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From Composting to Solar Drying: One Machine - Two Uses

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Abstract

TM Solutions LTD (TMS), has been involved in a number of projects regarding the onsite treatment of waste, supporting a new perspective for innovative and flexible composting technology solutions. The conversion of a solar autonomous mechanical composters into a hybrid solar dryer, utilizing both thermal and solar energy and the alternative use of it, is presented in this work.
This modified drying system was utilized for drying of non-marketable vegetable products, as well as non-marketable (damaged packaging) flour, pasta, etc. A series of experimental processes were carried out, from which it emerged that the optimal mixture of the above-mentioned materials is 8 parts of plant products and 2 parts of flours. The vegetable products, after hand-sorting, in order to remove any foreign materials, were shredded, so that the maximum diameter of the shredded product not to exceed 2cm. This material was then mixed with flour and the mixture fed to the dryer. The initial mixture moisture was about 75% and the drying time in order to reduce the moisture up to 35-40% was about 6 days (during summer, where the outside average temperature was around 32oC and the air temperature inside the solar drying system exceeded 50oC). The thermal resistors' temperature varied at 45oC. Afterwards, this material was transferred into a solar drying greenhouse, until the final moisture content to be reduced below of 12%.
The above process resulted in the production of a significant nutritional value product, with crude protein, crude fiber and fats content at 12-14%, 4-6% and 2-2.5% respectively, without any presence of pathogens, aflatoxins, etc. It is noted that the specific product was incorporated in pigs feeding trials at 15% with very encouraging results. Further investigation will take place in order to both evaluate the production process and the produced feed component.

Keywords: solar drying, feed components, non-marketable fruits and vegetables, non-

marketable flour and pasta

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