

BULK DEMONSTRATION OF USE OF VEGETABLE OIL-WATER EMULSION ON UNSOAKED GREEN HUSK FIBRE

P.K. RAVI ,S.S.O. CCRI , KALAVOOR

A demonstration cum-workshop on the vegetable oil in water emulsion was conducted on 27th December 2005 at CCRI so as to disseminate the out come of the new technology of treatment of coir fibre with vegetable oil in water emulsion eliminating pollution of water during soaking of fibre bales in water prior to spinning. During the workshop after the demonstration, Chairman, Coir Board instructed to conduct field demonstration at places that have voluntarily came forward for the field demonstrations as part of popularization of the vegetable oil treatment on unsoaked coir fibre.

Accordingly action was taken to conduct field level demonstration in the Vycome coir producing centre by selecting appropriate yarn producing societies/units. The first small scale field demonstration on unsoaked green husk fibre using vegetable oil in water emulsion was conducted on 02.01.06 in the premises of Shri. Pappachan, Kuncharath, Panavally, who extended their facilities by providing the required quantities of fibre, labours etc and CCRI provided the technical assistance and other materials free for the treatment. They provided 5 bales (150 kg) of first quality unsoaked green husk fibre. The fibre bales were opened by passing the fibre through cleaning (ginning) machine without sprinkling a drop of water. A vegetable oil (castor oil) in water emulsion was prepared with the following recipe per kg of coir fibre.



Materials	1 kg coir fibre	150 kg coir fibre
Castor oil, g	3.0	450.0
Urea, g	2.5	375.0
Detergent, g	1.0	150.0
Water, ml	100.0	15.0 litres

The castor oil with urea and detergent together with 2 litres of water was mixed well in a bucket using a stirrer for 30 to 45 minutes. Thereafter 13 litres of water was added to the mixture and made up the volume to 15 litres. Well stirred for 15 minutes and the solution were taken in a hand sprayer used for spraying pesticides in paddy fields. The willowed fibre was laid on to a plastic sheet as a thin layer and the emulsion was sprayed on it uniformly. The first fibre layer was turned upside down and further sprayed with the emulsion to the other side of fibre. Another layer of fibre was spread over the treated fibre layer and sprayed with emulsion. This process was continued for the remaining quantity of fibre. The top layer of fibre was also turned upside down and again sprayed with emulsion.



The heap of treated fibre thus obtained was well covered with plastic sheet for preventing air contact and kept in the covered condition for 48 hours. One third of the treated fibre from the heap was drawn out after 24 hours on 03.01.06 and used for spinning into vycome yarn by distributing among the traditional vycome coir yarn spinners.



Four spinners spun the fibre drawn from the treated lot after 24 hours. Initially there were breakages as the spinners were nervous in presence of the Coir Board officials. Thereafter the spinning was natural. The women spinners were requested to offer their opinion on the treated coir fibres. All the four spinners expressed that the fibre is soft to touch, easy to draw during spinning and no other difficulties experienced while spinning. They informed that the fibre is little dry and therefore advised them to sprinkle the sufficient water on the fibre before spinning and do all the practices that were adopted for fibres soaked in water before spinning. Uniform colour was obtained for the yarn spun from the treated fibre. Similarly the vegetable oil treated fibres after 48 hours was also spun into yarn on 04.01.06 where the fibre is much softer than the fibre obtained after piled for 24 hours.



150 kg brown fibres were willowed without sprinkling water during willowing and it was treated with vegetable oil-in water emulsion using the following recipe on 04.01.06.

Materials	1 kg coir fibre	150 kg coir fibre
Castor oil, g	4.0	600.0
Urea, g	4.0	600.0
Detergent, g	1.0	150.0
Water, ml	125.0	18.75 litres

The treated brown fibre was piled for 48 hours in covered condition with plastic sheet. Thereafter the fibre was spun into yarn. There was no difficulty experienced by the spinners in spinning of the vegetable oil treated brown fibre even though it is unsoaked in water.

150 kg of 2nd quality unsoaked green husk fibre was willowed after sprinkling sufficient water so as to reduce the dust generated during willowing. It was sprayed with vegetable oil in water emulsion made from castor oil (4g), urea (3g), detergent (1g) and water (100ml) on 11.01.06 and piled for 24 hours in covered condition with plastic sheet compared to 48 hours in piled condition, as it may affect the production schedule of the coir yarn manufacturer. The yarn spun from treated and piled fibres for 24 hours are of reasonable and satisfactory quality according to the opinion of the yarn manufacturer.

The vegetable oil treated unsoaked green husk fibre was spun into yarn after 24 hours by the same spinners. The spinners complained that the treated fibre is little dry and they sprinkled water to the fibre at their premises before spinning. The spinners as well as the yarn manufacturer desired that the treated fibre should contain sufficient moisture.

The experiment was repeated on 12.01.06 with 150 kg unsoaked green husk fibre by sprinkling sufficient quantity of water during willowing. Thereafter the willowed fibre was treated with oil in water emulsion containing 4g castor oil, 3g urea, 1 g detergent and 150 ml water. Patches were visible on the treated fibre and the colour of the yarn spun from it after 24 hours was not uniform probably due to the high quantity of water which did not allow the emulsion to be absorbed fully by the fibre. The yarn manufacturer itself was apprised of the situation and it also proved that the optimum level of water is 100ml per kg. of willowed fibre.

The field study was continued on 16.01.06 by treatment of unsoaked green husk fibre without sprinkling water during willowing. The oil in water emulsion was prepared by using 4g oil, 4g urea, 1g detergent and 100ml water and the treated fibre was kept in piled condition for 24 hours. The study was repeated on 150 kg fibre by sprinkling water during willowing and treated the fibre using oil in water emulsion containing 4g oil, 4g urea, 1g detergent and 100ml water on 17.01.06. It was also kept in piled condition for 24 hours.



The above two types of fibres were spun into yarn permitting the spinners to sprinkle sufficient quantity of water to the treated fibre prior to spinning. The spinners and the yarn manufacturer expressed satisfaction of the yarn produced from both types of treated fibre. The spinners also informed that they felt the treated fibre is soft and easy to spun with practically no breakage. Collected the samples of treated fibre and yarn spun from it and still found that the yarn spun from willowed fibre without sprinkling water is better than that obtained from willowed fibre sprinkled with water during willowing.

150 kg of fibre was willowed without sprinkling water on 25.01.06 and spread into layers in a clean RCC tank. Oil in water emulsion containing 4g oil, 4g urea, 1g detergent and 100ml water was sprayed on it and kept in piled condition for 24 hours. Similarly 150 kg fibre bale was opened by hand (unwillowed) and was also treated on the same day with oil in water emulsion containing 5g oil, 5g urea, 1.5g detergent and 125 ml water and kept in piled condition for 24 hours in RCC tank. The unwillowed treated fibre was willowed after 24 hours.

The proportion of oil, urea, detergent and water was changed, as the fibre is not opened by passage through a willowing machine. Both the treated fibres were spun into yarn and it was reported by the yarn manufacturer that the yarn obtained from unwillowed treated fibre is sufficient for them, as it did not involve much labour and time. Examined the yarns spun from both types of treated fibres and observed that the yarn obtained from the willowed fibre before oil treatment is of better texture.

The yarn manufacturer requested to treat 4.5 MT of unsoaked green husk fibre by vegetable oil in water emulsion for converting into yarn for the manufacture of tufted coir mat and treated 450 kg of willowed fibre and 1050 kg of unwillowed fibre on 31.01.06. The treated fibre was kept in piled condition for 24 hours in 4 RCC tanks in their factory consisting of 450 kg in first tank, 300 kg in second tank, 450 kg in third tank and 300 kg in fourth tank. The oil in

water emulsion was prepared by mixing 3.75 kg oil, 3.75 kg urea, 1.125 kg detergent and 93.75 litres of water in two batches. The recipe used was given below.

Materials	1 kg coir fibre	1500 kg coir fibre
Castor oil, g	5.0	7500.0
Urea, g	5.0	7500.0
Detergent, g	1.5	2250.0
Water, ml	125.0	187.5 litres

The mixture was stirred for 45 minute and required quantity of water was added and stirred further for 15 minutes. The first layer of fibre was sprayed with the emulsion on the face side and turned upside and sprayed again with emulsion for uniform penetration. Air compressor fitted with spray gun was also used for spaying emulsion. Better and uniform penetration was obtained when compressed air was used for spraying. Thereafter all the subsequent layers were sprayed with emulsion on the face side only. The top layer of fibre was spread on the face and back side for uniform penetration and covered the top with plastic sheet and kept in piled condition for 24 hours. The treated fibres were spun into yarn.



The bulk treatment of unwillowed fibre with oil in water emulsion was repeated on 1500 kg fibre on 02.02.06 using the same composition of 5g oil, 5g urea, 1.5g detergent and 125 ml water per kg fibre and kept in piled condition for 24 hours in RCC tank.

150 kg unwillowed fibre was treated with oil in water emulsion on 03.02.06 during the visit of the Chairman, Coir Board. The spinning of treated fibre in to yarn was also shown to him. The remaining 1350 kg unwillowed fibre was treated with oil in water emulsion on 06.02.06 thereby completed the bulk treatment of 4500 kg unwillowed coir fibre. All the treated fibres were distributed to the spinners for spinning into vycome yarn. The progress of the spinning was monitored and visited the yarn/factory on 21.02.06 and saw that almost all the yarn spun from the oil treated fibre reached the yard and bobbin winding was in progress. All the experiments were photographed and documented for reference.

Inferences from field demonstration

1. Best yarn with uniform texture and colour was obtained from willowed and unsoaked green husk fibre on treatment with vegetable oil in water emulsion.
2. The colour of the yarn obtained from willowed fibre without sprinkling of water during willowing is better than the colour of yarn obtained with sprinkling of water during willowing.
3. Satisfactory uniform coloured yarn can be spun from unwillowed and unsoaked fibre on vegetable oil treatment and subsequent willowing after oil treatment.
4. The colour of yarn spun from vegetable oil treated unwillowed fibre is not uniform if it is not willowed after vegetable oil treatment.
5. Brown fibre can be spun into uniform coloured yarn if treated with vegetable oil after willowing and piled for 24 hours.
6. The yield of the yarn increased by 10% for vegetable oil treated unsoaked fibre compared to that obtained from soaking in water.
7. The vegetable oil treated fibre is soft and easy to draw while spinning.
8. The vegetable oil treated fibre / yarn can be bleached and dyed like the fibre/ yarn obtained by soaking in water.