



POSTER SESSION



Hypercritical Separation Technology (HYST): An innovative technology for resource use in sustainable animal feeding

Pierpaolo dell'Omo¹, Francesca Luciani², Luca Malagutti³

Abstract:

The Hypercritical Separation Technology (HYST) is an innovative biomass processing technology having tremendous potential in the field of nutrition (both animal and human) and renewable energy. The HYST technology is based on plants which carry out a physical disaggregation of the plant tissues, and suitable for integration into several industrial processes. When applied to the animal production sector, the HYST processing of corn straw and cereal bran results in a significant increase in the nutritional value and digestibility of the processed raw material, as revealed by the analytical evaluation (composition and nutritional value). To evaluate the nutritional quality of the HYST products, the *in-vitro* dry matter digestibility and the neutral detergent fibre (NDF) digestibility (NRC, 2001) have been determined and used for the calculation of *Unité Fourragère Lait* (UFL)/kg dry matter by using the *in-vitro* gas method (Menke and Steingass, 1988).

The finest fraction obtained from bran reaches a value of 1,07 UFL/kg dry matter, comparable to barley flour. Likewise, the finest fraction obtained from straw reaches 0.64 UFL/kg dry matter, as that of a common grass hay. The HYST processing improves the NDF digestibility by 2.4% for straw and >7% for bran, when compared with the starting raw materials.

Moreover, the lignocellulosic biomass (corn straw), once pre-treated with the HYST system, showed high biogas yield (2.5 to 2.8 times that from corn silage) when submitted to anaerobic digestion for biogas production, also due to the good miscibility of the treated material in the digester sludge.

The above results, along with the reduced working costs, suggest that the HYST process is a valuable technology for resources optimization. In fact, the HYST processing allows to improve the yield and quality of biomass intended for animal feeding and to solve the waste biomass disposal problems, making biomass such as straws 100% usable for feeding or bioenergy production purposes.

Keywords: HYST, nutritional value, feed, bioenergy

¹ University of Rome "La Sapienza" – DIAEE, Via Eudossiana 18 - 00184 Rome (Italy) - paolo.dellomo@uniroma1.it

² Superior Health Institute (ISS) – CRIVIB, Viale Regina Elena 299 - 00161 Rome (Italia);

³ University of Milan – Department of Animal Sciences, Via Celoria 2 – Milan (Italy).