A REVIEW OF MECHANIZATION AND AUTOMATION OF MUSHROOM CULTIVATION

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Global mushroom production has been expanded rapidly in last few decades with the introduction of new mushroom varieties and new technologies. Cultivation procedures and management practices are varied widely based on the type of mushroom and substrates used. This study was conducted to investigate the mechanized and automated levels of each and every step of mushroom cultivation important for future researches. Basically, six steps could be identified in mushroom cultivation process as substrate preparation, bag filling, sterilization, inoculation, incubation, and harvesting regardless of the types of mushrooms. Several studies have been conducted to mechanize each step of mushroom cultivation. Only one machine was developed for sawdust sieving with 212 kgh⁻¹ capacity and 84% efficiency. Several mixing machines have been developed and only a few were evaluated. The capacity of evaluated machines ranged from 323 kgh⁻¹ to 500 kgh⁻¹. Although, a number of bag filling machines have been developed in several countries, only few machines are available in commercial level. Technical information on most of the machines were not available. Glow box and oven door methods were developed for inject spawn into sterilized growing media. High voltage stimulation (HVS) was developed to stimulate mycelium growth where, 20 kV – 50 kV current was provided through the electrode with the distance of 1 – 7 cm to the substrate during 10 seconds. Automated mushroom growing room environmental control systems have been developed to build up better micro climate surround mushrooms. Moreover, automated harvesting and conveying systems have been developed for more accurate and convenient harvesting. The results concluded that, although mushroom cultivation has been attempted to mechanize and automate, important knowledge gaps still remain for scientific studies aimed at developing the industry.

Keyword: Automation, Mechanization, Mushroom, Steps of mushroom cultivation