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ICAR NEWS

A SCIENCE AND TECHNOLOGY NEWSLETTER

RESEARCH UPDATE

PROMISING TECHNOLOGIES

A green and clean technology for biodegradation of lignocellulosic waste

Lignocellulosic biomass is a promising renewable resource for attaining value-added products. Conversion of lignocellulosic biomass is a challenging task from collection of raw material to distillation. One of the most energy-intensive step involved in this conversion is a pre-treatment of biomass. Although several pre-treatments such as physico-chemical (grinding, milling, acid treatment, alkali treatment, ammonia explosion, steam etc.) have been attempted but biological pre-treatment seems to be promising as it is an eco-friendly approach. Physical treatment is depends upon the size of substrate used and for it great amount of energy is utilized, so this treatment proved very costly and energy consuming, where as use of chemicals generate lots of inhibitors like hydroxy methyl furfurals (HMF), 5-HMF, vanillin, phenolics, weak organic acids etc. which inhibits reducing sugar production. There is an urgent need of the process for the development of an economically viable process. Furthermore, such pre-treatment should be carried out with minimal generation of inhibitors, power requirements, as well as effluent generation. Biological pre-treatments are generally carried out by growing microorganisms directly on the feedstocks or by use of enzyme cocktails. This pre-treatment process is

Morphology of thermophillic fungal strain- *Myceliophthora thermophila* SH1

Lignocellulosic biomass used as substrate

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E-extension efforts on soil nutrient management in cashew

One of the major constraints in realizing the potential yield in cashew is the limited attention given by growers on nutrient and pest management in cashew. The application of right quantity of required fertilizer at the right time is vital for judicious management of resources and for achieving the maximum benefit and income. Due to wide variability in field conditions, and availability and choice of fertilisers, the farmers cannot correctly determine the right quantity of fertiliser to be applied and they may have to depend on scientists and extension personnel to get information on the correct doses. For empowering farmers to take informed decision by themselves, a software and a mobile App for nutrient management in cashew was prepared under the project funded by RKVY-RAFTAAR at ICAR-Directorate of Cashew Research (DCR), Puttur.

Software on Cashew nutrient manager

This software is available in both English and Kannada. It is available on ICAR-DCR website for calculating fertilizer requirement, lime requirement, foliar application of major and micronutrients. The deficiency symptoms of major and micronutrients commonly observed in the field also included in the software. The farmers can click on images and understand the symptoms and find out options to correct the deficiency. The software also lets the farmers download the soil health card issued by ICAR-DCR, Puttur. The link to the software is https://cashew.icar.gov.in/soil

Use of fertilizer calculator module

- The user needs to provide number of trees in the plantation. Or this will be automatically calculated if the user gives spacing followed in plantation and total area.
- The full recommended dose is required from 5th year onwards under normal density planting and from 3rd year onwards under high-density planting. Columns are provided to enter this information in software.
- There are options to calculate fertilizer if the user follows high-density planting either with general fertilizer recommendation or special recommendation of fertilizer.
- If soil test reports are available, this information can be added. Based on soil nutrient status, the fertilizer rate will be adjusted automatically.
- The user can choose the rate of fertilizer recommended for his/her area in the state from the drop down menu.
- The type of fertilizer can be selected as per farmers' choice, or even a new fertilizer can be used in the calculation, providing the percentage content of nutrients, which will be available on the fertilizer bag.
- The user can generate the report with information on fertilizer rate per tree basis and the quantity required for the plantation.

Use of lime calculator module

To calculate the lime requirement, the user has to get the soil tested for Lime requirement and use the lime calculator. The user has to enter the information such as pH value (obtained after testing the soil for lime requirement), the radius of the tree canopy, the liming material available for use, and the no. of trees per unit area or spacing.

Use of foliar nutrition calculator module

For calculating, the user has to enter the following information.

- Choose the nutrient to be applied as a foliar spray
- Enter information on no. of trees or spacing & area in the plantation
- Provide the age of tree and capacity of the tank being used for spraying/mixing fertilizer.

Mobile App on cashew nutrient manager

The mobile app version of the software on the cashew nutrient manager was developed. The App has got bilingual functionality (English and Kannada). The app can be downloaded from the Google play store at https://play.google.com/store/apps/details?id=com.icarcashew.dcr_cashewnutrientmanager

Soil health card generator

Offline software in both English and Kannada was

prepared to generate the soil health card. It enables to generate error-free soil health card from the analytical results as single and multiple pdf files.

Digital soil health card

Farmers who tested their soil at ICAR-DCR, Puttur can download their soil health card any time anywhere from DCR web page or Mobile App on Cashew Nutrient Manager by inputting the information such as Aadhar card number and year.

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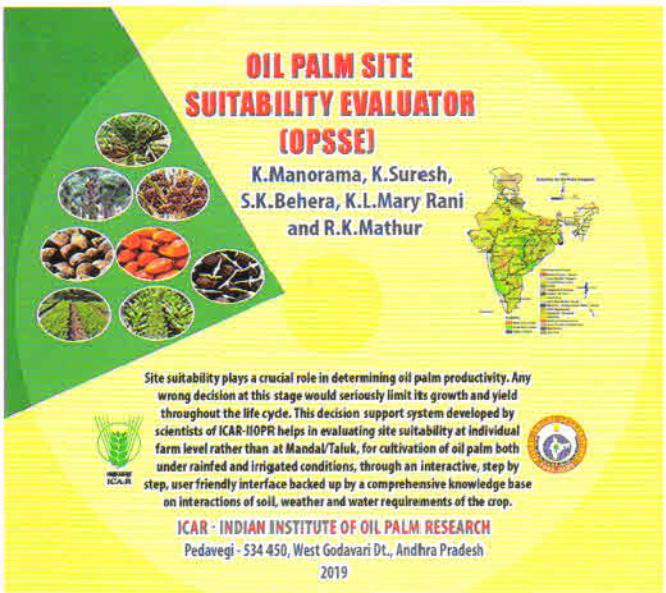
OPSSE – A smart tool for evaluating oil palm site suitability

A unique computer aided Decision Support System (DSS) which facilitates an easy, precise and scientific way of evaluating the biophysical suitability of a given piece of land for cultivating oil palm has been



developed by ICAR-Indian Institute of Oil Palm Research (IIOPR). This Oil Palm Site Suitability Evaluator (OPSSE) evaluates the land suitability both under irrigated and rainfed conditions depending upon the rainfall situation of the locality. This OPSSE is an empirical expert system developed for Microsoft Windows operating system using Visual Basic higher-level programming language.

This support system guides the client through a step by step process to achieve the land suitability class for growing oil palm, by providing the basic data pertaining to the piece of land under question. For the convenience of farmers/laymen, dropdown menus have been given for most of the parameters and images of critical parameters are embedded in "JPEG" format along with a brief description to make the user understand and choose correct value for data. The user can easily move forward and backward in all the four screens and change the input values at any stage.

Screen shots of OPSSE

The criteria for suitability evaluation cover all the major parameters of soil, climate and water needs of the crop. In total there are four different screens in which data needs to be filled by the user and the expert system generates the overall score from individual scores of each parameter. Based on the overall score, the suitability class is decided and the possible potential yield for that class along with crop condition becomes visible in the final screen. This tool is expected to be highly useful for policy makers and all the stakeholders of oil palm Research and Development including researchers, oil palm processors, state department of agriculture and horticulture officials, farmers and extension persons in taking appropriate decisions with reference to site selection for oil palm cultivation.

OPSSE helps in proper decision making in selection of site for oil palm cultivation both under irrigated and rainfed