Applications of Juncao Technology and its Contribution to the Achievement of Sustainable Agriculture and the SDGs in Tanzania

Remarks

by

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Background

Mushroom cultivation

- Tanzania is blessed with a rich diversity of wild edible mushrooms that grows naturally in the forests
- It is common to find people who collect and sell them at the market or in roadside stalls.
- More than 60 edible mushroom species have been identified, including some species endemic to Tanzania
- People from many tribes in Tanzania eat wild mushrooms

Background

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Mushroom cultivation in Tanzania

Substrates for Mushroom cultivation

- Locally available organic materials which are mostly agricultural residues are used as substrates for mushroom cultivation.
- Some materials are common to all areas, while others are specific to some areas.
- The most commonly used bulk substrates in various areas are banana leaves, rice straw and bean trash.
- Banana juice pulp and elephant grass are unique to Kagera, where banana stem barks and finger millet straw are unique to Kilimanjaro areas

Mushroom cultivation in Tanzania

Common techniques for Mushroom cultivation

Mushroom cultivation in Tanzania

Economic potential for Mushroom cultivation

Mushroom cultivation in Tanzania

Contribution of Mushroom cultivation to GDP

Mushroom cultivation in Tanzania

Mushroom cultivation for Food and Medicinal Purposes

Mushroom cultivation in Tanzania

Role played by the University of Dar es Salaam

SDG 1: No Poverty

Promotes income generation (mushroom production)

- UDSM through training and workshops: conducted training to individual and groups on mushroom cultivation.
- Established spawn laboratory at Uyole Agriculture Research Institute in 1996.
- Initiated the formation of the Tanzania Mushroom Growers Association which through its members is spearheading the spread of the mushroom cultivation technology.
- Mushroom growers countrywide estimaed about 5000 producing more than 1000 tons of oyster mushrooms annually

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Role played by the University of Dar es Salaam

SDG 2: Zero Hunger

SDG 3: Good health and well-being

Promotes consumption of edible and medicinal mushroom (Nutrition/ Health)

- Through research identified locally available substrates that are suitable for mushroom cultivation and isolate and grow on agricultural substrates two Tanzanian wild mushrooms, *Oudemansiella tanzanica* nom. prov and *Pleurotus flabellatus*
- Led ffforts to identify and classify more indigenous edible wild mushrooms and determine their nutritional value and medicinal potential
- Conducted seminars and workshop to raise awareness on health benefits related to mushroom consumption
- Have prepared mushroom policy brief which propose adoption of mushroom as stratergic crop

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Role played by the University of Dar es Salaam

SDG 4: Quality Education

Promotes Academic exchange and capacity building

- Through training and workshops to individual and groups on mushroom cultivation
- The MBB departement has a course on microbial entrepreneurship which train students mushroom cultivation from spawn making to haversting

SDG 5: Gender equality

Promotes involvement of women and youth

- Mushroom cultivation require no big land, the activities can be accomplished with low capital.
- Hence suitable for young and women

Mushroom cultivation in Tanzania

Role played by the University of Dar es Salaam

SDG 8: Descent work and economic growth

Production of mushrooms

- Mushroom cultivation value chain involve different stages which generate income
- Spawn making, supply agricultural waste (substrate), value addition to produce various mushroom product such as pickle, mushroom power, etc.

SDG 15: Life on Land

Conservation and protection of ecosystems

- Mushroom cultivation help to conserve and protect the existing mushroom species by propagating mushroom mycelia which will produce multiple fruiting bodies of mushroom.
- Thus, prevent overharvesting and conserve wild mushroom species

Research at UDSM on mushroom Cultivation

SN	Research title	Authors
1	Cultivation of Oudemansiella tanzanica nom. prov. on agricultural solid wastes in Tanzania.	Magingo, et al. (2004).
2	Proximate and nutrient composition of three types of indigenous edible wild mushrooms grown in Tanzania and their utilization prospects.	Mshandete, A. M., & Cuff, J. (2007).
3	Cultivation of three types of indigenous wild edible mushrooms: *Coprinus cinereus*, *Pleurotus flabellatus* and *Volvariella volvocea* on composted sisal decortications residue in Tanzania.	Mshandete, A. M., & Cuff, J. (2008).
4	Cultivation of Pleurotus HK-37 and *Pleurotus sapidus* (Oyster mushrooms) on cattail weed (*Typha domingesis*) substrate in Tanzania.	Mshandete, A. M. (2011).
5	Cultivation of Tanzanian *Coprinus cinereus* (sisal compost mushroom) on three non-composted sisal waste substrates supplemented with chicken manure at various rates.	Mwita, et al (2011).
6	Comparative study on cultivation and yield performance of *Coprinus cinereus* on sisal wastes supplemented with cow dung manure.	Raymond, et al (2012).
7	Cultivation of oyster mushroom (Pleurotus HK-37) on solid sisal waste fractions supplemented with cow dung manure.	Mshandete, et al (2013).
8	Optimization of Pleurotus mushroom cultivation on saline sisal solid waste.	Muthangya, et al (2013).
9	Antioxidant properties of seven wild edible mushrooms from Tanzania.	Hussein, et al (2015)
10	Successful domestication of *Lentinus sajor-caju* from an indigenous forest in Tanzania.	Hussein, et al (2016).

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Challenges

- The main challenges for mushroom farmers is sustainable spawn supply
- Spawn production require expertise and sterile environment, which is difficult to maintain particularly in rural areas.
- Low yield
- The market is dominated by Oyster mushroom

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Opportunities

- Despite challenges, mushroom cultivation is opportunity for income generation
- The demand for mushroom is high
- Innovation on adding values to mushroom product and proper packaging will ensure market for the mushroom product and generating income

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Potential of adoption of Juncao Technology in mushroom cultivation in Tanzania

- Mushroom cultivation in Tanzania is dominated by Oyster mushroom.
- The yield is moderate, demand is high and supply is essentially low.
- Introduction of Juncao technology can help to improve the yield in mushroom production and possibly facilitate domestication of local apreciated and familiar wild edible nd medicinal mushrooms

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Way forward