

# MODERNISATION AND EXTRACTION OF COIR

YEAR	ACTIVITIES	ACHIEVEMENTS
1982-83	Soil samples were collected from retting yards in Vaikom region for a study of the microbiological population. 40 bacterial cultures, 22 fungal cultures and 2 yeast cultures were isolated from the soil.	
1983-84	<p>Field studies in retting were conducted by steeping lots of 5000 crushed and uncrushed husks each in 3 areas in the Keerikad susceptible to varied extent of tidal action. The pectin and phenol content and microbial load of the crushed/uncrushed husks at monthly intervals from the date of steeping were evaluated and observed that satisfactory retting was attained with crushed husks after a period of about 3 months from steeping which hold good in respect of husks steeped in regions susceptible to varied extent of tidal action. The physical characteristics such as tensile strength, initial modulus and elongation of the fibre extracted from crushed and uncrushed husk were measured and it was revealed that crushing of husks prior to steeping does not have any adverse effect on the physical characteristics of the fibre.</p> <p>The soil samples collected from different retting sites of Kerala were found to be acidic. The population of fungi and yeast in the soil samples collected from the Vaikom region was poor, indicating the possibilities of poor aeration and accumulation of phenolic substances.</p>	<ol style="list-style-type: none"> <li>Precrushing was found to have no adverse effect on the physical properties of coir.</li> </ol>
1984-85	<p>A field study was conducted at Perumbalam in the region producing vycome yarn for improving the retting process by steeping lots of 5000 coconut husks enclosed in nets in shallow water, keeping husk steeped in pits served as control, for comparing the quality of fibre produced by following net retting as against traditional pit retting. Laboratory analysis of the samples of the husk and soil collected at monthly intervals showed that the elimination of pectin and phenol of the husk is faster in respect of husk subjected to net retting compared to the husks steeped in pits. Increased microbial activity is observed with the progress in elimination of phenol content of the husk. Net retting was found to be more efficient in that the fibre extracted from the husk steeped for retting was observed to have good colour and the stock of fibre was free from hard pieces of unretted husk and pith.</p>	<ol style="list-style-type: none"> <li>Study revealed that net retting is efficient than pit retting of coconut husk.</li> </ol>

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	<p>A field study was conducted in collaboratoin with Central Plantation Crops Research Institute, Kayamkulam on the quality of fibre extracted from coconut husks of wilt infected coconut trees, The husks of coconut collected from healthy coconut trees, coconut trees in early stage of wilt infection, and coconut trees in advanced stage of wilt infection were crushed and steeped for retting in lots of 300 each in areas susceptible to good tidal action. Samples of husks before steeping and three months after steeping were examined for microbial load.</p> <p>The data revealed increased microbial activity in husks from nuts of healthy trees compared to husks from nuts of root wilt affected trees, with the infection being either in the early or later stage. The physical characteristics such as tensile strength, initial modulus and elongation were also measured showed no substantial difference at all among the three types of fibre.</p>	<p>2. Study showed that increased microbial activity in husks from nuts of healthy trees compared to husks from nuts of root wilt affected trees.</p>
<b>1985-86</b>	<p>Composite cultures of bacteria / fungi / yeast were selected for inoculation in the stocks of husks to be steeped for retting in an area known for poor retting in the regions producing vycome yarn. The culture was mass multiplied and inoculated on coconut husks in duplicate lots of 500 each and steeped.</p>	<p>1. Composite culture were applied for retting of husks.</p>
<b>1986-87</b>	<p>Husks in lots of 500 were steeped in duplicate in the field experiment conducted in vycome region. In one of the retting sites composite culture having Aspergillus Sp., Trichoderma Sp, Bacillus sp, Micrococcus Sp., Debaryomyces Sp. and Hansenula Sp. was inoculated into the rets and in the other site, isolates from ret soil of a good retting area (collected from Murikkumpuzha) was inoculated after mass multiplication. The first inoculation was done after 40 days of steeping and continued upto 5 months from the time of first inocuation at monthly intervals.</p> <p>Samples of husks were drawn at monthly intervals for enumeration of microflora and estimation of pectin and phenol content. The samples of husks drawn after 7 months of retting from the lots of husks inoculated with microflora showed completion of the retting with better colour for the fibre extacted from the husks whereas in the control area, the husk did not ret completely even after 9 months of retting and the fibre extracted from the husks drawn from the contol lots were of greyish colour.</p> <p>To confirm the findings in different environmental conditions, field experiments on seeding microflora in to coconut husks steeped for retting lots taken up in the region producing Aratory yarn by repeating the process.</p>	<p>1. A systematic study was carried out on application of composite cultures on husks in Aratory region.</p>

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1987-88	<p>Field experiments were continued in the Aratory region by inoculating composite cultures on coconut husks.</p>	
1988-89	<p>The field studies conducted in selected centres of retting in Aratory and Vycome regions by inoculating fungal cultures of <i>Aspergillus</i> Sp., <i>Trichoderma</i> sp. and yeast cultures like <i>Hansenula</i> sp, <i>Debaromyces</i> sp. revealed that the fungal and yeast cultures inoculated in to the mass of husks steeped for retting did not survive in the retting environment beyond two or three months.</p> <p>The bacterial cultures, isolated and collected from an area known for efficient retting in Ajengo region which contained <i>Bacillus</i> sp. and <i>Pseudomonas</i> sp., mass multiplied in the laboratory were inoculated into the mass of husks steeped for retting in the selected retting sites in Aratory and Vycome regions, after 40 days from the date of steeping the husks. The inoculation was repeated with fresh samples of cultures at monthly intervals upto 5 months from the date of steeping. The progress of retting as assessed by the ease of separation of the exocarp, fall in phenol and pectin contents of the husk at monthly intervals, by drawing out samples of husks from the ret. Sample husks drawn from the inoculated lots which had undergone retting for seven months showed completion of retting, whereas the husks steeped for retting in the control lot required more than nine months for satisfactory retting. Coir fibre extracted from the control lot after nine months of retting was observed to have dull colour.</p> <p>To confirm the results from the field study conducted in the Aratory and Vycome regions, the effectiveness of bacterial cultures to improve the quality of retting in an area known for inadequate./ inefficient retting such as Azhikode (Parur region) was investigated. Bacterial cultures consisting of <i>Pseudomonas</i> sp. and <i>Clostridium</i> sp. were inoculated and observed to improve in the colour of the fibre and reduction of period of retting in respect of the lot of husks inoculated with the bacterial culture.</p>	

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<b>1989-90</b>	<p>Field studies to hasten the retting and improve the quality of fibre with seeding selected bacterial cultures consisting of <i>Pseudomonas resinovorans</i>, <i>Pseudomonas des molytieum</i> and <i>Clostidium felsineum</i> into the mass of husks steeped in lot of 5000 after 40 days of steeping. Suitable controls (with out inoculation of the cultures) were maintained to examine the effect of bacterial inoculation on the progress of retting. The inoculation was repeated at monthly intervals after the first inoculation.</p> <p>Husk samples were collected from the steeped lots before each inoculation for microbial count and estimation of the phenol and pectin contents. Simultaneously sample husks were drawn from the control (uninoculated) lot of husks.</p> <p>Fall in pectin and phenol content at an accelerated rate is observed with husks drawn from the inoculated lots as against the samples drawn from the control lot, signifying hastening of retting on inoculation of bacterial cultures into the lot of husks steeped for retting. The investigation revealed that inoculation of bacterial cultures into the mass of husks steeped for retting results in hastening the retting process with improvement in the colour of the fibre.</p>	
<b>1990-91</b>	<p>A comparative study of retting in stagnant waters (lakes &amp; ponds) and that in backwaters (having tidal flushing effect) was conducted by drawing samples of water from 21 ponds and lakes in and around Cherthala, where soaking of coconut husks for coir extraction is practiced and analysed for hydrographical parameters.</p>	<ol style="list-style-type: none"> <li>1. A study was initiated for comparison of retting in backwater and stagnant waters</li> </ol>