AgriCos e-Newsletter
ISSN: 2582-7049
AgriCos e-Newsletter
Open Access Multidisciplinary Monthly Online Magazine
Volume: 05 Issue: 10 October 2024 Article No: 11

Waste Utilisation in Plantation Crops

Malothu Soniya[1] and Koduru Bhagya Laxmi[2]
[1]Ph.D. Scholar, Department of Vegetable Science, Sri Konda Laxman Telangana State Horticultural University, Mulugu
[2]Ph.D. Scholar, Department of Plantation, Spices, Medicinal and Aromatic Crops, Sri Konda Laxman Telangana State Horticultural University, Mulugu

SUMMARY
The commercialization of waste utilization in plantation crops is a crucial component of sustainable agriculture, providing the agricultural sector with a variety of advantages as well as the environment. This abstract investigates the idea of turning trash produced from numerous plantation crops, such as cocoa, coffee, rubber, tea, arecanuts, palmyrah, and coconut, into useful items. The strategy is in line with circular economy concepts, which encourage resource efficiency while lowering environmental impact when trash is recycled to produce value.

INTRODUCTION
Crop residues are rich in bioactive compounds. These residues can be used as an alternate source for the production of different products like biogas, biofuel.The use of agro- industrial wastes as raw materials can help to reduce the production cost and also reduce the pollution load from the environment, (Pardeep *et al*, 2018). Leaves, pod husk, coconut husk, pulps of coffee and cocoa, industrial waste of oilpalm, cashew shells, cashew apple baggase, tea seed powders etc., were the sources of waste material in plantation crops. Leaf wastes are used as mulch while fresh and as fertilizer by composting. Coconut husk is used for preparation coir pith and cocopeat, (Shiva *et al*, 2017). Arecanut leaf sheaths are used to make plates. Cashew baggase is used as manure, (Olivelra *et al*, 2020).

What is Waste?
"Any garbage or refuse, sludge from a wastewater treatment plant, water supply treatment plantand other discarded material, including solid, liquid, semi-solid.

Biodegradable wastes

Non-Biodegradable waste

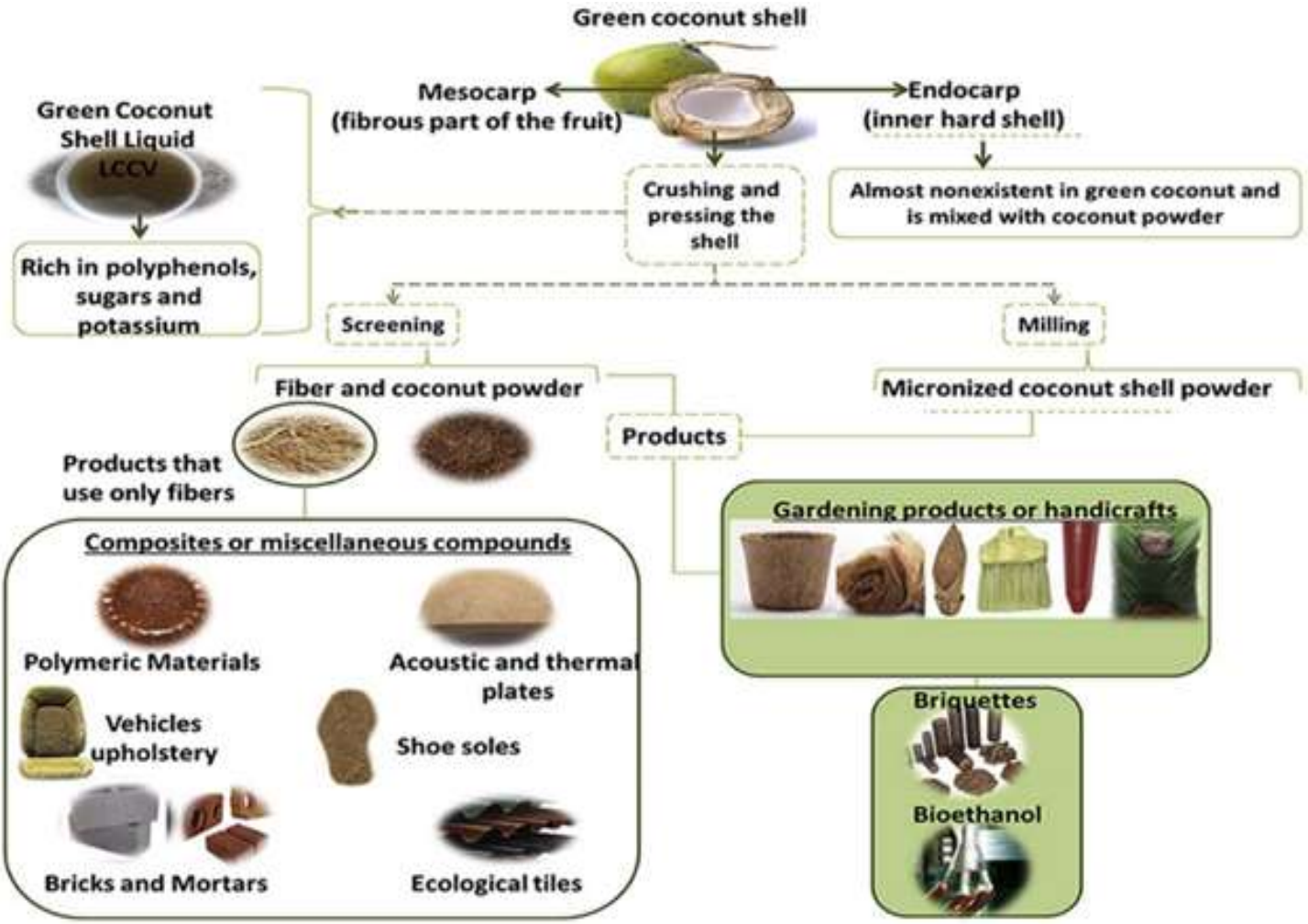
Types of waste
Solid waste
1.Biodegradable waste

2. Non-Biodegradable waste
Liquid waste
1.Black water
2.Gray water

Waste utilization in Plantation crops:
1.Coconut
2.Arecanut
3.Oilpalm
4.Coffee
5.Cocoa
6.Palmyra
7.Tea

Biomass Obtained From Plantation Crops

Crop	Biomass Obtained
Coconut	14-16 Tons / Ha / Year
Oilpalm	231.5 Kg/Year/Tree
Arecanut	4.5–5.4 Mt/ Year/Ha
Cocoa	0.7–0.8 Mt/ Year/Ha
Cashew	3.5 Mt/Ha/Year
Tea	0.015 Mt/Ha
Coffee	10 Tons / Ha / Year



Coconut Waste Management

Waste obtained from well manganed coconut gardens – about **14.36 MT / ha/ yr**

- Leaves: vermicompost and mulching, brooms
- Coconut husk: coir pith, cocopeat
- Coconut timber: wood products
- Coconut shells: crafts, charcoal

Arecanut Waste Management

- In India, the recyclable waste obtained from arecanut – **4.5-5.4 millon tonnes /y**r
- Areca leaf sheath
- Areca husk waste
- Areca leaf waste
- Arecanut leaf sheath
- Arecanut leaf sheath waste contains 0.5% N, 2.5% P, 1.8 % K

Husk contains 0.7% - 1.4 %N, 0.2 -0.7 % P, 1.16-1.4 % K when composted with cow dung slury, microbial consortia and glyricidia leaves.

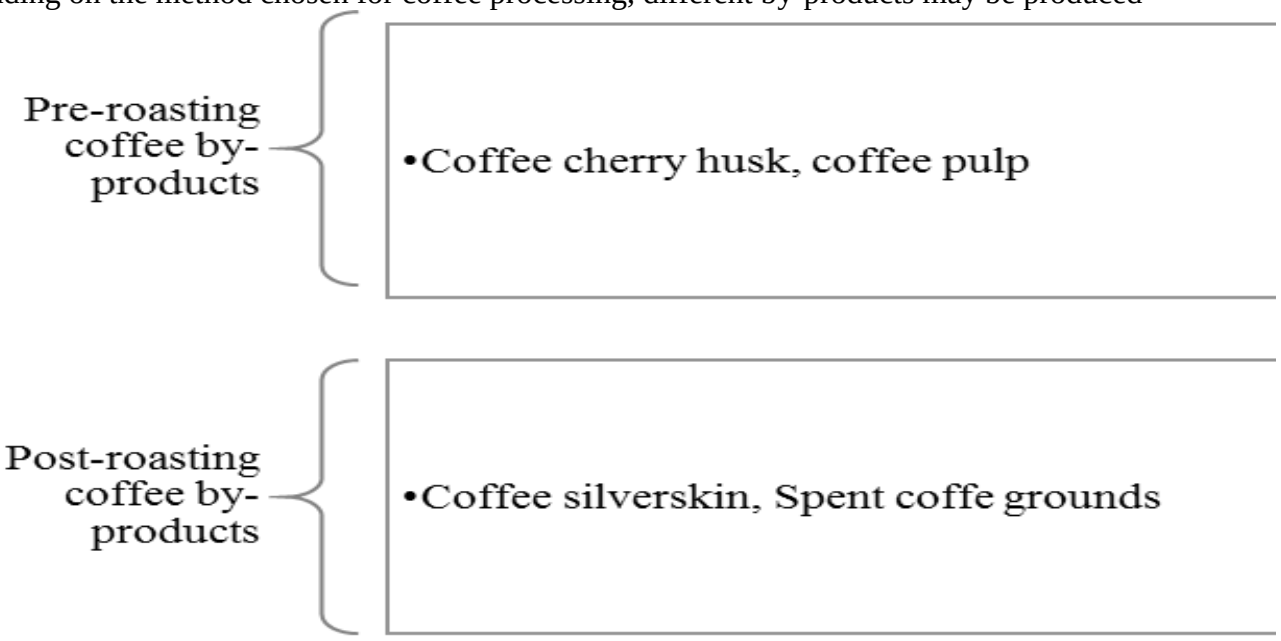
Coffee Waste Management

Waste produced **10 MT/ha year**

6 MT waste produced from SCG

Produced from defective coffee beans, spent coffee grounds, coffee husk.

Depending on the method chosen for coffee processing, different by-products may be produced



Pre-roasting coffee By-products

Coffee Husk:

- By-product from the dry method
- 1 ton of fresh coffee fruits - 0.18 tons of husks
- Uses: substrate for biogas, Mushroom production & compost

Coffee pulp:

- By-product from wet method
- 2 tons of green coffee - 1 ton of coffee pulp

- Uses: biogas production, bioethanol production, nutritious flour(Baking)

33

Post -roasting coffee By-products

Coffee silverskin:

- Known as "chaff"
- 54% of total dietary fiber
- Silverskin aqueous extract used for cosmetics and dermaceutics

Spent coffee grounds:

- The waste product from brewing coffee
- 0.91 g of the spent coffee grounds from 1 g of ground coffee
- Uses: pharmaceutical industry, & polymer industry

34

Cocoa Waste Management

In India, the recyclable waste from cocoa – **0.7-0.8 Mt/yr**

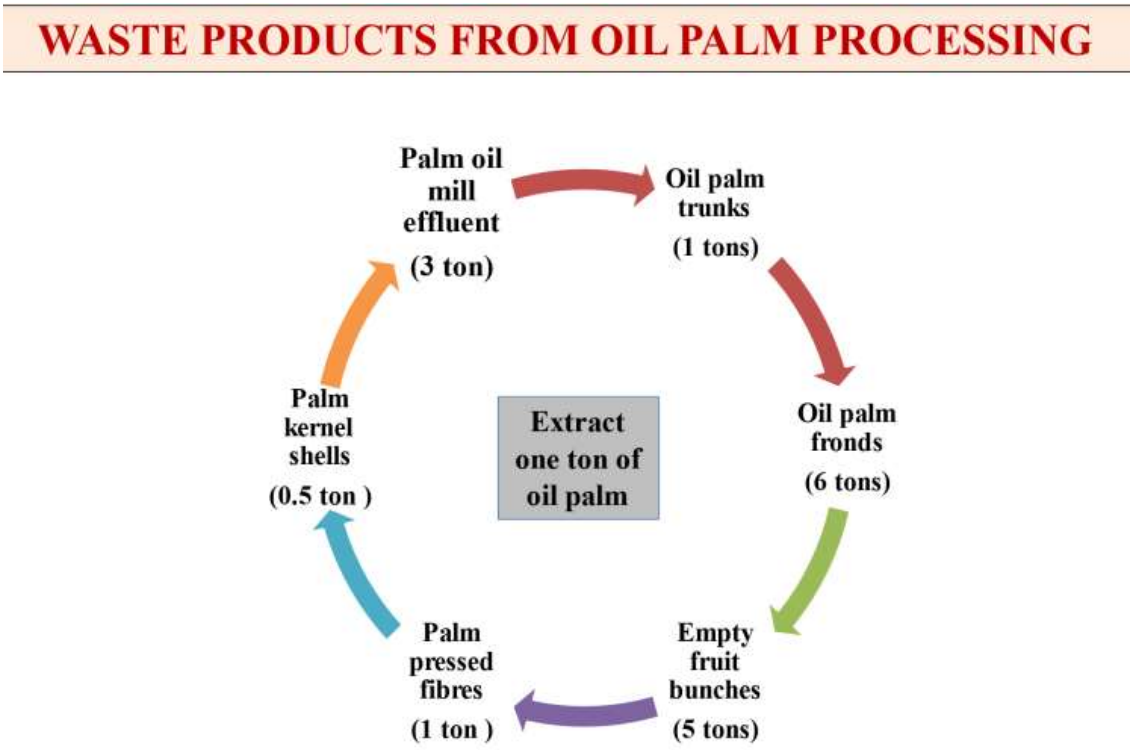
1t of dry beans produced generates approximately **10 t** of cocoa pod husks

Oil palm waste Management

Waste produced 29MT/Yr/ha

4-6 tonnes of crude palm oil & 0.4 to 0.6 tonnes of palm kernel oil from life span of 4 to 30 years

Highly nutrient demanding crop using waste from palm oil processing unit as fertilizer supplement in place of inorganic nutrients.



Palmyra waste management

- India has nearly **102 million palms**
- Tamil Nadu has the major share with 51.9 million trees with the district of Thoothukudi ranking first.
- One fruit contains only 10% of edible seeds and generates up to 90% waste in the form of leftover stem, calyx and husks

PALMYRAH LEAVES THATCHING

Tea waste management

The waste produced after processing in tea industry about 19040 tonnes/year in India

Tea waste includes discarded tea leaves, buds and tender stems of tea plants.

Composition of Tea Waste

Tea waste:

- Cellulose, hemicellulose, lignin, polyphenols, proteins and tannins
- Tea waste contains similar components as the regular tea

Pruned tea leaves:

Cellulose, lignin and bioactive compounds such as polyphenols, polysaccharide and water-insoluble proteins

Tea waste

Tea seed

Coir pith and Tea waste mix used as a media

Saponin rich waste product from tea seed

CONCLUSION

Waste material obtained from the plantation crops is used for manufacturing of biofuels, potting mixture, organic fertilizers, growth enhancers, pathogens control, bio-based chemicals, animal feed etc., The waste material can be used as media/organic fertilizers by enhancing its nutrient composition using beneficial microbes and earthworms which leads to efficient utilization of crop residues. The use of horticulture and horti-based industry wastes as raw materials can help to reduce the production cost and contributed in recycling of waste as well to make the environment eco-friendly.

REFERENCES

Pardeep, K.S, Surekha, D. and Joginder, S.D. 2018. Agro-industrial wastes and their utilization using solid state fermentation. *Bioresources and Bioprocessing*. 5(1):1-15.

Shiva, K.U, Anand K.N, and Naorem A.S. 2017. The Multipurpose Utilization of Coconut By-Products in Agriculture: Prospects and Concerns. International Journal of Current Microbiology and Applied Sciences, 6:1408-1415.