

TITLE: DEGRADATION OF PHORBOL ESTERS PRESENT IN *Jatropha curcas* BY FILAMENTOUS FUNGI

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ABSTRACT:

Jatropha curcas is an oilseed plant and its oil has several applications such as for biodiesel production. The seed cake, produced on the oil extraction step, is low-cost and highly nutritious, being a good source for animal feed. However, the high levels of phorbol esters (PEs), which are very toxic, make impossible the use of the *Jatropha* cake (JC) as animal feed. Most of the PE are withdrawn together with the extracted oil. However, the remainder PE is still much higher than the safe limit. Thus, several chemical, biological and physical methods were developed to remove the phorbol esters in order to make the seed cake useful and profitable. Solid-state fermentation (SSF) is one of the most promising methods for detoxification process. In this work, we used the SSF with filamentous fungi lipases producers for the biodegradation of *Jatropha* cake. The fungi used was *Penicillium simplicissimum*, *P. brevicompactum*, *Trichoderma harzianum*, *Rhizopus* sp. and *Aspergillus awamori*. SSF were carried out at 30° C with initial moisture at 50% until 120 hours. After the fermentation, the phorbol esters (PEs) were extracted from the cake and its amount analyzed using High performance liquid chromatography (HPLC). The final phorbol esters concentrations were: 244,4 µg/g (*P. simplicissimum* – positive control, according previously work), 370,34 µg/g (*P. brevicompactum*), 362,64 µg/g (*T. harzianum*), 295,34µg/g (*Rhizopus* sp.), 466,64 µg/g (*A. awamori*) and 425,354 µg/g (*in natura* cake – negative control). Moisture, water activity and pH were measured every 24 hours with intend to check if their levels declined to levels non-sustainable for fungi growth. The highest degraders were *Rhizopus* sp. and *Trichoderma harzianum* and they were able to reduce, at 96 hours, 46,3% and 50,3% of phorbol esters content, respectively. The solid-state fermentations do not were carried out using optimized conditions. So, the degradation rates can improve significantly when the fermentation conditions are established. The results present in this study are promising to develop and improve a sustainable method aiming the complete detoxification of *Jatropha curca* cake and add value to the residue.

Keywords: Solid-state fermentation, Detoxification, *Jatropha curcas*, phorbol ester.

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