

Exploitation of Mexican agro industrial wastes as raw material for solid-state fermentation processes

María C. Orzua, Univ Autónoma de Coahuila, Saltillo, Mexico; Solange I Mussatto, Univ of Minho, Braga, Portugal; Juan C. Contreras-Esquivel, Raul Rodriguez, Heliodoro de la Garza, Univ Autónoma de Coahuila, Saltillo, Mexico; José A Teixeira, Univ of Minho

Annually, large volumes of wastes are produced by food, agricultural and forestry industries, which if disposed cause serious environmental problems. Therefore, it is of great importance to find alternative ways to reuse them. Due to the composition rich in sugars, which due to their organic nature are easily assimilated by the microorganisms; such wastes could be appropriate for use as raw materials in the production of industrially-relevant compounds under solid-state fermentation (SSF) conditions. However, the physical-chemical and microbiological characteristics of the solid substrate affect the efficiency of the SSF process. In the present study, ten different agro industrial wastes derived from Mexican local regions were evaluated for use as raw material in SSF. The wastes included creosote bush leaves (*Larrea tridentata*), variegated Caribbean agave (*Agave lechuguilla*), lemon peel (*Citrus aurantifolia*), orange peel (*Citrus sinensis*), apple pomace (*Malus domestica*), pistachio shell (*Pistacia vera*), wheat bran (*Triticum spp.*), coconut husk (*Cocos nucifera*), pecan nutshell (*Carya illinoensis*), and bean residues (*Phaseolus vulgaris*). All of them were physical-chemically and microbiologically characterized. Physical-chemical tests consisted in the determination of the critical humidity point (CHP) and the water absorption index (WAI), while the microbiological tests were based on the evaluation of *Aspergillus niger* Aa-20 growth rate in such materials. The study pointed out that coconut husk, apple pomace, lemon and orange peels have great potential to be successfully used as raw material in SSF, since they have low water content linked to the structure (that is ideal to easily adjust the water content according to the process to be used), and allowed good and fast microorganism growth. Their use in SSF would be an interesting alternative to add value to these residues besides to be of great economical advantage and an environmental-friendly way for waste management.