

## **Characterization of cellulolytic bacterial cultures grown in different substrates.**

### **ABSTRACT**

Nine aerobic cellulolytic bacterial cultures were obtained from the Leibniz Institute DSMZ-German Collection of Microorganisms and Cell Culture (DSMZ) and the American Type Culture Collection (ATCC). The objectives of this study were to characterize the cellulolytic bacteria and to determine the optimum moisture ratio required for solid state fermentation (SSF) of palm kernel cake (PKC). The bacteria cultures were grown on reconstituted nutrient broth, incubated at 30°C and agitated at 200 rpm. Carboxymethyl cellulase, xylanase, and mannanase activities were determined using different substrates and after SSF of PKC. The SSF was conducted for 4 and 7 days with inoculum size of 10% (v/w) on different PKC concentration-to-moisture ratios: 1:0.2, 1:0.3, 1:0.4, and 1:0.5. Results showed that *Bacillus amyloliquefaciens* 1067 DSMZ, *Bacillus megaterium* 9885 ATCC, *Paenibacillus curdlanolyticus* 10248 DSMZ, and *Paenibacillus polymyxa* 842 ATCC produced higher enzyme activities as compared to other bacterial cultures grown on different substrates. The cultures mentioned above also produced higher enzyme activities when they were incubated under SSF using PKC as a substrate in different PKC-to-moisture ratios after 4 days of incubation, indicating that these cellulolytic bacteria can be used to degrade and improve the nutrient quality of PKC.

**Keyword:** Bacteria; Cellulolytic bacterial cultures; Cellulose; Substrate; Solid state fermentation; Palm kernel cake.