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THE TIMES OF INDIA

TNAU standardizes process of extracting 4 types of dye products from achiote tree

Dec 12, 2020, 04.46 AM IST

Coimbatore: At a time when environmentally conscious textile industries and food companies are struggling to acquire large-scale quantities of natural and organic dyes, TNAU's forest college and research institute has standardized the process of extracting four types of dye products from seeds of commercially cultivable Achiote tree—considered to be the second predominant dye yielding species in the country.

The college is also in the process of releasing two high yielding varieties of the Achiote tree, also called Annatto, which farmers can opt for commercial cultivation. "Over a period of 12 years, we have standardized silviculture or tree growing practices and dye extraction protocols through various government projects including from department of science and technology and department of biotechnology," says professor and head of department of forest biology and tree improvement, K Kumaran.

The Achiote or Annatto tree grows in all types of soil but is more suitable to well-drained soil. One tree would require around 60 litres of water per fortnight and produces seeds from 9 to 12 months after planting. However, it can provide economic returns from the third year onwards. "If any interested farmer approaches us from anywhere, we can guide them on how to plant, maintain the tree, harvest the seeds and extract the dye too based on the industry he or she plans to sell to," says Kumaran.

The tree is being commercially cultivated across around 500 hectares in Tamil Nadu, Andhra Pradesh and Karnataka. TNAU is also in the process of developing two high yielding varieties of the species which can produce 0.75 to 1 tonnes of seeds per species per year. "We will release them by 2021-22 academic year," says the professor. They have also established a natural dye extraction lab where they keep formulate dye extraction protocols.

Scientists have also identified 30 more tree species—including Eucalyptus species, Anogeissus latifolia and Tectona grandis

from which they believe dyes can be extracted. “Like we know Eucalyptus bark can give red, Anogeissus latifolia leaves can give us blue/indigo and Tectona grandis leaves can give yellow,” says Kumaran. “We eventually want to be able to produce natural dyes in all colours for all industries, by pointing out the right tree sources, cultivation and extraction methods making them commercially available in large scales,” he adds.

The university is in the process of applying for a patent for the extraction protocol they have come up for four types of dye products --- aqueous extract used by the textile industry, bixin in powder form used in food industry, solvent extracts which are used by pharmaceutical industries and oil extract used primarily by the cosmetic industry especially for lipsticks. They will also apply for a design patent for the automated aqueous and solvent dye extraction machine they have innovated that can extract aqueous dyes, solvent extracts and Bixin powder.

However, natural dye consumers in the garment industry say the government is yet to frame separate guidelines for natural and eco-friendly dyeing units. M Raaja Rajan, partner, natural dye house says, “Along with paying a higher price for raw materials being a new industry, we are forced to follow the same regulations as a synthetic dyeing unit of “0 discharge”. We also pay a price of 0.65p per litre of water used, which further increases the price of operations and our product. This is despite our effluents being eco-friendly and good for agriculture. It would be helpful if the government came up with a separate set of guidelines for natural dyeing units after studying us.”