



Value addition and waste utilization of Eucalyptus in Kodai Hills of Tamil Nadu

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Abstract

Plastics play a major role in several industrial applications owing to their properties such as elasticity, cheap availability, durability, convenience in packaging and various other features. Its usage has posed severe irreversible threats to the environment and its species owing to its non-biodegradable nature. Bioplastics are one of the most innovative and new packaging materials that are biobased and biodegradable which is made from waste, biomass, fruits and vegetables industrial waste like peel. The ideology of producing bioplastics from agro-based wastes proves to be an innovative solution to the aforementioned issue.

Introduction

Eucalypt has a long history in India. It was first planted around 1790 by Tippu Sultan, the ruler of Mysore, in his palace garden on Nandi hills near Bangalore. According to one version he received seed from Australia and introduced about 16 species. Subsequent to the planting at Nandi Hills, the next significant introduction of *Eucalyptus* was in the Nilgiri hills, Tamil Nadu, in 1843, and later (1856) where regular plantations of *E. globulus* were raised to meet the demands for firewood, from 1856. There were several other attempts to introduce eucalypts at various parts of the country.

Some 170 species, varieties and provenances of eucalypt were tried in India (Bhatia, 1984), out of which the most outstanding and favoured has been the *E. hybrid*, a form of *E. tereticornis* known



as **Mysore gum**. The most important characteristics of *E. hybrid* contributing to its popularity under Indian conditions are: it is fast growing, capable of over topping weeds, coppices well, is fire hardy, browse resistant and it has the ability to adapt to a wide range of edapho-climatic conditions. Other species which are grown on plantation scale are *E. grandis*, *E. citriodora*, *E. globulus*, and *E. camaldulensis*.

Eucalyptus globulus plantations were raised in Nilgiri and Kodaikanal hills in the past to meet the firewood needs. At medium elevations *Eucalyptus* hybrid was raised. The total area covered is over 80,000 ha out of which 60,000 ha are with *Eucalyptus* hybrid.

Eucalyptus oil is type of distilled oil produced from the leaf of Eucalyptus trees. Eucalyptus oil is used in wide range of application such as pharmaceutical, repellent, antiseptic, flavoring, fragrance and industrial uses. The leaves of various eucalyptus species such as eucalyptus globulus, eucalyptus kochii, and eucalyptus polybractea are steam distilled to extract eucalyptus oil. Eucalyptus oil offer wide range of medicinal benefits. Eucalyptus trees are present in numerous numbers and their leaves was wasted with out any use at Kodaiknal and Ooty and other parts of Tamil Nadu. Hence the project aims to develop to extract oil from their leaves and establish upscale distillation unit at HRS, Kodaikanal. Besides with other objective to identify the microbial volatile organic compounds present in the leaves collected from different places of Tamil Nadu

Fuel

Eucalypt was not considered a good firewood and timber species. This is being disproved. Due to the shortage of miscellaneous species, people have found that eucalypt is a very good substitute for firewood because of its calorific value and moderate burning qualities. In firewood depots in semi urban and urban areas it is finding preference over other species. In Mysore in Karnataka two decades ago the only firewood was that of *Anogeissus latifolia* which is one of the important fuelwood species found in the natural forests. The Forest Department raised captive plantations of eucalypt catering to the needs of the city in view of the dwindling natural resources. Today 90% of the firewood used in Mysore is from eucalypt. In the rural area, the lops and tops (at times even leaves alone) are used by the people as fuel.

Charcoal

Eucalypt gives good charcoal. Wherever farm forestry has flourished, eucalypt wood is used for charcoal manufacture to meet the semi urban and urban demand.



Poles

Eucalypt poles are good for transmission purposes and are also used in construction of dwelling houses, work sheds and in mines. Eucalypt poles have good demand near cities for use as scaffolding material. Eucalypt sold in the form of poles have price preference over firewood.

Timber

Earlier, eucalypt wood was not considered a good timber. The quality of the timber depends upon the species and edapho-climatic factors. Considering the cost of eucalypt timber, it is found to be quite economical to use in low-cost houses; as mine timber and in other construction purposes. It is also being used as furniture wood.

Rural small-scale industries

Rural small-scale industries are developing fast in the country-side, important ones among them being brick making, jaggery making, pottery, tile manufacturing, lime production, dyeing, smithy, etc. All these industries require firewood or charcoal, provided by eucalypt plantations. They earlier depended on firewood from natural forests, which is no longer available. In a few locations, because of the plantations, industries have flourished eg. the Kolar District of Karnataka.

Honey and oil

Several eucalypt species are rich in nectar and pollen. Bee keeping is profitable and this activity is improving. Leaves of *Eucalyptus globulus* and *E. citriodora* are used for extraction of oil. It is a cottage industry providing employment in some parts of India.

Paper and pulp

One of the most important uses of eucalypt wood so far has been in the paper and pulp industry. The demand for paper and pulp is going to increase many folds in India and eucalypt, being one of the good pulpwood materials, will be in continuing demand.

Novelty of the technology

The quality of oil produced from Eucalyptus leaves in Kodaikanal and Ooty is differing from other parts of India and world. Hence, it is planned to analyse the volatile compounds evolved from eucalyptus oils obtained from Kodaikanal and Ooty and also other parts of Tamil Nadu. The novelty of the result will be used for exporting the oil produced from Kodaikanal and Ooty to other parts of India and world

Significance and Impact/Value of the technology: This project will have social and economic impact among the livelihood and entrepreneurs who involved in the production of eucalyptus oil. Since the oil

produced from organic or virgin soils of Kodaikanal and Ooty the values of products will be doubled in the domestic and export markets

Scope of Industrial Application

Eucalyptus oil is available in three grades such as pharmaceutical grade, fragrance grade, industrial grade. Pharmaceutical grade segment dominates the global eucalyptus oil market due increasing use of eucalyptus oil in treating wide range of medical conditions. Countries such as the United States, Canada Germany, France, Spain, United Kingdom, Italy, Denmark, the Netherlands, and Austria, among others are among the leading countries having a well-established pharmaceutical sector. These countries offer a huge market opportunity for the eucalyptus oil producers operating worldwide.

Potential Competitors

Online portals such as Amazon and flipkart, has been beneficial for the eucalyptus oil market growth. Many small- and large-scale eucalyptus oil manufacturers are focusing on selling their products online to reach international consumers and earn higher profit.

National and International status

Eucalyptus oil is used in wide range of applications such as food & beverages, therapeutics & cosmetics, aromatherapy, fragrances, and others. The therapeutics & cosmetics segment accounted for the largest share in the global eucalyptus oil market. The nature segment of eucalyptus oil market is bifurcated into organic and conventional. The demand for organic eucalyptus oil is projected to boost significantly over the forecast period owing to rising preference for the consumption of organic essential oils in developed and developing economies such as the United States, Canada, Germany, France, Italy, China, Japan and Australia, among others. Organic eucalyptus oil products are produced and processed without the incorporation of chemicals and fertilizers. Therefore, consumers prefer organic eucalyptus oil over conventional eucalyptus oil product

Risk envisaged during scale up

Competition between domestic and global market in selling the products enhancing cultivation of eucalyptus tree in Tamil Nadu

**Online purchase of pure form eucalyptus
oil visit**

<https://www.tnauagricart.com/others>

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