

**DESIGN, FABRICATION AND PERFORMANCE EVALUATION OF A
CENTRALIZED STERILIZATION SYSTEM FOR MUSHROOM
GROWING BAGS**

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Mushroom cultivation is a cottage industry in Sri Lanka and a good opportunity for an additional income. Due to the higher nutritional value, taste and medicinal properties, mushroom has high demand in both local and international market. Artificial mushroom cultivation is comprised of few steps such as, growing media preparation and filling into grow bags, sterilization, inoculation, incubation and harvesting. Traditionally, sterilization is carried out in a barrel with 110 °C temperature. There is no improved system for sterilization other than the traditional method, which causes a high number of damaged bags, consumption of energy, time and labour. Therefore, this study aimed to introduce an efficient sterilization system with a centralized boiler and peripheral sterilization units to overcome these problems. The capacity of the boiler and a sterilization unit were 50 L and 200 L, respectively. The total production cost of the system was 23,000.00 LKR. The performance of the centralized sterilization system was evaluated by comparing the traditional method by changing the number of sterilization units. The average maximum temperature of the traditional method was 102.67 °C, while it was 103.67, 104, and 104 °C in 2, 3 and 4 sterilization units, respectively. The average time taken to reach the maximum temperature was 107.6, 118.0, 126.6, and 80.6 minutes with 2, 3 and 4 sterilization units and traditional method, respectively. Amount of biomass consumed by the furnace was 30.6 kg, 37.6 kg, 45.6 kg, and 21.0 kg for 2, 3, 4 sterilization units, and traditional method, respectively. The lowest cost-benefit ratio (0.919) was given by 4 sterilization units, while the highest was (2.121) in the traditional method. The number of damaged bags of new method was significantly lower than the traditional method ($p < 0.05$). The results revealed that centralized system with 2 – 4 sterilization units can be effectively used for mushroom cultivation.

Keywords: Centralized sterilization, Growing media sterilization, Mushroom cultivation