BIOTECHNOLOGY -
A New Avenue in Coir Research

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ABSTRACT

With the increasing demand of coir and coir products in the export market fetching valuable foreign exchange for the nation, increasing the availability of coir fibre for the coir industry has gained importance.

This paper examines the scope of application of biotechnology to the very first stage of coir extraction viz "Retting". Suitable manipulation of the ret microflora is noted to bring about reduction in the time factor required for retting the coconut husks. The process has also been observed to yield coir fibre of improved quality with respect to colour.

This would go a long way in exploiting the husk potential for the coir industry to the maximum making available a greater quantity of coir fibre in a limited time span and also reduce the cost of production by saving the interest on the blocked capital invested on the cost of husks steeped for "retting".

Introduction :

The Coir industry is an export oriented one based in Kerala. The exports of coir and coir products in the financial year 1991-92 amounted to 30,999 metric tonnes fetching a foreign exchange to the tune of about Rs.74.12 crores. The target set for the VIIIth plan is to cross the Rs.100 crore limit.

RETTING AND COIR FIBRE EXTRACTION :

The raw material of the coir industry is the coconut husk, the outer covering of the coconut. At present only 40% of the available husks is utilised for fibre extraction. The conventional method of extraction of coir fibre consists of steeping the husks in bundles for prolonged periods ranging between 6 to 9 months in saline backwaters. This results in the degradation of the binding matter in the husks holding the fibres thereby loosening the same from the surrounding tissues. "Retting" is a microbiological process which has already been taken up for study and a wide range of microbial isolates have been reported. The microflora isolated from coir rets is furnished in Table I.

Field Experiments on Retting for Extraction of Retted "White Fibre" :

The scope for speeding up of the retting process by seeding of selective strains of microbial cultures was the focus of study at the Central Coir Research Institute under the project head "Process Improvements in Extraction of White Fibre".

Details of the area of study, microbial strains used and the observations of the field experiments carried out in regions producing different varieties of coir yarn are shown in Table II. Pilot scale experiments on seeding of selected species of microbial cultures on lots of husks steeped for retting have all yielded encouraging observations with respect to reducing the time-factor and improving the quality of coir fibre.

The quality of coir fibre is mainly determined by the elimination of the pectic binding tissue and the phenolies by the action of the ret microflora. A wide range of micro-organisms

TABLE - 1

BACTERIAL FLORA ISOLATED FROM COIR RETS

	Genera	No. of isolates	% of isolates
1.	Esherichia	129	26
2.	Pseudomonas	92	19
3.	Micrococcus	87	18
4.	Bacillus	68	14
5.	Paracolobactrum	50	10
6.	Alcaligenes	48	10
7.	Achronobacter	7	1
8.	Aerobacter	4	1
9.	Corynebacterium	3	1

were taken up as bioinoculants and the efficiency of selected strains of pectinolytic and phenolytic cultures has been observed to be greater.

Scope of Future Research on "Retting"

The role of bioinoculants treatment for hastening the retting process has been confirmed by field experiments. The development of selective strains of cultures which could yield the best results with respect to retting forms an important area in the following work.

Standardisation of the cultures by repeated field experiments and development of techniques for mass cultivation of bioinoculants are areas of further attention. Exploring the possibility of use of enzymes for quality betterment in unretted fibre and using a combination of inexpensive chemicals with the bioinoculants to bring about further reductions in the retting time are envisaged in the continuing programme of work. The coir industry can therefore be made a biotechnology based one where the potential of the abundantly available raw material the coconut husk can be exploited to the greatest extent.

Conclusion :

Studies on the application of biotechnology in the extraction of coir have confirmed its advantages. This indicates that a sound and effective beginning has been made. It is expected that the possibilities for potential economic benefits from biotechnology to the Coir Industry will become much greater.

It is therefore essential to formulate specific programmes, implement them and make concerted efforts to ensure that the programmes do in fact contribute significantly to achievement of their objectives.

References :

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TABLE - II

Sl. No.	Area where the Field Experiment was conducted	Bioinoculants used for the study			Observations
1.	Akkarapadam, Vycome Region	Bacillus Micrococcus	Aspergillus Trichoderma	Hansenula Sp. Debaromyces Sp.	The dissimilation of pectin and phenol levels achieved by inoculation of microflora was to the extent of 85%. The fibre was observed to be of greyish colour as against the bright colour of the fibre extracted from the husks of the inoculated lot. Retting time could be limited from 9 to seven months.
2.	Azhikode, North Paravur	Pseudomonas aeruginosa Pseudomonas desmolytioum Pseudomonas Yisinovorans		Clostuduim felsineum	Retting period could be reduced from ten to six months and the quality of the fibre extracted from the inoculated lot was observed to be brighter in colour and of a supple feel compared to the fibre extracted from husk samples drawn from the control lot.
3.	Velorvattom, Shertallai	Pseudomonas desmolyticum Pseodomonas pictorum Mycoplana bullata Mycoplana dimorpha		Cladosporium Fusarium Aspergillus oryzae Aspergillus foetidus	Retting period could be shortened to three months and the fibre obtained of consistent quality in bright clour.