

Green Fab

Patent Application: Microbial consortium and process for degumming of Ramie fiber

Application number with date of filing: 201931048663 dated 27th November 2019

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Innovation: It is a process for degumming of Ramie fiber. Ramie fiber yield was enhancement. The fiber following adequate washing and partial chemical degumming was subjected to enzymatic degumming with bacterial consortium. Each reagent could be reused for making the process economically viable. Novel well characterized microbes combined in a definite proportion when grown under optimized condition produces extracellular enzyme mixture in a definite proportion. Partially chemically treated fibers upon biological treatment gives evenly and adequately degummed fibers which are soft, shiny and strong. These fibers could be used for spinning of threads with blending with cotton, viscous, wool, silk and lyocell. It could also be formed into thread without blending. They are stronger and improved in texture compared to chemically treated fibers.

Applications in the field

This technology could expand the use of Ramie in natural fiber market. It would find use in textile and handicraft industry

Problems addressed

The degumming of the Ramie fiber is extremely polluting and water consuming after producing coarse fiber after chemical finishing. Through this approach the water retting and associated occupational hazards (also seen in jute retting) can be alleviated. The chemical use can be minimized and the final fiber can be made stronger, softer and lustrous giving better thread and textile.

Advantages (4-5 bullet points)

- Softer, lusturous and stronger fiber than chemical degumming.
- Uses less water and needs no retting step.
- No added pollution to the environment other than the effect of removed gum.

Potential market value (a comparison with an already present product)

Natural fiber related industries

Process Flow

Microbial degumming of Ramie Fiber



1. Microbial combination for environmental protection and agricultural sustenance. 203/KOL/2013, dt 21st Feb 2013
2. Bio-fertilizer production from bacterial consortium. 201731003023 dated 27th January 2017.
3. Microbial consortium and process for degumming of ramie fiber. **201931048663** dated 27th November 2019



Machine opened Ramie



Blended Ramie threads



Pure Ramie thread



Manually opened Ramie

Ramie Alone

Ramie and Kala Cotton

Ramie & Eri blended



Cloths with and without kalendering. Different Handloom products



Different Handloom products demonstrated at different National Conclave and Expo in 2022

Publication to the Tech if any:

- Self-sustained ramie cultivation: an alternative livelihood option. **Shaon Ray Chaudhuri**, Basant Kumar Agarwala, Sunil K Sett, Priyasankar Chaudhuri, Piyali Paul, Gourav Bhattacharjee, Sumona Deb, Sukanya Chowdhury, Purnasree Devi, Sinchini Barman, Mandakini Gogoi, Tethi Biswas, Purabi Baidya, Abhispa Bora, Amrita Chakraborty, Chaitali Chanda, Saurav Saha, Ajoy Modak, Gautam Das, Priya Sarkar, Ronald Jamatia, Amitava Mukherjee, Ashutosh Kumar, Ashoke Ranjan Thakur, Mathumal Sudarshan, Rajib Nath, Leena Mishra, Indranil Mukherjee, Gautam Bose, Amarpreet Singh, Ranjan Kumar Naik. 2021. In Bioresource Utilization and Management Applications in Therapeutics, Biofuels, Agriculture, and Environmental Science, book edited by Thatoi, Das and Mahapatra. Apple Academic Press (AAP), Inc., Canada, a Taylor & Francis group. **ISBN: 9781771889339. 365-382.**
- Manjila Gupta, Arindam Roy, Srimoyee Banerjee, Raman Kapoor, Basudam Adhikari, Ashoke Ranjan Thakur, **Shaon Ray Chaudhuri**. 2015. Bacillus sp MCC2138: a potential candidate for microbial degumming of Ramie. International Journal of Fiber and Textile Research. 5 (3):39-43.
- Srimoyee Banerjee, Manjila Gupta, Arindam Roy, Amtita Chakraborty, **Shaon Ray Chaudhuri**. 2018 Ramie (*Boehmeria nivea*) gum: A natural feed to sustain and stimulate the growth of bacteria. Journal of Bacteriology and Mycology. 5(2): 1067 (1-3).
- Amrita Chakraborty, Ankurita Bhowmik, Sangita Jana, Pranami Bharadwaj, Dimpal Das, Bhaskar Das, Basant Kumar Agarwala and **Shaon Ray Chaudhuri** 2018. Evolution of waste water treatment technology and impact of microbial technology in pollution minimization during natural fiber processing. Current Trends in Fashion Technology and Textile Engineering. 3(4): 555620 (001-004).
- Ashish Yadav, Anees Ahmed Mahaboob Ali, Mrunal Ingawale, **Shaon Ray Chaudhuri**, Lalit Mohan Gantayet, Aniruddha Pandit. 2020. Enhanced co-production of pectinase, cellulase and xylanase enzymes from *Bacillus subtilis* ABDR01 upon ultrasonic irradiation. Process Biochemistry. doi:10.1016/j.procbio.2020.01.011 (**IF: 2.952**)
- **Shaon Ray Chaudhuri**, Mandakini Gogoi, Tethi Biswas, Soumya Chatterjee, Chaitali Chanda, Ronald Jamatia, Ajoy Modak, Sunil K Sett, Indranil Mukherjee. 2020. Optimization of bio-chemical degumming of Ramie fiber for improved strength & luster. Biotechnology Reports. 28. e00532. <https://doi.org/10.1016/j.btre.2020.e00532> (**IF: 4.47**)

Recognition/Award

The 1st startup of Tripura University funded by BIRAC and founded by a Women Entrepreneur was selected for product demonstration at the 1st Biotech Expo organized by BIRAC on 9th and 10th June 2022 at Pragati Maidan, New Delhi. The founder member from the University was one among the top 75 Women Biotech Entrepreneurs of the country. The coffee Book reflecting this success story was released on 10th June 2022 by Dr Jitendra Singh, the Hon'ble Minister of State (Independent Charge) of the Ministry of Earth Sciences, Minister of State (Independent Charge) of Science and Technology, Minister of State PMO,

Minister of State in the Ministry of Personnel, Public Grievance; Dr Rajesh S Gokhale Secretary DBT, Chairman BIRAC; Dr Manish Diwan, DGM and HoD SPED BIRAC and Dr Alka Sharma, Managing Director BIRAC.



Technology Commercialization Contact: Prof Shaon Ray Chaudhuri