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DESIGN AND DEVELOPMENT OF PORTABLE MODIFIED ATMOSPHERIC PACKAGING (MAP) UNIT FOR GRAIN DISINFESTATION

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ABSTRACT

A portable modified atmospheric packaging (MAP) unit was designed and developed keeping in view the needs of small farmers and entrepreneurs for safe storage of their agricultural produce. The MAP unit consists of grain holding unit fitted with sealing unit, nozzle, pressure regulator and control panel, solenoid valve with timer all placed over the working table and connected to the carbon dioxide cylinder. The dimensions of the unit were 600, 450 and 200 mm in length, width and height respectively. The nozzle of 2 mm orifice diameter was used for flushing gas into the packet with grains. The operational parameters of the unit viz., flushing pressure and time were optimized for three different grains (i.e., rice, pigeon pea and foxtail millet) of one kg capacity each using the statistical software. The flushing pressure of 3 kg/cm^2 for a period of 5 s was found to flush maximum amount of CO_2 (89.9%) and minimum amount of O_2 (0.06%) concentrations into the packets for all the grains. The estimated cost of the developed portable modified atmospheric packaging unit was found to be Rs 8350.00 and the cost of packaging was worked out to be Rs 2.00 per packet of one kg each.

KEYWORDS: Modified Atmospheric Packaging, Grain Disinfection, Flushing Pressure and Flushing Time

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