Kombucha Microbial Cellulose: the Sustainable Alternative to Paper Industry

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Paper industry is hugely contaminating, releasing 55 trillion tons of CO_2 and cutting down 15 billion trees annually. We aim to solve this problem by using Kombucha as a sustainable alternative to produce cellulose optimizing its growth. Kombucha has cellulose-producing bacteria (Acetobacter), which find this symbiosis a suitable and safe environment to grow without competence. To optimize its growth, we studied the rate of production of cellulose, its pH evolution through time, the effect of the type of nutrient in the medium and the resistance of Kombucha to extreme conditions. We concluded that the optimal nutrient is green tea with sucrose, and we confirmed that the growth of the biofilm is exponential, growing up to a 4115% in just 70 days. We also discovered the outstanding ability of Kombucha to degrade various kinds of organic matter and to survive to pH 1 conditions and to a complete lack of nutrients for months. Then, we compared the production costs of microbial cellulose with those of the paper production and studied its ecological effect. We contacted a paper factory which made a sheet of paper from a sample of microbial cellulose with very high-quality standards, showing that this idea could be implemented soon. We concluded that, despite being Kombucha paper initially more expensive than traditional paper, this would be overcompensated with the beneficial impact it would have: ending up with more than 60% of the total deforestation and reducing the total emissions of the paper industry practically to a 50%.

Awards Won:
Third Award of $1,000