



From Farm Waste to Feed Resource: Sustainable Pathways for Reducing Agrofood Losses in Livestock Production Chain

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Introduction

- Agrofood loss and waste (FLW) remain major challenges to global food security, environmental sustainability, and farm profitability. Livestock systems are both contributors to and potential solutions for FLW through the recovery and valorisation of agro-industrial by-products. Fruit and vegetable processing residues, particularly from the wine industry, represent underutilised resources with high nutritional and functional potential for animal feeding.

Objective

- To highlight sustainable waste-to-feed strategies in livestock production, with a focus on fruit-derived by-products, and to demonstrate how feed valorisation can reduce agrofood losses while improving animal health, welfare, and system resilience.

Agrofood By-products as Feed Resources

- Grape seeds and pomace from wine production
- Fruit processing residues rich in polyphenols
- Cereal and vegetable side streams
- These materials offer antioxidant, anti-inflammatory, and functional properties when appropriately processed and standardised.

Valorisation Pathways & Technologies

- Mechanical separation and stabilization
- Drying and milling
- Phytogenic and supercritical extraction
- Feed additive formulation and quality control

These technologies enable the transformation of food-chain residues into safe, high-value feed ingredients.



Agrofood By-products as Feed Resources

Studies in cattle and calves show that grape seed extract supplementation:

Improves antioxidant status:

- * Reduces inflammatory and heat-stress responses
- * Supports gut integrity and physiological resilience
- * This demonstrates that waste-derived feed additives can deliver both **nutritional** and **welfare** benefits.

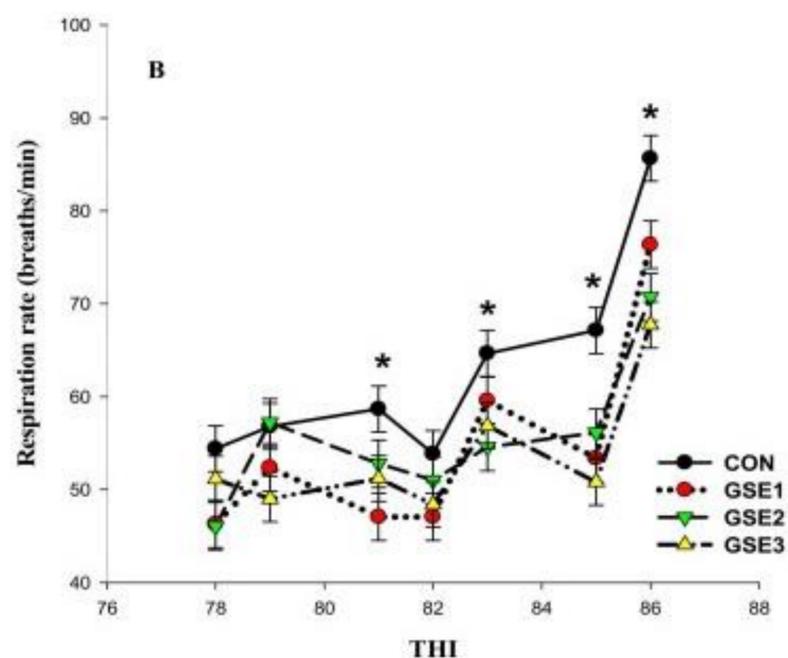


Figure 1. Effect of different levels of grape seed extract (GSE) on respiratory rate (breaths/min) of calves under heat stress. CON: control, GSE1: 25 mg/kg, GSE2 = 50 mg/kg, GSE3: 100 mg/kg. * Significant treatment \times THI interaction ($P \leq 0.05$). (Adopted from Urkmez and Bricik, 2022)

Agrofood By-products as Feed Resources

- * Reduction of food and processing waste
- Improved resource efficiency and nutrient recycling
- Lower environmental footprint of livestock production
- Alignment with EU Green Deal and Farm-to-Fork strategies

Implications for FoodWaStop

- Waste-to-feed valorisation bridges FLW prevention, sustainable management, and industrial implementation. Integrating livestock into circular agrofood systems strengthens cross-sector collaboration and accelerates scalable solutions.

Key Message

- Agrofood by-products are not waste, but strategic resources. When integrated into livestock feeding systems, they reduce food loss, enhance animal welfare, and support a resilient, circular agrofood chain.