

## Optimizing Fermented Paper Production Using Spirogyra sp. Interpolating with Banana Pulp

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**Abstract :** Spirogyra sp. is genus of microalgae which has a high carbohydrate content that used as a best medium for bacterial fermentation to produce cellulose. This study objective to determine the effect of pulp banana in the fermented paper production process using Spirogyra sp. and characterizing of the paper product. The method includes the production of bacterial cellulose, assay of the effect fermented paper interpolating with banana pulp using Spirogyra sp., and the assay of paper characteristics include gram-mage paper, water assay absorption, thickness, power assay of tensile resistance, assay of tear resistance, density, and organoleptic assay. Experiments were carried out with completely randomized design with a variation of the concentration of sewage treatment in the fermented paper production interpolating banana pulp using Spirogyra sp. Each parameter data to be analyzed by Anova variance that continued by real difference test with an error rate of 5% using the SPSS. Nata production results indicate that different carbon sources (glucose and sugar) did not show any significant differences from cellulose parameters assay. Significantly different results only indicated for the control treatment. Although not significantly different from the addition of a carbon source, sugar showed higher potency to produce high cellulose. Based on characteristic assay of the fermented paper showed that the paper gram-mage indicated that the control treatment without interpolation of a carbon source and a banana pulp have better result than banana pulp interpolation. Results of control gram-mage is 260 gsm that show optimized by cardboard. While on paper gram-mage produced with the banana pulp interpolation is about 120-200 gsm that show optimized by magazine paper and art paper. Based on the density, weight, water absorption assays, and organoleptic assay of paper showing the highest results in the treatment of pulp banana interpolation with sugar source as carbon is 14.28 g/m<sup>2</sup>, 0.02 g and 0.041 g/cm<sup>2</sup>.minutes. The conclusion found that paper with nata material interpolating with sugar and banana pulp has the potential formulation to produce super-quality paper.

**Keywords :** cellulose, fermentation, grammage, paper, Spirogyra sp.

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