

## **Egyptian okra Fibers, Extraction, and Investigation**

**Heba Tollah El Sayed Abo El Naga**

Lecturer, spinning and weaving department, Applied Arts, Damietta University  
des.hebatollah2020@gmail.com

### **Abstract:**

Increasing awareness of the damage synthetic materials cause to the environment has led to the development of environmentally friendly materials. The development of such materials that can replace synthetic materials has attracted the attention of researchers. As a result, there is an increase in demand for natural fibers to be used in commerce(1) . The focus of biodegradable and sustainable fibers is on clothing that will benefit from biodegradation and is made from environmentally friendly materials. (2) Among the various natural fibers is bast, which is mostly produced or extracted from plants, and considered a significant source of fiber(3) . Bast fibers, a relatively new class of eco-friendly materials that combine technological, financial, and ecological factors, have experienced significant demand in recent years. Naturally extracted okra fiber was used in this study. After harvesting, the okra stems are treated as agro-wast. Therefore, the purpose of this study is to utilize agricultural waste to obtain Egyptian okra bast fiber.

### **Keywords :**

Abelmoschus esculentus (Egyptian Okra) Fibers, Agro-Wast, extract (water retting), chemical composition, Physical and Mechanical Properties, Scanning Electron Microscope (SEM), Optical Microscope.

### **References :**

- 1- Girijappa Y.G., Rangappa S.M., Parameswaranpillai .J and Siengchin S, Natural Fibers as Sustainable and Renewable Resource for Development of Eco-Friendly Composites: A Comprehensive Review, *Front. Mater.*, 6:226, 2019. doi: 10.3389/fmats.2019.00226
- 2- Blackburn.R, *Biodegradable and Sustainable Fibres*, Woodhead Publishing, 1st Edition - November 30, 2005, ISBN: 9781845690991
- 3- Debnath.S., 3 - Sustainable production of bast fibres, Editor(s): Subramanian Senthilkannan Muthu, In *The Textile Institute Book Series, Sustainable Fibres and Textiles*, Woodhead Publishing, pp 69-85, 2017, ISBN 9780081020418, <https://doi.org/10.1016/B978-0-08-102041-8.00003-2>
- 4- C. H. Lee , A. Khalina , S. H. Lee, and Ming Liu, A Comprehensive Review on Bast Fibre Retting Process for Optimal Performance in Fibre-Reinforced Polymer Composites, *Advances in Materials Science and Engineering*, Vol 2020, Article ID 6074063, <https://doi.org/10.1155/2020/6074063>
- 5- Lobo.F.C.M., Franco.A.R., Fernandes. E.M., Reis, R.L. An Overview of the Antimicrobial Properties of Lignocellulosic Materials. *Molecules*, 26, 1749. 2021, <https://doi.org/10.3390/molecules 26061749>
- 6- Kiruthika.A.V, A review on physico-mechanical properties of bast fibre reinforced polymer composites, *Journal of Building Engineering*, Vol 9, pp91-99, 2017, ISSN 2352-7102, <https://doi.org/10.1016/j.jobe.2016.12.003>
- 7- Abidi. A ., Singh. P., Chauhan.V., Tiwari. B., Chauhan. S., Sobita.S., and Bilal. S., An overview on okra (*abelmoschus esculentus*) and it's importance as a nutritive vegetable in the world. *IJPBS* , Vol 4, No 2 , pp 227-233. 2018
- 8- Duman .M.N., Kocak.E.D , Merdan .N., and Mistik.I., Nonwoven production from agricultural okra wastes and investigation of their thermal conductivities, *IOP Conf. Ser.: Mater. Sci. Eng.* 254 192007, 2017
- 9- Ganan.P., Zuluaga.R., Velez.J.M, Inaki Mondragon,.I., Biological Natural Retting for Determining the Hierarchical Structuration of Banana Fibers. *Macromol. Biosci.*, vol 4, No 10,pp 978–983,2004
- 10- DOI: 10.1002/mabi.200400041
- 11- Sisti, L., Totaro, G., Vannini, M. and Celli, A., "Retting Process as a Pretreatment for Natural Fibers for the Development of Polymer Composites". In: Kalia, S. (eds) *Lignocellulosic Composite Materials*. Springer Series on Polymer and Composite Materials. Springer, pp.97–135 ,2018, [https://doi.org/10.1007/978-3-319-68696-7\\_2](https://doi.org/10.1007/978-3-319-68696-7_2)
- 12- Paridah. M. T., Ahmed. A. B., SaifulAzry. S. O. A., and Ahmed. Z., "Retting process of some bast plant fibers and its effect on fibre quality: A review," *BioRes.* 6(4), pp5260-5281, 2011.
- 13- Mohankumar. D., Veeraswamy. A., Bhuvanewari .v., Saran. S., Jayaprakash. S., Gogul. M., Sridhar. S., Kathiresan. G., and Rajesh .K. L., Extraction of plant based natural fibers – A mini review. *IOP Conference Series: Materials Science and Engineering*, 1145. 012023, 2021. DOI 10.1088/1757-899X/1145/1/012023
- 14- Ntenga. R., Saidjo. S., Wakata. A., Djoda. P., Tango. M., and Mfoumou. E., Extraction, Applications and Characterization of Plant Fibers. *IntechOpen.* (2022). doi: 10.5772/intechopen.103093

### **Paper History :**

**Paper received September 5, 2023, Accepted October 20, 2023, Published on line January 1, 2024**