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Solar-Dried Agricultural and Agro-Industrial Wastes as Alternative Feed Ingredients: A Quality Assessment Within the LIFE-INOFEED Project

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Abstract

The growing demand for sustainable and cost-effective alternative feed ingredients has intensified interest in the valorisation of agricultural and agro-industrial by-products as viable substitutes for conventional feed raw materials. The LIFE-INOFEED project (LIFE24-ENV-EL-LIFE-INOFEED, 101215561), co-funded by the European Union under the LIFE Programme, develops and demonstrates a decentralised solar-assisted drying system, the Autonomous On-Site Drying Unit (AOSDU), for the on-site treatment of food-related biowastes and their conversion into safe, marketable feed ingredients. The present study focuses on the physicochemical characterisation of solar-dried materials derived from four representative feedstock streams: brewers' spent grain, non-marketable fruits and vegetables (supermarket residues), two-phase olive pomace and cucumber processing residues. Samples were collected from the AOSDU prototype unit operating under real-life conditions and subjected to comprehensive analysis, including proximate composition (dry matter, crude protein, crude fat, crude fibre and ash), mineral content and microbiological safety parameters, in full compliance with EU feed legislation (Regulation (EC) No 183/2005). Preliminary results demonstrate that solar drying efficiently reduces moisture content to below 12% within short processing times, yielding products with nutritional profiles consistent with established alternative feed ingredient categories. The significant compositional variability observed across feedstock streams underlines the necessity of source-specific quality assessment and tailored feed formulation strategies. Beyond establishing a growing evidence base for the use of solar-dried agro-industrial by-products as sustainable feed ingredients, these findings will directly inform the optimisation of the technical parameters of the LIFE-INOFEED pilot-scale AOSDUs. In doing so, they simultaneously advance the circular economy objectives of the project, demonstrating a replicable model for the integrated valorisation of food-related bio-waste across the European agri-food sector.

Keywords: alternative feed, solar drying, quality assessment, agricultural, agro-industrial wastes

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