

*Development of Algae Biofabric as an Alternative  
Environmentally Friendly Textile Material*  
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**ABSTRACT**

The fashion industry is one of the main contributors to the increasing amount of textile waste due to unsustainable consumption. Cotton, although biodegradable, has a significant environmental impact as it requires large amounts of water, pesticides, and fertile land, making it necessary to find more eco-friendly alternatives. This study aims to develop algae-based biofabric as a sustainable solution to replace conventional textiles. Brown algae are rich in alginate, a natural compound that can be processed into strong, flexible, and environmentally friendly fibers. The research was conducted using algae powder mixed with glycerin to produce fibers. The resulting fibers exhibited optimal tensile strength, high flexibility, and a rapid biodegradability rate. The findings show that these fibers degrade in water in less than 168 hours, which is faster than cotton-based or synthetic textiles. This study demonstrates that algae-based biofabric is not only environmentally friendly but also efficient in utilizing marine resources, particularly in coastal areas such as Balikpapan. In addition to reducing the environmental impact of textile waste, this development is expected to open new innovation opportunities in the fashion industry while promoting a sustainable local economy.

**Keywords:** *brown algae, alginate, biofabric.*