University of Kassel
Faculty of Organic Agricultural Sciences

Development, construction and testing of modified Gombisa for long term storage of maize cobs

Master-Thesis at the Department of Agricultural and Biosystems Engineering

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Abstract

The storage of leafless corn cobs traditionally takes place in some African countries in a wood-braided cylinder called Gombisa in Ethiopia. As a result of the bad ventilation situation and the high regional humidity there is no adequate drying of the corn cobs, stored in with high grain moisture content between 18 and 25 %. From this not sufficiently fast drying process of the corn cobs mould fungus forms out within the bulk, which spread further under the humid- warm core climate of the bulk. Only a rapid cob drying to a long-term grain moisture content of less than 14 %, a mould growth can be contained to its standstill. Thus, the question arose whether the conversion of a traditional Gombisa to a ventilation dryer would have a positive effect to the drying behaviour of the corn cobs. In order to find initial answers to this question, a Gombisa was reconstructed on the test field of the department of Agriculture of the University of Kassel in Witzenhausen. In addition to a sealing of the external cylinder of the Gombisa, a solar-powered fan was the main modification for the generating of a sufficient airflow. For a result comparison, two drying tests have been carried out under different weather conditions. In both experiments, originating from an initial grain moisture content of 19 %, the grain moisture content required for long-term storage was below 14 % could have been reached within 13 days.