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For editorial queries contact

Reena Kandwal
011-2584 1004, 2584 1960 / 685
e mail: indfarm@icar.org.in
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For Subscription and Advertisement,
Contact:

S K Joshi

Business Manager, DKMA, ICAR
Krishi Anusandhan Bhavan I, Pusa
New Delhi 110 012
Telephone: 011-2584 3657
Fax: 011-2584 3657
e-mail: bmicar@icar.org.in

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Single Copy : ₹ 25
Annual : ₹ 250 (inland)
: \$ 50 (overseas)



Indian Farming

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Improved Retting Technology of Jute

for quality fibre production

B. Majumdar¹ and S. Satpathy²

Central Research Institute for Jute & Allied Fibres, Barrackpore, Kolkata, West Bengal 700 120

JUTE fibre quality depends to a large extent on the bio-chemical process of retting. The genetic quality of the fibre of the jute varieties is retained through proper process of retting which resembles the natural biochemical process. Improper retting may lead to inferior quality of fibre in spite of good crop which ultimately fetches lower price. Production of quality fibre is very much essential for manufacture of diversified products by the jute industries which is of great demand in European market which greatly depends on the retting process. Retting is best carried out in slow moving soft water, which is rarely available in jute and mesta growing areas of India except few parts of Asom and West Bengal. More than 90% of jute growers ret the jute and mesta plants in stagnant water following conventional method of retting. The repeated retting of jute and mesta in the stagnant water of same natural retting tank lead to the production of inferior quality fibre unless the tank is recharged with fresh water after each retting. Moreover, in case of less rainfall retting of jute and mesta utilizing uplifted ground water lengthens retting period and requires repeated watering for retting as it does not

contain natural microbes. Thus development of suitable retting technology for quality fibre production in stagnant water was a challenge. On the principle of augmenting microbial activity, by use of talc based CRIJAF microbial formulation in stagnant water to hasten the retting was found suitable not only for the reduction of retting duration but also for the improvement in fibre quality by at least two to three grade.

Development of Microbial formulation

The predominant task for extraction of fibre is to remove non-cellulosic substances like pectin and hemicellulose primarily xylan in the bast without damage to the fibre cellulose. Search for efficient retting microbes confined to pectin and xylan degrading bacteria which secrete by secreting pectinase and xylanase enzymes without any cellulose degrading activity. In this context, a large number of retting water samples were collected from the quality jute fibre producing districts of West Bengal and six efficient pectinolytic bacterial isolates were screened on the basis of high polygalacturonase (5.1 -6.0 IU/ml), pectin lyase (162.5 - 203.7 U/ml) and xylanase (12.2-16.2 IU/ml)

activity without any cellulase activity. Out of all isolates, a combination of three isolates identified as three different strains of *Bacillus pumilus* in the form of a microbial consortium was found to be very effective for jute retting. The limitation of less self-life of the CRIJAF liquid formulation was overcome by formulating talc based microbial consortium which maintains viability up to 120 days with a cfu in the range of 10^8 to 10^9 /g of formulation in room temperature and can be used for retting of jute and mesta as and when it is required. This formulation can easily be transported and applied under field condition.

Improved Retting in Stagnant Water with Microbial Formulation

In this method, at the time of making the 'jak' (arrangement of jute bundles for retting in the retting tank) of jute bundles, the talc based formulation is applied on the jute bundles in each layer and when the 'jak' is ready, the empty cement bags filled with sand/soil are kept on the jute bundles for proper immersion in the water. By following this method, the retting water in the retting tank remains cleaner compared to mud cover and same water can be used for 2 to 3 times retting. Twenty-five to

Quality jute fibre is essential for obtaining higher price and manufacture of high value diversified products. The retting process directly affects the quality of jute fibres. Improved technology is essential for making the retting process more effective for quality improvement of the fibre. The Central Research Institute for Jute and Allied Fibres has developed a low cost, simple, microbial consortium-based dry formulation-mediated retting technology suitable for retting in stagnant water. Jute growers of various states have got higher price for the quality fibre produced by adopting microbial-consortium based retting technology.

thirty kg microbial formulation costing about ₹ 750 to 900 is needed for quick retting of jute and mesta plants harvested from 1 ha area. For the second or third retting in the

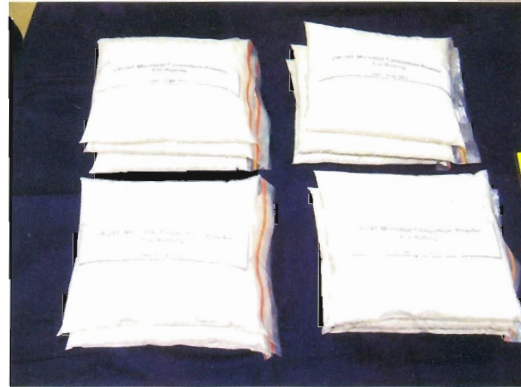
same stagnant water, the need of microbial formulation will be half of the amount required for first retting. By following this method, farmers can get quality fibre with good

golden colour, lustre and strength.

Demonstration of Improved Retting Technology

The talc based microbial

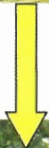
Steps to use microbial formulation for jute retting



Application of powdery formulation over the arranged jute bundles in retting arena



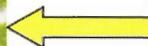
Golden fibre



Extraction of fibre



Empty cement bags filled with sand/soil kept over the bundles for proper immersion



Schematic diagram showing the method of using microbial formulation for retting

Table 1. Effect of microbial formulation for retting on retting duration and fibre strength

District and State	No. of demonstrations	Retting duration (days)		Enhanced fibre strength (g/tex) in improved method of retting
		Improved method	Traditional method	
Hooghly, West Bengal	44	9-14 (11.6) ¹	15-19 (18.2)	23.1-30.1 (26.2)
North 24 Parganas, West Bengal	79	10-17 (13.4)	17-21 (19.5)	23.9-28.8 (25.2)
Nadia, West Bengal	57	11-19 (14.6)	21-23 (22)	23.3-31.6 (25.7)
Murshidabad, West Bengal	05	13-14 (13.6)	16-21 (18.6)	24.0-29.0 (25.4)
Malda, West Bengal	20	12-14 (12.7)	17-22 (19.5)	23.5-26.1 (24.6)
Baharaich, Uttar Pradesh	15	09-11(9.2)	15-17 (16.3)	23.5- 30.8 (25.8)
Srikakulam, Andhra Pradesh	60	13-15 (13.6)	22-25 (23.8)	-

¹The values in parenthesis indicate the mean value

formulation developed by CRIJAF was extensively demonstrated in various jute growing districts of West Bengal, Bahraich district of Uttar Pradesh and mesta growing district of Andhra Pradesh during the retting season of 2012 and 2013. By using this talc based formulation in natural retting tank the retting period was reduced by 6 to 7 days with improvement in fibre quality by 2 to 3 grades (Table 1). The mesta retting was completed in 13 to 15 days with microbial formulation compared to 25 days required under conventional method of retting, thereby reducing the retting period by 10 to 12 days in Srikakulam district of Andhra Pradesh during the month of October and November. There was reduction in the retting period by 10 to 12 days and the farmers earned additional income of ₹ 400/q fibre

for the improvement in fibre quality.

Impact of improved retting using microbial formulation

- Production of quality fibre by retting in stagnant water has got a new dimension
- Improved productivity because of reduction in retting period
- Improvement in fibre quality by adopting this retting technology fetched ₹ 200-300/q more over traditional method for west Bengal farmers.
- The farmers of Srikakulam district of Andhra Pradesh got higher price for the quality fibre @ ₹ 400/q extra over traditionally produced fibre.
- Farmers can earn additional income of ₹ 6000 to 9000 by spending ₹ 750 to 900 for microbial formulation from one

hectare of land over traditional method.

- The improved method of retting is user friendly and safer than traditional method.
- The quality fibre needed for the production of diversified products by the industry may be fulfilled by using the microbial formulation for retting and the valuable currency spent to import quality jute fibre may be minimized.

SUMMARY

The CRIJAF has developed a talc-based microbial formulation consisting of three different strains of pectinolytic bacteria *Bacillus pumilus* very useful for quality jute/mesta fibre production in the stagnant water. By using this talc based formulation in natural retting tank, the retting duration was reduced by 6 to 7 days with improvement in fibre quality by 2 to 3 grades. Jute and mesta farmers of Andhra Pradesh and West Bengal have got higher price for the fibre produced by using this formulation. Farmers could earn an additional income of ₹ 6000 to 9000/ha by spending only ₹ 675 to 900 from one hectare of jute/mesta crop over traditional method of retting by following this microbial talc mediated based formulation.

¹Principal Scientist; ²Director (Actg.)

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