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AGRO WASTE MANAGEMENT AND REUTILIZATION- A REVIEW

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ABSTRACT

Waste is a product or a substance that is no longer suited for its intended use. Waste may be generated during the extraction of raw materials, the processing of raw materials into intermediate and final products, the consumption of final products, and other human activities. Agriculture is the largest contributor of any resource sector; it is also a large generator of waste materials. Every year more than 1000 million tonnes of Agricultural waste is produced globally. Waste generation is increased around 5% annually. India produces more than 42.0 million tonnes of municipal solid waste annually. Food waste contributes to excess consumption of freshwater and fossil fuels along with methane and CO_2 emissions from decomposing food, impacts global climate change. The first goal of any waste management system is to maximize the economic benefit from the waste resource and maintain acceptable environmental standards. If wastes are not properly handled they can pollute surface and groundwater and contribute to air pollution. Therefore we should follow the 4 Rs of waste management strategies viz., Reduce, Reuse, Recycle and Recover is the best first option: Reduce the amount of waste product generated. Reuse the waste product on the farm or provide it for others to use; and after reducing and reusing as much of the waste product as possible, recycle the product either on-farm, such as with land application of manure, or off-farm, such as with plastic recycling programs. Recover methane gas from manure waste.

Introduction

"Wastes are materials that are not prime products (that is products produced for the market) for which the generator has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose. Wastes may be generated during the extraction of raw materials, the processing of raw materials into intermediate and final products, the consumption of final products, and other human activities. Residuals recycled or reused at the place of generation are excluded."(**United Nations Statistics Division (U.N.S.D.)**

Waste breaks down in landfills to form methane, a potent greenhouse gas. Littering, illegal dumping and leaching due to which solid waste enter soil and ground water and contaminating them. Construction of backyard compost pit, storage bins where recyclable and reusable materials are stored by each household, storage centers where recyclable and reusable materials collected by the street sweepers are stored

prior to selling to junk dealers and maintenance of cleanliness in work areas and streets by encouraging others to join in the movement. The 4 Rs of Waste Management: Reduce, Reuse, Recycle and Recover is the best first option: Reduce the amount of waste product generated. Reuse the waste product on the farm or provide it for others to use; and After reducing and reusing as much of the waste product as possible, recycle the product either on-farm, such as with land application of manure, or off-farm, such as with plastic recycling programs, Recover methane gas from manure waste. Only after considering the four Rs should farm waste be disposed of.

The highest waste management value is 88%, meaning none of the farmers can be considered as environmentally conscious when it comes to disposing of waste products. Agricultural waste management, many farm by-products are economically important resources when managed properly. Manure, for instance, is a valuable resource by virtue of its nutrient supplying ability besides infusing the much required resilience in arable lands. Manure contains about 75%of the nutrients fed to livestock including nitrogen, phosphorus and potassium. Animals use only about 25% of nutrients and excrete the rest. About 50% of nitrogen and 75% of potassium in manure is found in the liquid fraction. Therefore, it is important to hold the liquids for soil application. Almost all the phosphorus is found in the solid portion.

Maximum moisture content at field capacity was observed in 5% of municipal waste compost and rice waste treatment (26.6%) that showed 6.5% increase in moisture content at field capacity. Also10 g of zeolite lead to 8.4% increased moisture in ratio of field capacity. The amount of water available in all three treatments of olive waste and rice waste had significant increase than control and that the greatest increase was in the treatment of 5% olive and rice waste.

Citric acid is one of the important commercially produced organic acid. Pre-treated sugarcane bagasse for citric acid production by using *Aspergillus niger* under solid state fermentation. The maximum value of citric acid was observed in acid treated substrate followed by urea and heat respectively. As a globally required organic acid for various industrial applications, citric acid can be produced at large scale by utilizing pre-treated agro residues such as sugarcane bagasse. Application of agro residues in the production of value added product can be a positive step towards agricultural waste management. It also has other industrial uses, such as in pharmaceutical, cosmetic and various chemical industries (Heinzle *et al*., 2007). Large amounts of sugarcane bagasse are produced world wide as a by-product of sugar industries. Many investigators have successfully utilized sugarcane bagasse as substrate for solid state fermentation for citric acid production (Kumar *et al.*, 2003 and Vandenberghee *et al.*, 2000). In India bagasse is mainly used as a fire fuel so this agricu7ltural waste can easily be used for citric acid production.

The following table illustrates management for waste utilization

Agro waste	Utilization options
Sunflower and Corn Stalk, Cane Bagasse	Reinforcement for thermoplastics
Rice husk	Power generation
Rice husk ash and Charcoal	Additive in cement mixes , Water glass manufacture, Active carbon
Onion skin, Groundnut husk	Heavy metal removal
Oil Palm stems, Rubber wood	Particleboards, Softwood furniture
Empty Fruit Bunches (EFB) of Oil Palm	Mulching, Organic Fertilizer
Husk, Straw, Cow Dung	Biogas production , Electricity generation
Rice straw and Cane bagasse	Mushroom cultivation
Banana Peel & Sugarcane fibers	Paper pulp
Bagasse, Banana Fruit Reject	Ethanol production, Animal feed
Animal waste (dung)	Compost and Manure.

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There was increase in total nitrogen a various stages of vermicomposting under different agricultural waste indicating highest total nitrogen in glyricidia (1.84%) followed by vegetable waste (1.69%) and parthenium weed (1.41%).Through increase in total nitrogen was recorded in vermin compost with the time the magnitude of increase was lower in order as wheat straw, sunflower husk, garden waste and sugarcane trash. The increase in total nitrogen was attributed to the inherently high nitrogen content in glyricidia and vegetable waste and subsequent digestion of nitrogen by earthworms and nitrogen mineralization. Gupta and Ram Sakal (1967) found more total nitrogen in cast than the surround soil. Similar findings were reported by Mulongoy and Bedret (1992).

Wood waste (sawdust, conifer waste) is the traditional substrate for mushroom cultivation (**Stamets and Chilton, 1983; Croan, 2004; Moonmoon *et al.*, 2010; Peng, 2010; Khan *et al.*, 2012**). The using of wood waste for mushroom cultivation has two major shortcomings. A number of researchers indicate lower results of cultivation on sawdust and lower nutritional value of mushrooms in

comparison with other using agro wastes (**Onuoha *et al.*, 2009; Ukoima *et al.*, 2009; Tripathy *et al.*, 2011; Govindaraju *et al*,. 2013; Dehariya and Vyas, 2013**). Furthermore, many forest trees are toxic and allergenic (**Meier, 2013**). Among substrates alternative to wood waste **Stamets and Chilton** (**1983**) mentioned for spawn making and fruit body production sugarcane bagasse, cereal straw, rye bran, rye grain, wheat bran, wheat grain, farm yard manure and some others. Meanwhile, the growth of agricultural waste in the last decades of the XX century, have attracted the researchers attention to this type of potential cheap substrates for the cultivation of mushrooms.

Compost made from livestock manure is an effective material for improving the physical and chemical condition of soil (Hara, 2001). One of the processes of biodegradable waste management is pelleting; *i.e.*, the processing of recyclable materials into organic ecological products. In order to reduce environmental pollution, sago bagasse and chicken manure slurry can be co-composted to obtain high quality organic fertilizers. This may lead to production of a co-compost that is rich in plant nutrients (Abdulla, 2007).

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