

Submission of EOI

Interested companies should submit their **EOI** in a sealed envelope labelled '**TECHNOLOGY NAME**', addressing the "**DIRECTOR**", which should be delivered to ICAR-NINFET's office located at **12, Regent Park, Kolkata-700040, West Bengal** with following detailed information of respective parties

1. Company / Organization name and address
2. Company / Organization profile/ history
3. Legal status (limited liability, sole proprietorship, partnership, NGO, Trust or any other etc.)
4. Company / Organization contact information
5. Copy of certificate of incorporation/ certification in any other form
6. An outline proposal for functional modality to execute the work

1. Microbe Mediated Keratin Extraction From Animal Hair

Background

Keratins present in animal hair, hooves, nail and feather have immense use in cosmetic and pharmaceutical industries. However, these proteins are extremely difficult to dissolve and needs harsh mechanical and chemical treatment sometimes at elevated temperature for prolonged period. Such treatments sometimes modify the protein and degrade it producing poor quality keratin proteins. Moreover, some of the chemicals have harmful effects on environment. A microbial process of keratin extraction, on the other hand, is benign and gives good quality keratin proteins.

Technology Details

The above problem can be solved if extraction is carried out with keratinolytic enzymes such as keratinases which are produced by a number of bacterial and fungal cultures. Use of purified enzymes being a costly affair sometimes people directly use the microbes producing the enzymes instead. A bacterial culture, AR31, isolated from poultry shop waste has been found to give about 56% dissolution of keratin from coarse sheep wool under specified condition. Such a process of keratin extraction, is not only benign but also environment friendly.

Licensing terms

- **Nature of License:** Non-exclusive
- **Mode of Licensing:** Technology Transfer Agreement / Memorandum of Agreement (MoA)
- **Licensing Territory:** India
- **Duration of the License:** 5 years
- **Proposed License fee:** Rs. 1.5 lac + applicable taxes.
- **Others :** Rs. 10,000/- should be charged for 2 slang per year with nutrient agar with taxonomic details and genetic information
- **Royalty:** @ 5% on net sales value
- **Training support:** Person nominated by the licensee shall be trained for a period of 5 days. The cost of training to be imparted by the institute is ₹5,000 per person payable to ICAR-NINFET. The other expenses like boarding and lodging and travel of the licensee personnel shall be borne by the licensee.
- All statutory compliances related to production, sales, transportation, storage and performance of the product in the field to be fulfilled by the licensee.

2. Handy Type Fibre Bundle Strength Tester

Background

Bundle strength of the fibres is an important property of jute fibre as a raw material for yarn and fabric preparation. Strength of fiber refers to its ability to resist rupture under stress. Strength is calculated by dividing the breaking load of the sample by the linear density of the restrained fibre. The breaking strength is called tenacity. This is expressed in g/tex. Traditionally, it is measured by taking 10–15 fibres from the middle of the reed, gripping the reed between the thumb and forefinger of both hands, and breaking longitudinally without jerking. A fiber that produces audible sound is a very good fibre, while a fibre that does not produce sound is a weak fibre. This is a simple, easy method that requires less time. It has a drawback like method is subjective and assessment depends on the grader to grader. There are

different instruments available for measuring bundle strength viz., Mechanical bundle strength tester and Electronic bundle strength tester. Mechanical bundle strength tester takes a lot of time for sample preparation and manual calculation. Electronic bundle strength tester provides rapid reading of the strength. It has disadvantages that require regular power supply and regular calibration of the instruments. There may be a solution to the problems of the above instruments in the form of a handheld fibre bundle tester

Technology Details

It assesses the fibre qualitatively by grading it poor, average, good, and excellent. The specimen length and weight must be the same as the recommendations in IS: 7032 (1986). The unit consists of handle, fibre holder with clamp, analog indicator with pointer, body and chain. Scale has degrees starting from 01 to 90 °. The 0 to 15 °, 15 to 50 °, 50 to 70 °, 70 to 90 ° indicates Red, Yellow, Blue and Green colour, respectively. Red, yellow, blue and green colour indicates poor, average, good and excellent fibre, respectively. Chain is provided to return back to the pointer at initial positioning.

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3. NINFET-Gender Friendly Portable Power Ribboner

Background

Extraction of fibre from banana pseudostem is gaining attention day by day. The pseudostem is formed by closely packed leaf sheaths embedded in the growing tip. The manual process of extraction of fibre from this pseudostem is very tedious and time consuming. It also damages a large quantity of fibre. Thus for the improvement upon the productivity and quality of the fibre, mechanical extraction is the need of the hour.

Technology Details

The present innovation (extractor) with two beating rollers and a debris removal roller, eliminates the human drudgery as back-ward dragging is not required to get the desired function of extraction. The quality of the fibre in terms of uniformity is better than that of manually extracted fibre and also production increases manifold.

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4. Hand Held Colour Meter for Jute and Allied Fibres

Background

Colour of fibre means the property of fibre which distinguishes its appearance as redness, yellowness, greyness etc. ICAR-NINFET has been developed a digital and mechanical colour and lustre meter which requires continuous supply of power. In hand and eye method of grading, colour of fibre is assessed subjectively. This instrument assess fibre colour subjectively and indicates through LED lights.

Technology Details

Hand held type and portable colour meter is developed to measure the colour of fibre at onsite for farmers. It is light weight, battery operated torch kind of colour meter working on the principle of light reflectance. It consists of colour sensor, four LED to indicate the qualitative characteristics of fibre and battery level and rechargeable battery as power source. A colour sensor is a type of "photoelectric sensor" which emits light from a transmitter, and then detects the light reflected back from the detection object with a receiver. Three LED of the instrument indicates whether fibre tested falls under very good, fairly good and average category.

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5. NINFET Jaiveek Sathi: Softening of Barky Root Cuttings

Background

Jute is the second most important natural fibres grown in India. It sustains more than 4 million people in the country. However, improper retting of jute often produces inferior quality of fibres, and farmers suffer huge economic losses (Ray et al. 2015a; Ray et al. 2015b, Ray et al. 2016). Due to improper retting, a large quantity of jute fibre produced in India in the water scarce areas are of very inferior quality having 10 - 25% cuttings in basal portions of the fibre, which have no use until it is processed further to remove the barks (Ahmed, 1963, 68). As a result, farmers are deprived of getting fair price due to low grade produce and the jute industry in the country is also losing the fibre as waste material. Removal of hard barks from jute fibres by microbial retting is a process essentially similar to that of retting of green jute plant but not identical because of dried barks (Majumder et al. 1996). The retting process also involves pectinolytic activity mediated by micro-organisms and their enzymatic actions. The microbes and the enzymes which carry out the decomposition of pectic substances have also been studied by many workers. The enzymes have been found to be mostly of pectin polygalacturonase and pectin methyl esterase in nature. The softening process developed with two bacterial consortia will become an eco-friendly process of up-grading barky roots and good quality yarn can be produced out of it through which the jute industry will be immensely benefitted.

Technology Details

A Spray formulation consisting of 2.0 % bacterial consortium along with 0.50 % media supplement and JBO (2.75%) is sprayed on barky root cuttings in 2:1 liquor ratio (w/v). The root cuttings need to be covered for 3 days after which cuttings can be directly processed for spinning.

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- **Royalty:** @ 5% on used culture value
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6. NINFET SATHI – A Retting Accelerator of Jute and Mesta

Background

In major jute growing areas of India and Bangladesh, conventional retting involves the submergence of 2-3 layers of jute plants in water bodies with banana pseudo-stem and mud, and jute fibres are extracted after 20-25 d of retting. The retting process involves microbial removal of pectin, hemicellulose, and other water-soluble materials from the bark of jute plants and results in the separation of fibre from the plant. Inadequate availability of retting water with the non-availability of proper retting technology renders the production of low-quality fibre. Thereby, the farmers are often getting deprived of their hard earn produce, demotivated and very often opt for alternative cultivation practices over jute.

Technology Details

The present technology reported the application of a non-microbial retting formulation trademarked as NINFET-Sathi as a microbial food supplement for improved retting of jute. Application of NINFET-Sathi resulted in 8-10.5% higher yield of jute fibre with 1-1.5 grade improvement within 10-12 d over conventional retting. It accelerated the growth of native pectinolytic and xylanolytic microbial populations in the retting water. This formulation improved bundle strength by 10.8-15.3%, fineness by 14.7-22.8%, and colour by 27.9-33.1% with low defects (0.56-0.61% by weight) and root content (7.11-7.68% by length) leading to higher fibre quality (TD-2) over conventional retting (TD-3) consistently for three years of storage. Long storability also offered scopes of distant transport of NINFET-Sathi formulation to jute growing areas with difficulty to reach.

NINFET-Sathi has already been established as a proven technology for improved retting of jute and near future, it may cater for the need of the larger farming community for harnessing better income.

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7. Natural Fibre based Biodegradable Engineered Leather

Background

Generally natural leather production and processing involved a larger quantity of toxic synthetic chemicals. In addition, slaughtering of animal for the raw source of leather hide is another major challenge. Therefore, development of artificial leather is getting attention for the industries and researchers. Most of the artificial leathers composed of synthetic fibre (mostly polyester) based fabric, synthetic rubber coated with polyurethane or polyvinyl chloride.

However, most of the chemicals used are petroleum based and synthesized from toxic chemical combinations.

Technology Details

- Natural fibre-based biodegradable leather like hide was developed at ICAR-NINFET
- Plant fibre used to develop high quality flexible composite like hide
- NINFET developed hide can be used to make purse, wallet, life style items, footwear items etc.
- Perturbed by the issue of climate change and animal welfare, an alternative to animal leather that are ethical, environmentally beneficial and animal free.
- A step forward practicing sustainable business by adopting natural fibre based hide

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Note:

This EOI is an invitation to receive responses from prospective parties in keeping with the terms and conditions expressed herein. ICAR-NINFET is not bound to accept any of the EOI responses received and reserves the right to cancel this EoI at any time, and for any reason.

ICAR-NINFET will consider all EOI responses received and may enter into further discussions with parties which satisfy the requirements of this EoI in order to determine eligibility for the offer. Failure by a party to provide information that is essential in the evaluation of this EOI may result in rejection of that party's EoI.

For further information, contact us at: 033-24212115/16/17 or email: director.ninfet@icar.gov.in , nirjaftdirectorcell13@gmail.com, nirjaftitmu@gmail.com ; Find out more about ICAR-NINFET on our website: www.nirjaft.res.in

Table of Technology & Sale Price of the Machines/ Products:

Sl. No.	Name of the Technologies	Sale price of the Machines / products
1.	Microbe Mediated Keratin Extraction From Animal Hair	Sale price may be decided by the Licensee
2.	Handy type Fibre Bundle Strength Tester	Rs. 6,000/- + (18% GST)
3.	NINFET-Gender friendly Portable Power Ribboner	Rs. 1,10,000/- + (18% GST)
4.	Hand held colour meter for jute and allied fibres	Rs. 8,000/- + (18% GST)
5.	NINFET Jaiveek Sathi: Softening of barky root cuttings	Sale price may be decided by the Licensee
6.	NINFET SATHI – a retting accelerator of jute and mesta	Rs. 65/- per Kg. ex-factory excluding applicable taxes and freight charges
7.	Natural Fibre based Biodegradable Engineered Leather	Sale price may be decided by the Licensee