



Scutcher-Based Nutri-Mats for Urban Horticulture

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Rapid expansion of agro-based industries has led to the accumulation of large quantities of organic waste, creating serious environmental and management concerns. Banana fibre extraction units generate considerable amounts of scutcher waste, which is often disposed of improperly resulting in pollution, nutrient loss and unpleasant odour. At the same time terrace gardening and urban horticulture systems face challenges such as water scarcity, rapid evaporation and soil erosion in containers. To address these issues, scutcher-based Nutri-mats have been developed as an eco-friendly and sustainable solution. These mats are prepared by enriching banana scutcher waste with cow dung, farmyard manure, phosphates and micronutrients and processing them into biodegradable bio-mulch mats. Their application improves soil moisture retention, reduces evaporation losses, provides slow and sustained nutrient release and enhances soil health. The technology is cost-effective, environmentally safe and suitable for urban and container-based cultivation systems.

Introduction

Agricultural intensification and growth of agro-based industries have played a major role in improving farm productivity and economic returns. These activities have resulted in the generation of large volumes of organic residues that are often poorly managed. Banana cultivation is widespread in tropical regions and increasing demand for banana fibre has led to establishment of numerous fibre extraction units. This process produces a bulky fibrous residue known as scutcher waste, which is frequently disposed of indiscriminately. Improper disposal of this waste causes environmental pollution, unpleasant odour, delayed decomposition and loss of essential plant nutrients. Concurrently, urban expansion has encouraged terrace gardening and container-based horticulture where limited soil volume leads to moisture stress, nutrient depletion, rapid evaporation and soil erosion. Hence, environmentally sustainable approaches that effectively utilize agro-waste while supporting urban agriculture are critically needed.

What is Scutcher?

Scutcher is a fibrous by-product generated during the extraction of banana fibres from the pseudo stems, which are otherwise discarded after harvest. Despite containing substantial amounts of organic matter and plant nutrients, scutcher remains largely unutilized and is often treated as waste. Its coarse and fibrous structure provides excellent physical properties, such as high moisture-holding capacity and improved soil aeration when incorporated into the soil. In addition, scutcher creates a favourable environment for proliferation of beneficial soil microorganisms, which plays an important role in nutrient cycling and soil health. When properly processed and enriched with organic and inorganic nutrient sources, scutcher can be converted into a valuable agricultural amendment rather than an environmental burden. The utilization of scutcher in agricultural systems supports sustainable and regenerative farming practices by recycling organic residues, minimizing environmental pollution, improving soil structure and enhancing overall soil fertility and productivity.

Concept and Preparation of Scutcher-Based Nutri-Mats

Scutcher-based Nutri-mats are developed by combining banana scutcher waste with cow dung, farmyard manure, phosphates and essential micronutrients in predetermined proportions. The mixture is homogenized using mechanical mixers and processed through rolling and heating mechanisms to form uniform mats. These mats are then dried, cut into suitable sizes, and packaged for use in container gardening and horticultural systems. The enrichment of scutcher ensures that Nutri-mats not only function as mulch but also act as nutrient reservoir over time. This slow and sustained nutrient release improves nutrient use efficiency and reduces losses due to leaching and volatilization.



Banana Scutcher Nutri-mats of different size

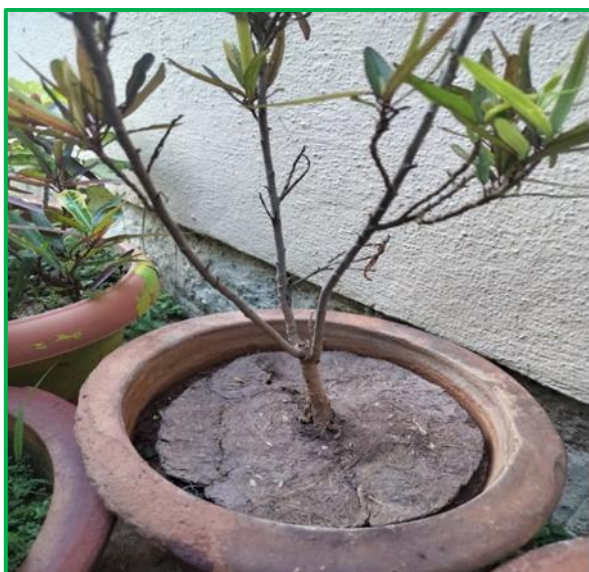
Importance of Scutcher Nutri-Mats in Urban Horticulture

Urban and terrace gardening systems often suffer from limited water availability and frequent irrigation requirements due to rapid evaporation from exposed soil surfaces. Scutcher Nutri-mats serve as an effective bio-mulch by covering the soil surface, reducing moisture loss, and maintaining favourable soil temperature. The fibrous structure of the mats protects the soil from erosion and compaction, thereby improving root growth and plant establishment. In addition, scutcher Nutri-mats contribute to sustainable waste management by converting agro-industrial residues into value-added products, thus supporting circular economy concepts in agriculture.

Benefits of Scutcher-Based Nutri-Mats

The application of scutcher-based Nutri-mats offers several agronomic, environmental and socio-economic benefits:

- Enhanced soil moisture retention and reduced irrigation frequency.
- Slow and sustained release of nutrients, ensuring better nutrient uptake.
- Effective weed suppression by acting as a natural bio-mulch.
- Improvement in soil health and organic matter content.
- Reduction in environmental pollution caused by scutcher waste disposal.
- Cost-effective, biodegradable and eco-friendly alternative to plastic mulches.
- Creation of rural employment and skill development opportunities.



Scutcher based Nutri-mats applied to pots

Environmental and Economic Significance

The utilization of banana scutcher waste in the form of Nutri-mats offers an effective solution for managing large quantities of agro-industrial residues while reducing the environmental problems associated with their improper disposal. By utilizing this biodegradable waste material, the accumulation of scutcher in open areas is minimized, thereby lowering risks of pollution, unpleasant odour and nutrient loss. Scutcher Nutri-mats serve as a sustainable alternative to synthetic fertilizers and plastic mulching materials reducing reliance on non-renewable resources and minimizing environmental footprints. Their biodegradable nature ensures safe decomposition without leaving harmful residues in the soil. In addition, the Nutri-mats are lightweight, easy to handle and convenient for storage and transportation which enhances their commercial viability. The technology holds strong economic potential, especially for urban horticulture, nursery production and home gardening, while also creating opportunities for value addition, rural employment and sustainable green enterprises.

Conclusion

Scutcher-based Nutri-mats represent a sustainable and innovative technology that integrates organic waste recycling with soil and water conservation. By converting banana scutcher waste into nutrient-enriched biodegradable mats, this approach addresses critical challenges related to waste management, moisture conservation and nutrient availability in urban horticulture systems. The adoption of scutcher Nutri-mats promotes eco-friendly farming practices improves soil health and supports sustainable agricultural development. Thus, scutcher-based Nutri-mats offer a promising pathway toward resource-efficient and environmentally sound urban and semi-urban agriculture.

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