

Abstract

Purpose Food insecurity and poverty are common challenges in arid and semi-arid regions. Diversification into low input agriculture like mushroom cultivation can help address these challenges. However, recommended mushroom substrates in Kenya (rice and wheat straws) are not widely available cheaply. Crop residues found in semi-arid areas can serve as alternative substrates, but their efficiency has not been adequately evaluated. This study evaluated the potential of various agro-waste materials as alternative substrates for cultivation of phoenix oyster mushrooms (*Pleurotus pulmonarius*) in semi-arid regions.

Method Five agro-waste materials and their combinations were tested: maize stalks, beans straw, maize cobs, rice straw, and *Melia volkensii* leaves. The study assessed the effects of these substrates on different mushroom growth and productivity parameters. The experiment was set in a randomized complete block design, under relative humidity of 80 - 90% and temperatures of 23 - 24°C, over a 75 day period.

Results Substrates containing *M. volkensii* failed to colonize fully except in their combination with bean straw, which yielded little. Yields varied significantly by substrate, ranging from 136.2 g/kg of wet substrate in bean straw + *Melia volkensii* to 434.9 g/kg of wet substrate in rice straw. Mushroom yields from maize stalks + bean straw and maize stalks + maize cobs substrates were not significantly different from those of rice straw, the control substrate.

Conclusion The study showed that combinations of maize stalks, bean straw and maize cobs are suitable alternatives to rice straw, as substrates for oyster mushroom production.