

Comparative Performance of Retting Methods on Quality Jute Fibre Production and Water Pollution for Environmental Safety

Authors : A. K. M. Zakir Hossain, Faruk-Ul Islam, Muhammad Alamgir Chowdhury, Kazi Morshed Alam, Md. Rashidul Islam, Muhammad Humayun Kabir, Noshin Ara Tunazzina, Taufiqur Rahman, Md. Ashik Mia, Ashaduzzaman Sagar

Abstract : The jute retting process is one of the key factors for the excellent jute fibre production as well as maintaining water quality. The traditional method of jute retting is time-consuming and hampers the fish cultivation by polluting the water body. Therefore, a low cost, time-saving, environment-friendly, and improved technique is essential for jute retting to overcome this problem. Thus the study was focused to compare the extent of water pollution and fibre quality of two retting systems, i.e., traditional retting practices over-improved retting method (macha retting) by assessing different physico-chemical and microbiological properties of water and fibre quality parameters. Water samples were collected from the top and bottom of the retting place at the early, mid, and final stages of retting from four districts of Bangladesh viz., Gaibandha, Kurigram, Lalmonirhat, and Rangpur. Different physico-chemical parameters of water samples viz., pH, dissolved oxygen (DO), conductivity (CD), total dissolved solids (TDS), hardness, calcium, magnesium, carbonate, bicarbonate, chloride, phosphorus and sulphur content were measured. Irrespective of locations, the DO of the final stage retting water samples was very low as compared to the mid and early stage, and the DO of traditional jute retting method was significantly lower than the improved macha method. The pH of the water samples was slightly more acidic in the traditional retting method than that of the improved macha method. Other physico-chemical parameters of the water sample were found higher in the traditional method over-improved macha retting in all the stages of retting. Bacterial species were isolated from the collected water samples following the dilution plate technique. Microbiological results revealed that water samples of improved macha method contained more bacterial species that are supposed to involve in jute retting as compared to water samples of the traditional retting method. The bacterial species were then identified by the sequencing of 16SrDNA. Most of the bacterial species identified belong to the genera *Pseudomonas*, *Bacillus*, *Pectobacterium*, and *Stenotrophomonas*. In addition, the tensile strength of the jute fibre was tested, and the results revealed that the improved macha method showed higher mechanical strength than the traditional method in most of the locations. The overall results indicate that the water and fibre quality were found better in the improved macha retting method than the traditional method. Therefore, a time-saving and cost-friendly improved macha retting method can be widely adopted for the jute retting process to get the quality jute fiber and to keep the environment clean and safe.

Keywords : jute retting methods, physico-chemical parameters, retting microbes, tensile strength, water quality

Conference Title : ICGRASG 2020 : International Conference on Green Revolution and Agriculture for Sustainable Growth

Conference Location : Rome, Italy

Conference Dates : January 16-17, 2020