

Organic jute fibre

production technology- A case study

B Maji¹, B Majumdar² and B S Mahapatra³

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

The demand for organically produced jute based diversified products is increasing day by day in the European market. Looking to this demand, the entrepreneurs approached the Central Research Institute for Jute & Allied Fibres for proper organic jute fibre production technology. The institute came out with organic jute fibre production technology and disseminated the same to the interested entrepreneurs through an NGO called "SEVA". The effect of organic jute fibre production on the soil properties was also studied and was found to maintain the soil health.

ORGANIC agriculture has been gaining considerable importance in recent years. In India farmers have always been practicing traditional ways of using indigenous technologies and inputs mostly in line with modern organic farming principles. Organic farming favours lower input costs, conserve renewable resources, high-value markets and boost farm income. Organic farming systems rely on practices such as cultural and biological pest management and virtually prohibit synthetic chemicals in crop production. The organic farming in natural fibre crop and particularly in jute is very new. The European countries are the main importer of diversified jute products from India. The demand for organic jute products is increasing day by day in European market. There is specific demand for food packaging materials organic in nature, i.e. jute/mesta in European market. Considering this demand, Central Research Institute for Jute & Allied Fibres (CRIJAF) has come out with organic jute fibre production technology and transferred this technology to interested

entrepreneurs. The production technology for organic jute fibre is discussed below.

Land selection: Select preferably upland clay loam soil, well demarcated from other inorganic zones. Grow exhaustive crop like maize or jowar without any fertilizer or pesticide application prior to starting of the organic jute production programme.

Land preparation: The land should preferably be well drained. The field should be ploughed for 2 to 3 times to get fine tilth, depending on soil texture. The crop stubbles and weeds should be removed from prepared field. The land should be properly leveled using laddering as available.

Germination test: Before sowing, 100 jute seeds should be kept in wet



Line sowing of jute seed with multi-row seed drill

¹Principal Scientist & Head; ²Senior Scientist, Division of Crop Production; ³Director



Line sown jute crop

blotting paper in a bowl for 24-36 hours. The percent germination should be more than 90 per cent. Alternatively the seed lot has to be rejected.

Seed source: Certified seeds with proper germination percentage (>90%) should be collected from NSC centers, Agricultural Development Office (minikits) and other authorized seed distributors of jute. Bolder seeds (>1.2 mm size, ASTM, No.16) should be preferred by screening through strainers for getting healthy plants.

Sowing date: 15th April to 30th April

Variety: 'JRO 204', 'JRO 128', 'S 19', 'JRO 8432', 'JRO 66', 'JRO 524' etc.

Seed rate: 3-4 kg/ha (sowing through seed drill) and 5 to 6.5 kg/ha for broadcasting method.

Seed treatment: Use preferably bolder jute seeds treated with *Trichoderma viride* (local strain preferably) @10 g/kg of jute seed.

Sowing methods

Line sowing: Treated jute seed should be sown using multi row seed drill developed at CRIJAF. Spacing can be adjusted in the seed drill. The optimum being 25 cm × 5 to 7 cm. A pre or post sowing irrigation

ensures proper germination.

Broadcasting: Treated seeds should be broadcasted cross wise (East to West or vice versa followed by North to South or vice-versa) for uniform seed distribution and desirable plant stand. After sowing, planking should be done to cover the jute seeds. A pre or post sowing irrigation ensures proper germination.

Nutrient management

- If possible, include a pre-kharif legume crop preferably sunnhemp preceding jute and incorporate the green manure into the soil 45 days after sowing. If water is a limiting factor for incorporation of the green manure, utilize the above-ground portion of the same as composting material for succeeding rice crop. This green manuring will add about 25 to 30 kg N/ha to the soil.
- Apply 25-30 kg N/ha as organic (compost/manure) during the final land preparation. Well decomposed FYM or neem cake or a combination of both can be applied according to the availability on N content basis.
- Apply *Azotobacter* culture (nitrofert) at 5 kg/ha after completion of weeding-cum thinning three weeks after sowing.

Weed control

Hand weeding: Two hand weeding, one after 21 days of emergence and another at 35 days after emergence were found to control the weeds very effectively.

Mechanical: Weed can be controlled by using wheel hoe at field capacity condition twice at 15 and 21 days after emergence. Weed flora can also be controlled at very early stage with the help of nail weeder after 2-3 days of emergence of grass in between the jute rows. Mechanical weed control by nail weeder (6 rows) at 3-4 days after emergence coupled with one hand weeding has been found to be effective in weed control of jute.

Cultural: Mulching can be practiced for control of weed flora in jute field. It should be practiced in well drained alluvial to coarse textured soil. Under rainfed farming, apply rice straw mulch @ 7.5 to 10 tonnes/ha in between jute rows at the time of line sowing. In case of broadcast sowing, lay straw bundles @ 2 to 3 tonnes/ha in lines keeping 7 to 10 cm gap in between rows to facilitate jute germination. Red amaranth (*Amaranthus tricolor* cv. Jabakusum @ 20 kg seed/ha can also be grown along with the jute crop @ 4 to 5 kg seed/ha to reduce the cost of manual weeding with extra income at initial stage (18 to 21 days after emergence).

Thinning: Thinning should be done within 15 to 21 days after emergence.

Irrigation: One presowing irrigation + 2 to 3 additional irrigations on hair cracking stage for better fibre and intercrop growth and yield if sufficient rainfall is not available.

Drainage: Adequate drainage facility may be arranged for proper growth and yield. The excess water in the jute field should be removed within 2 to 3 days for higher fibre yield.

Plant protection measure: Protect the crop with neem oil @ 2 to 3 ml

/litre of water as and when required. Various neem oil based organic products are available in the market with different brand names; these can be used if necessary.

Harvesting: Harvesting should be done within 100 to 120 days. Stack the harvested jute crop *in situ* for 2 to 3 days for residual leaf fall.

Retting: Retting is the most important post harvest operation in quality jute fibre production. Retting is best carried out in slow flowing soft and clean water. The following improved methods of retting can be followed for quality fibre production.

- Green bark from jute stems immediately after harvest is extracted by decorticators or manual ribboners. These extracted green ribbons are then sprayed with a microbial consortium developed by CRIJAF and kept for 1 hour covering with polythene sheet for quick retting. These sprayed ribbons are then steeped vertically in polythene lined pits or isolated retting pond for retting and retting is completed within 5 to 7 days. The fibre is then washed in clean water and dried.
- Defoliated jute bundles is steeped in isolated retting tank having clean water with proper jak material (eg. seasoned wooden logs, cemented poles, brick bats tied in cement bags etc.). The covering material should preferably be water hyacinth or coconut leaves. Mud and banana logs as jak material should strictly be avoided. When the retting of jute is complete (15 to 20 days), fibre is extracted manually by 'beat-break-jerk' or single plant extraction method. The microbial retting consortium can also be used to reduce the retting time by 5 to 7 days.

Following strictly the above production technology for organic jute, organic jute fibre was produced in about 0.75 ha area for consecutive

Table 1. The organic jute fibre productivity for consecutive three years

Year	Area in hectare	Yield (kg)	Productivity (q/ha)
2007	0.75	1183	15.8
2008	0.75	1236	16.5
2009	0.75	1217	16.2

Table 2. Changes in soil properties after three years of organic jute production

Soil Properties	Soil samples	
	Initial	After 3 years
<i>Azotobacter</i> population (cfu/g oven dry soil)	23 x 10 ³	45.5 x 10 ³
<i>Azospirillum</i> population (cfu/g oven dry soil)	0.5 x 10 ³	2.2 x 10 ³
Phosphate solubilizing microbes (cfu/g oven dry soil)	9 x 10 ³	11 x 10 ³
Organic carbon (%)	0.71	0.76
Available N (kg/ha)	337	347.5
Available P (kg/ha)	95.9	75.2
Available K (kg/ha)	152.8	172.5
Available Zn (ppm)	6.6	6.2
Available Cu (ppm)	2.7	2.3
Available Fe (ppm)	146.5	142.0
Available Mn (ppm)	20.1	19.5
P solubilizing capacity (ppm)	2.10	2.50

three years in North Farm of CRIJAF, Barrackpore. The yields of organic jute fibre for three years were given Table 1.

The initial and soil samples collected after three years of cropping were analyzed for various chemical and microbial properties. These properties clearly indicated that (Table 2) there is improvement in population of beneficial microbes like N fixers (*Azotobacter* and *Azospirillum*), P solubilizers as well as the fertility status of the soil is also maintained. After the harvest of jute crop, lentil was grown without addition of any input.

The organic jute production technology was adopted by a local NGO called Society for Equitable Voluntary Actions (SEVA), Vikas Kendra located at Atghara village of North 24 Parganas district and was implemented in two villages namely Atghara and Madhusudan kathi in an area of about 96.6 ha consisting of 725 farmers with our technical expertise since 2007. The organic jute

fibre production in these two villages including CRIJAF was inspected and certified by IMO Controlled Private Limited, Bangalore. The whole produce is purchased by the Ganges Jute Mills Limited, Kolkata for production of diversified organic jute

products and export to the European market. Organic jute farmers usually grow paddy after the harvest of jute and then vegetables, pulses like lentil and oil seed crops like mustard and sesamum during *rabi* season following the organic farming technique.

SUMMARY

The CRIJAF has come out with the organic jute fibre production technology and the same was disseminated to about 725 interested farmers covering around 96.6 ha area in the North 24 Parganas district of West Bengal through a NGO called SEVA. The yield of organic jute fibre was around 16 q/ha under CRIJAF condition. As the organic jute fibre production has beneficial effect on soil fertility and soil health, this technology can be adopted by the interested farmers of jute growing areas with very low input but with higher income as the organic jute fibre has more market value than the inorganically produced jute fibre.