported and funded under Horizon 2020, the Framework European Union's Programme for Research and Innovation



PRIMA
PARTNERSHIP FOR RESEARCH AND INNOVATION
IN THE MEDITERRANEAN AREA

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PRIMA NEWFEED: Communication of the project outcomes

An Innovation Project for the exploitation of food industry by-products

NEWFEED project was launched on July 1st 2021. It involves 14 partners (R&D Institutes, Universities, Federations) from 4 countries (Egypt, Greece, Spain and Turkey) and it is going to be completed by June 2025.

The objective of the project is to develop and promote alternative animal feeds by establishing a circular economy approach in livestock production. This is achieved by converting food industry by-products into high-value secondary feed materials. The project also aims to enhance the sustainability of Mediterranean livestock farming by valorising local by-products such as those from the winery, orange juice, and olive oil industries in Southern and Eastern Mediterranean regions, including Spain, Greece, and Egypt. This approach contributes to reducing both environmental impact and production costs.

During the project, real-time trials were conducted to integrate by-products into animal feed aiming to evaluate the impact of this inclusion on the quality of the final dairy products.

- Case study 1

Case Study 1, conducted in Spain, investigates the impact of various hydrolysis strategies on the digestibility of grape stems for ruminants, using both in vitro and in vivo assays.

The results of this study demonstrate that grape stems (GS), when ground and washed, can be effectively processed and included in ruminant diets without technical complications. The washing step successfully reduced sugar content, improving drying efficiency and minimizing unwanted fermentation. Although alkali hydrolysis further modified the fiber profile and improved digestibility by potentially breaking lignocellulosic bonds, it also led to a loss of soluble sugars. However, this benefit did not translate into significant advantages during animal trials. Feeding tests in dairy sheep and cows confirmed that including up to 10% GS or hydrolyzed GS (HGS) in the diet did not impair productive performance, milk quality, or consumer acceptance. Notably, unprocessed GS improved the milk's fatty acid profile and offered greater economic and environmental benefits by avoiding the additional costs and impacts of bioprocessing. Furthermore, since neither form of the ingredient reduced enteric methane emissions, the simpler, unprocessed GS emerges as the more practical and sustainable option. Overall, grape stems, without the need for hydrolysis, present a viable, cost-effective, and environmentally friendly feed ingredient for ruminants, supporting circular economy goals through the valorization of agri-food by-products.



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- Case study 2

Case Study 2, conducted in Greece, focuses on optimizing the valorization of orange peels through fermentation, hydrolysis, and drying techniques.

This study demonstrates the successful transformation of orange peel waste into a high-value, sustainable animal feed ingredient through a multi-step valorization process involving enzymatic hydrolysis, fermentation, and drying. The results highlight significant improvements in both the nutritional profile of the feed and the performance of dairy sheep, including increased milk yield and enhanced milk fat content. The reduction in methanogenic archaea abundance in the rumen suggests a potential for mitigating enteric methane emissions, contributing to more environmentally friendly livestock production. Importantly, the cost analysis shows that even the unprocessed version of the feed is economically viable, offering a highly affordable and scalable solution for farmers. Life cycle assessment confirms the lower environmental impact compared to traditional feed production and waste management practices, aligning with circular economy and sustainability goals. Furthermore, the quality and sensory evaluations of dairy products derived from supplemented animals confirmed that neither the nutritional enhancements nor the feed type adversely affected the final product. In fact, yoghurt made from the milk of ewes fed unprocessed orange peel feed not only exhibited higher protein and fat content but also achieved high consumer acceptability, highlighting its strong potential as a nutritious and appealing product. Altogether, this valorization strategy not only addresses food industry by-product challenges but also enhances livestock productivity, supports climate goals, and maintains dairy product quality—making it a comprehensive, impactful innovation for sustainable Mediterranean agriculture.

- Case study 3

Case Study 3, conducted in Egypt, examines the effects of incorporating fermented olive cake into broiler diets. The trials focused on evaluating growth performance, carcass characteristics, and blood parameters in broilers.

The findings of this study suggest that olive cake can be a valuable ingredient in poultry diets, particularly due to its cost-effectiveness and potential role in promoting sustainable animal agriculture. However, the results also highlight important considerations regarding its inclusion levels. Higher inclusion rates of olive cake were associated with a reduction in feed intake and a significant impact on liver percentage, indicating possible physiological adaptations or stress responses in broilers. Despite these effects, most blood biochemical parameters, including triglycerides and general cholesterol levels, remained stable, suggesting no severe metabolic disruption. Interestingly, a significant reduction in total cholesterol was observed in broilers fed olive cake, which may point to a beneficial modulation of lipid metabolism. This cholesterol-lowering effect could potentially enhance the health profile of the meat, adding nutritional value for consumers. From an economic and environmental standpoint, utilizing olive cake—an abundant agro-industrial by-product—can reduce feed costs and contribute to waste valorization efforts, aligning with circular economy principles. Therefore, while careful management of inclusion levels is necessary to avoid negative effects on performance, the strategic incorporation of olive cake into poultry diets offers a promising route to enhance feed sustainability, reduce production costs, and improve the environmental footprint of poultry farming.

In summary, the results from the experimental trials indicate that incorporating industrial by-products into animal feed has a positive effect on the overall quality of the resulting dairy products. These findings are promising for the future of animal nutrition, promoting a more sustainable and circular economy approach.