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Polyhydroxybutrate Production Using Groundnut Shell as Substrate by *Bacillus circulans* (MTCC 8167) †

Susithra K. [1], Ramesh U. [2], Kannan M. [3], Varatharaju G. [4], Premkumar G. [1], Rajarathinam K. [1,*]

[1] Department of Botany., V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar – 626 001
[2] Department of Molecular Biology, School of Biological Sciences, Madurai Kamaraj University, Madurai – 625 021
[3] Department of Zoology, V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar – 626 001
[4] Department of Botany, Sri Kaliswari College (Autonomous), Sivakasi – 626 123
* Correspondence: krrathinam@yahoo.co.in;
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Abstract: Groundnut shell is considered to agro-industrial waste product and is rich in lignocellulose materials. It is obtained after the removal of groundnut seed from its pod and used as fodder for cattle. Duc *et al*., (2019) elaborately reviewed beneficial uses groundnut shells for commercial and industrial purposes and listed production of various bio-products such as biodiesel, bioethanol, and nano-sheet. The aim of this work was to study the production of polyhydroxy butyrate (PHB) using groundnut shells as the carbon source after hydrolysate. Groundnut shell was pre-treated with alkaline reagent with 0.5M, 1M, and 1.5M, of potassium hydroxide and acid hydrolysis with 30%, 50%, and 70%, of sulphuric acid. Combined alkali (1M of potassium hydroxide) and acid (70% sulphuric acid) pre-treatment of groundnut shell yield maximum reducing sugar. In addition, with pre-treated groundnut shell, various pH level (6, 7, & 8), KH_2PO_4 (100mg/l, 200mg/l and 300mg/l), and temperature (25^0C, 30^0C and 35^0C) are also test for PHB production. *Bacillus circulans* (MTCC 8167) significantly utilized the hydrolysate substrate and produced the maximum amount PHB (7.6 ± 0.2 g L^{-}l) with pH level 7 and 30^0C with 100mg/l of KH_2PO_4. A detailed study of the functional group was also done using FTIR and NMR. Through biochemical pre-treatment, an in-expensive groundnut shell was converted into a valuable bio-product in order to achieve the minimum waste production.

Keywords: Polyhydroxybutrate; Groundnut shell; Agro-industrial waste; lignocellulose.

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Conflicts of Interest

The authors declare no conflict of interest.