Innovative Feed Production from Food Waste and Poultry Slaughterhouse by-products: A Techno-economical Evaluation

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Through the realization of the Life project “Food 4 Feed” and the RIS3Crete project “BEATLE”, the efficiency of a boosted and slightly altered solar drying process was evaluated through the operation of pilot units. The raw materials used were mainly food waste from catering units (hotels, restaurants) and poultry slaughterhouse by-products in the Food4Feed project, and fruit and vegetable waste from supermarkets in the BEATLE project.

The nutritional value of the produced feed component and its safety use in poultry, pigs’, cats’, and dogs’ diets was investigated in various experimental trials and the respective results were published. According to these findings the produced feed component proved of high quality, safe and as a result, of a significant economic value. In addition, the proposed treatment method is of a low carbon footprint and proved of a low treatment cost, with the collection cost to be estimated more than 50 % of the treatment cost. The feed component produced from catering waste according to legislation is allowed to be used only in dogs, and cats in shelters, fur animals, and zoo animals.

Through a spin off company and a secured funding from the Ministry of Development and Investment, of the Action "Environmental Infrastructure: Strengthening Waste Management Facilities" in the framework of the Operational Program "Competitiveness, Entrepreneurship and Innovation, an effort is made to develop a full scale unit in Heraklion, the largest city of Crete. This unit is aiming to treat a bit more than 8,000 t per year of food waste and poultry slaughterhouse by-products, through two separated production lines. Fruit and vegetable waste from supermarkets and packaging plant could also be utilized as raw material in the production line. However, the kind of raw materials and the quantities that will be used, will be determined on the relevant gate feed that can be imposed.

For the development of a full-scale unit, the actual required capital cost has been accurately estimated, taking into consideration the collection, the pretreatment, and the post treatment cost, based on the experiences occurred from the operation of the pilot units developed within the two projects mentioned above. Moreover, a thorough investigation concerning the various technologies that are needed to be composed for the operation of the production lines has also been completed and all these data have been utilized for the techno -economical evaluation of this full-scale unit.

According to that, only for the development of the full-scale unit 2,8 million Euros will be required, without including the cost for the respective land. The average production cost has been estimated at about 177 €/t, with the treatment cost of both raw materials to be estimated at 44 €/t. In order this unit to be viable and the investment return period to be less than five years, the minimum gate fee of 25 € / t for catering waste and 15 € / t for slaughterhouse by-products is required, with a respective end value of the produced feed components to be 175 € / t and 425 € / t.

Overall, the techno-economic analysis showed that, with the implementation of the new Greek Law 4819/2021, about the Integrated Waste Management Framework, implementing new landfill taxation and the “pay as you throw” system, this investment could not only be a viable system but could easily become a profitable business.

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