भाकृअनुप-केन्द्रीय रोपण फसल अनुसंधान संस्थान
कासरगोड़ - 671124, केरल, भारत

ICAR-Central Plantation Crops Research Institute
Kasaragod - 671124, Kerala, India
(An ISO 9001:2015 Certified Institution)

F. No: 17(1)/RTI(10)/2022-Confl. Date: 25.09.2023

To

Mr. Praful Prakash Paunikar
Lalganj gujari, shree kshetra, Zade chowk,,
Itwari,Nagpur, Pin:440002

Sub: Right to Information Act, 2005 – reg.
Ref: Your RTI Application dated 09.09.2023.

Sir,

With reference to the above, the information sought by you is enclosed herewith.

This disposes off your request under the provisions of Right to Information Act-2005.In case you desire to file an appeal on this issue the same may be addressed to the Director, ICAR- CPCRI, P.O.Kudlu, Kasaragod – 671 124, Kerala.

Yours faithfully,

(P Krishna Kumar)
Administrative Officer & PIO

Query: Waste coconut recycling technology new and old, research technology in coconut waste material all new and old!

❖ ICAR-CPCRI has pioneered several recycling technologies based on proper scientific research for gainful use of coconut wastes. Brief information of different technologies is listed below under two broad theme viz. 1) recycling coconut waste for soil and plant health and 2) recycling coconut wastes for edible food production and 3 recycling coconut wastes for moisture conservation :

1. **Recycling technologies of coconut biomass residues for improving soil and plant health and components of organic farming-**

i) ***Coconut leaf vermicomposting technology***- About 6-8 tonnes of end-of life coconut fronds are shed annually from one hectare coconut garden. The fronds are high in lignin content and are resistant to quick decomposition. ICAR-CPCRI has developed a coconut leaf vermicomposting technology using local isolate of earthworm, *Eudrilus* sp. that hastens the conversion of coconut leaf to good quality granular organic vermicompost in 3-4 months times period. Inputs required for this technology are i) fallen coconut fronds, ii) cow-dung iii) CPCRI isolate of *Eudrilus* sp and iv) water. The vermicomposting is best done in cement tanks having a roof to prevent direct sunlight and rain filling into the tanks. About 50-70% granular vermicompost is harvested from a unit when provided with proper conditions. The coconut leaf vermicompost can be used for any crops as component of organic fertilizer. It helps in increasing the soil carbon, microbial population and availability of nutrients to plants. Coconut leaf vermicompost is highly suitable for potting mixture and soilless gardening. The technology is branded ***'Kalpa Organic Gold'*** and is available for commercialization by any entrepreneurs.

ii) ***Coconut leaf vermiwash*** – Using the earthworm *Eudrilus* sp., mature coconut leaf vermicompost, cow dung and substrates filled in big barrels, a liquid organic fertilizer, coconut lea vermiwash, is extracted from the barrels. It is produced in batches and each batch can be run for 45 to 60 days. The vermiwash produced must be diluted appropriately and applied as foliar spray or soil application to any crop. The coconut leaf vermiwash can be ideal liquid organic fertilizer for use as **drone spray** too. The technology is branded as '***Kalpa Vermiwash'*** and is available for commercialization by any entrepreneurs

iii) ***Urea-free coir pith composting technology*** – Coir-pith is byproduct produced from coir fibre extraction industries. Coir-pith is also extremely resistant to decomposition due to presence of high lignin content. ICAR-CPCRI has developed a simple, urea-free coir-pith composting technology using locally available inputs such as i) poultry manure or cow dung, ii) lime, iii) rock

phosphate available in fertilizer shop as Rajphos or Mussooriephos and iv) water. Good quality coir-pith compost is produced in 60 to 75 days time depending upon the quality of manure added. The compost can be used as component of organic manure for any crop. Coir-pith compost is ideal input for potting mixture and soilless gardening. Like the vermicompost, it also enhances soil health and plant health. The technology is branded ***'Kalpa Soil Care'*** and is available for commercialization by any entrepreneurs.

iv) ***Biochar from coconut tender and mature husks and leaf petiole –*** Biochar is carbon rich, porous material produced by converting any organic wastes by heating under nil or limited oxygen conditions. The method is called pyrolysis. ICAR-CPCRI has developed methods to convert tender and mature coconut husks and leaf petiole to biochar using a simple charring kiln developed from ICAR-CIAE, Bhopal. Biochar produced from coconut wastes can be mixed with coconut leaf vermicompost or coir-pith compost and added to soil for improving soil and plant health. Biochar is also an excellent source of input for organic farming.

v) ***Utilizing waste coconut water for production of biofertilizers and biocontrol agents***–Mature coconut water in coconut oil producing units or desiccated coconut powder units are wasted as unwanted byproduct. ICAR-CPCRI has developed technologies for using this waste mature coconut water to mass-produce important biofertilizers and biocontrol agents such as *Bacillus megaterium, Metarhizium anisopliae* etc commonly used for soil health and pest and disease management. The technology is available for commercialization for entrepreneurs.

vi) ***Trichoderma coir-pith cake-*** ICAR-CPCRI has developed an excellent farmer-friendly mass-production technology of *Trichoderma harzianum* using coir-pith cakes. The Trichoderma coir-pith cake is widely adopted by coconut and arecanut farmers for management of soil borne diseases and for promotion of plant health. The technology is available for commercialization to any willing entrepreneurs.

2. Recycling coconut wastes for edible food production :

i) ***Production of oyster mushroom from coconut wastes*** – Production of edible mushrooms is generally carried out using paddy straw as it has been found to be the most suitable and efficient substrate. However, in places where coconut is cultivated in plenty, for such places, ICAR-CPCRI has developed a low cost technology for production of oyster mushroom, *Pleurotus florida*, using coconut

bunch wastes, leaf petiole etc. Within 45 to 50 days, three to four flushes of mushroom can be harvested from 3-4 kg mushroom bag.

Elsewhere, some others have developed production of milky white mushroom, *Calocybe indica*, using fermented coir-pith as substrate. Casing was done with sand + garden soil mixture (1:1) ratio amended with 5% calcium carbonate. About 50% is the biological efficiency in production of milky white mushroom from fermented coir-pith has been reported. Milky white mushroom production is not a ICAR-CPCRI technology.

ii) ***Production of edible extrudate products from coconut milk residue*** **–** Coconut milk residue and virgin coconut oil cake are two main underutilized co-products of virgin coconut oil processing, which contain dietary fibre, protein, polyphenols and antioxidants. ICAR-CPCRI made a successful effort to develop a healthy, natural and crispy extrudates from co-products of virgin coconut oil processing and derived an optimized formulation "***Kalpa Krunch***". Kalpa Krunch is a coconut milk residue / VCO cake enriched ready to eat extruded snacks. It is prepared from 60% rice flour, 25% corn flour and 15% coconut milk residue/VCO cake flour. The technology is available for commercialization to any entrepreneurs.

iii) ***Production of vinegar and jelly from waste coconut water-*** ICAR-CPCRI has developed technologies for production of vinegar and jelly from coconut water which is wasted in several coconut value-added production units.

iv) ***Production of biodegradable plates from tender coconut husk wastes*** – With increasing consumption of tender coconut across the country, the tender coconut husks is generated as voluminous waste in the metros that leads to several health hazards if not disposed properly. ICAR-CPCRI is developing a technology for production of biodegradable plates from such tender coconut husk wastes. The project is funded by Coconut Development Board. The technology development is in progress.

3. Recycling coconut wastes for moisture conservation :

i) ***Use of coconut husks, leaves or coir-pith as mulching in coconut basin*** **–** Husk burial is a common technology practiced in coconut garden to prevent moisture loss in rain-fed areas. Approximately 250 to 300 husks are required to mulching a coconut basin. Two layers of husk may be buried in the coconut basin with concave side facing upwards for the lower layer to absorb more moisture. The top

layer can be placed with the convex side facing upwards to arrest the evaporation. The buried husk will last for 5-7 years and hold moisture 3-5 times of its weight.

Similarly, about 20 coconut fronds can be spread around the coconut basin area as mulch. This helps to keep top soil cool and reduces evaporation from the basin area and improves moisture conservation.

In the same fashion, coir-pith heaped to the thickness of 15 cm after the end of the rainy season around the coconut basin improves moisture conservation.

ii) ***Trench mulching for moisture conservation in coconut garden***- The coconut wastes such as fronds, husks and bunch wastes can be filled in trenches dug interspaces of coconut. The trenches can be filled and covered with soil. This trench acts super soakers of rainwater and help improve the moisture availability to coconut and any intercrops during the summer seasons.

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Mon 9/25/2023 2:12 PM

To: praflulpaunikar157@gmail.com;

1 attachment

Reply to Pr~.pdf

Sir/Madam,

Please find the above attachment.

RTI & APAR Cell
ICAR-CPCRI,
Kasaragod.