

MODERNISATION AND EXTRACTION OF COIR

YEAR	ACTIVITIES	ACHIEVEMENTS
1970-71	<p>Retting was conducted on crushed and uncrushed green husk soaked in cement tubs in tap water with sludge from retting sites as the medium of microbiological flora in comparison to the crushed/uncrushed husks without the sludge from the retting sites as the control. The ret liquors were siphoned out once in a week for one set of experiments and in the second set no such flushing was done. The retting was carried out for 6 weeks and the crushed husks were observed to become softened on soaking. Husk parts were drawn out from the tubs in every two weeks for the determination of the changes brought out in the husks by the retting process.</p> <p>A collaborative project on retting was undertaken at Indian Institute of Science, Bangalore with the following objectives:-</p> <ul style="list-style-type: none"> ▪ To determine the period required for retting of green husks before and after crushing. ▪ To explore the possibility of aerating the retting environment with a view to facilitate the process. ▪ To study the effect of periodic flushing of the ret liquor on the quality of the fibre and the time taken for completion of the process. ▪ To study the influence of sodium chloride in the retting process. ▪ To determine the optimum number of husks and the material to liquor ratio. ▪ To isolate and characterise the dominant microflora associated with retting and ▪ To follow the disappearance of pectin and polyphenols during the progression of retting. <p>The preliminary investigation in steeping of crushed or uncrushed husks in cement tanks (24" X 24" X 24") with a m:l ratio of 1:10/1:12 in tap water with or without sodium chloride and flushing of ret liquor at weekly/fortnightly and aerations revealed that crushing of green coconut husks prior to steeping considerably reduced the time taken for completion of the retting process compared to the uncrushed husks.</p> <p>Aeration of the retting environment did not hasten the retting process. However the colour of the fibre was superior when aerated.</p> <p>Weekly or fortnightly flushing resulted in shortening the time taken for completion of retting for uncrushed husks. Flushing did not help in reducing the time further for crushed husks. The colour of the fibre derived from periodically flushed husks was superior and comparable to the best grades of commercial fibres whereas the fibre from stagnant rets was far inferior in colour.</p> <p>Addition of sodium chloride did not result in any significant change in the time taken for retting. Ret effluents from the sodium chloride treated husks were darker in colour than the untreated ones and the colour of the fibre was slightly inferior.</p> <p>The material to liquor ratio did not affect the time taken for retting or the colour of the fibre.</p>	1.Introduced retting of coir in RCC tanks.

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1971-72	<p>A systematic study on the nature and characteristic of the organism bringing about retting of coconut husks and the biochemical transformations involved in the process was carried out under the project study at the Indian Institute of Science, Bangalore. The initial investigations were confined to the enumeration and isolation of aerobic ret microflora.</p> <p>Microbiological examination revealed that the following aerobic bacterial and yeast flora are present in coir rets:-</p> <p style="text-align: center;">Bacterial flora of Coir rets</p> <p style="text-align: center;"><i>Genera</i></p> <p style="text-align: center;">Escherichia Pseudomonas Micrococcus Bacillus Paracolobactrum Alcaligenes Achromobacter Aerobacter Corynebacterium</p> <p style="text-align: center;">Yeast flora of coir rets</p> <p style="text-align: center;"><i>Species</i></p> <p style="text-align: center;">Saccharomyces fructuum Debaryomyces hansenii D.Kloeckea Cryptococcus diffluens Rhodotorula flava R. glutinis Debaryomyces micotianae Hansemula scheneggii</p>	<p>1.Presence of bacterial and yeast flora was detected in retting places.</p> <p>2.Characterisation was done for a large number of species responsible for retting.</p>

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	<p>The investigations provided no evidence for the beneficial effect of sodium chloride in retting of coconut husks contrary to the popular belief of retters engaged in the industry. The extent of decomposition of pectin and poly phenols (taken as a criterion of the extent of retting) in the fresh water was more or less comparable to that of brackish rets and sodium chloride is not essential for retting.</p> <p>The degradation of polyphenols and pectin was much faster when the husks were crushed than uncrushed.</p>	
1972-73	<p>Lab level studies in retting conducted in porcelain cisterns submerging the husks in ret liquor by weighting down the material with stones in collaboration with Indian Institute of Science, Bangalore. The result indicated that all the bacterial flora of the rets belonged to six genera. Isolated and identified the microflora present in the retting environment by drawing mud samples from five retting sites which confirmed that the bacteria belonged to the genera Pseudomonas, Acrobactor, Alcoligenes, Paracolobactrum and Bacillus. Except for the Bacillus species, this observation is in agreement with the bacterial isolates obtained from laboratory ret liquors.</p> <p>Studies were conducted in softening of coir fibre by the action of microflora associated with the retting of coconut husk and observed that fibres could be softened to varied extent but had reduction in the weight of the fibre softened by the action of mycelium growth.</p>	<p>1. Analysis of ret liquors collected from retting sites confirmed the findings of retting in Lab. level</p>
1973-74	<p>Preconditioning of semi/dry husks by spraying with tap water twice in a day for 3 days prior to crushing and soaking yielded higher proportion of bristle fibre and mattress fibre of grade I.</p>	

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1974-75	<p>Studies revealed that elimination of phenolics from the husk facilitates speedy retting.</p> <p>Analysed percentage distribution of different groups of long, medium, short and bit fibres in retted fibre and decorticated fibre from green husks and observed that there was a substantial fall in the percentage of long fibres and perceptible increase in the percentage of short and bit fibres in the decorticated fibre compared to the retted fibre.</p> <p>The studies on colour of the stored yarn indicated that the natural tint of the yarn deepens on continued exposure of the material to the air.</p>	
1975-76	<p>Sample lot of husk received from Goa was evaluated for its suitability to extract the fibres in the combing type machine and assessed the yield of bristle and mattress fibre from 1000 husk.</p>	
1976-77	<p>A field study of the different types of machines for extraction of coir from dry/semi dry coconut husk was conducted with a view to assess the performance of the machines under field conditions. The field investigation covered Japanese (SATO) Austrian (Fehrer) and Indigenous (Alltex,Ennor Patvolt etc.) installed in the regions of Karnataka, Tanjore and Kozhikode.</p> <p>Evaluated fibre content of sample husk received from the Andhra Pradesh on the combing machine and obtained a yield of 35 kg. to 40 kg. bristle fibre and 25kg. to 30 kg mattress fibre per 1000 husks ie. for 8000 husk segments.</p> <p>Conducted a field experiment at South Paravoor in reducing the period of retting of crushed husk in comparison to uncrushed husks as control. 12000 each of crushed and uncrushed husks in batches of 500 crushed/uncrushed husks were steeped for retting in “Malis” by the usual technique. It was observed that the crushed husks sink quicker than the uncrushed husks. Sample husks of 100 each were taken from the lots of crushed/uncrushed husks after a period of two months and subjected to extraction of fibre by the usual techniques of beating by mallets. It was observed that a worker experienced in extraction of coir by the traditional method of beating with mallets could handle 50 husks in 8 hours compared to the 15 uncrushed husks (control) and the fibre extracted from crushed husk was brighter in colour compared to the fibre obtained from control.</p>	

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1977-78	<p>The field study on different sets of crushers having 2 rollers, 3 rollers ,4 rollers and 5 rollers in defibering process revealed that an equipment of 5 rollers with a combination of punching rollers and fluted rollers with adjustments for release of the clearance between the rollers to allow passage of husks of different thickness , running at slow speed are more suited to give optimum crushing effect without damaging the fibre, facilitating efficient extraction of the fibre in the subsequent defibering process. A soaking period of 7 days is adequate for optimum yield of fibre.</p> <p>Studies indicated that on crushing green husk prior to steeping, the period of retting is reduced to three months as against 10 months required for uncrushed husks. Retting crushed husks beyond six months is observed to adversely affect the colour of the fibre.</p> <p>The analytical results on percent proportion of different length of fibre and pith content of fibre extracted from crushed husk retted for 3 months and uncrushed husk retted for 10 months did not show any appreciable difference.</p> <p>Ret liquors from 5 retting places viz. Chavara, South Paravoor, Muthukulam, Pachalloor and Muthakunnam were analysed for microflora (bacteria, fungi and yeasts) under the research project in collaboration with the Indian Institute of Science, Bangalore.</p>	<ol style="list-style-type: none"> 1. Precrushing reduced retting period to 3 months only. 2. Soaking period of 7 days was found to be adequate for fibre extraction by defibering process. 3. Analysed ret liquor from various retting sites for microflora.
1978-79	<p>The study of the project on microbiological aspects in association with the Indian Institute of Science, Bangalore revealed that retting of coconut husk is of aerobic nature. The pH, colour, distribution of bacterial genera and fungal flora, its counts/ml in the ret liquor collected from the five important retting centres viz Chavara, South Paravoor, Moothakkunnam, Pachalloor, Muthukulam were analysed during the study. The anaerobic species and yeast flora associated with the five natural rets were also analysed.</p> <p>The study revealed that many aerobic species of bacteria belonging to the genera Pseudomonas, E. coli, Micrococcus Bacillus, Paraclostridium, Alcaligenes, Achromobacter and Aerobacter and yeast species such as Saccharomyces fructeum, Debaryomyces hansenii, D.nicotinae and Rhodotorula flavor, are intimately involved in the retting process. Most of the organisms play a vital part in the decomposition of pectic substances and polyphenols. Micrococcus and Pseudomonas have the ability to attack phenol and/or catechol. Micrococcus cryptococcus and other species are capable of liberating pectinolytic enzymes as poly galacturonase, pectin trans-eliminase and pectin-methyl esterase. The study also revealed that retting of coconut husks is of aerobic nature.</p>	<ol style="list-style-type: none"> 1. The study on microbiological aspects revealed that retting of coconut husk is of aerobic nature.