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Waste papers as a sustainable resource for the production of polyhydroxybutyrate (PHB) using *Ralstonia eutropha* ATCC 17699

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Polyhydroxybutyrae (PHB) is a biodegradable and biocompatible bioplastic that can replace conventional petroleum-derived plastics. The cost of PHB production is the major obstacle that hinders the production process and limiting their availability in the market compared with their petrochemical counterparts. In this work, PHB production was successfully implemented using waste papers, a cheap sustainable and renewable feedstock, as a raw material. The presence of 83% of carbohydrate in alkaline pretreated waste paper makes it a prospective source for bioplastic production. Alkaline-pretreatment (0.5% H_2O_2, 121°C, 30 min) of waste paper results in 91.93% glucose yield after enzymatic hydrolysis (37 FPU/g of cellulase and 50 CBU/g of β – glucosidase). Ralstonia eutropha ATCC 17699 was tested for its capability to produce poly-3-hydroxybutyrate (PHB) using waste paper hydrolysates as its sole carbon source in the deficiency of nitrogen source (20:1 C/N). Cells utilized the hydrolysate and accumulated 57 ± 1.83 % PHB of dry cell weight and produced 4.439 g PHB/l. The product yield coefficient was 0.3699 while 0.06 g/l/h volumetric productivity was achieved within 72 h of fermentation. Thus, waste paper hydrolysate is recommended as an excellent, cheap carbon substrate for PHB production.

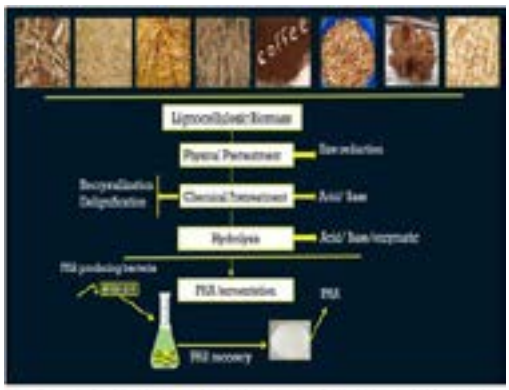

Figure 1: Schematic process flow sheet of PHB fermentation using lignocellulosic biomass

Biography

Huda Al-Battashi is a PhD student at Biology department, Sultan Qaboos University, Oman. She is working in biomass utilization for production of value added products. She did her BSc and MSc in College of Science, Sultan Qaboos University and graduated with Biotechnology major. She also has expertise in biopolymer production and chromium bioremediation.

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