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Solid state fermentation: case study for biopesticide production in Brazil .

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Brazil is well-known for its research efforts in controlling pests by microbiological control means. Many microorganisms are screened and studied to control insects, phytopathogens and weeds every year. Nonetheless, there are just quite a few studies on engineering aspects of the fermentative process, which could lead these microorganisms to the level of commercial products. Many authors point out the importance of such studies to increase the amount of biopesticides in the market, to improve the product yield and to expand the future market for such environment friendly products. To reach these goals in a short period, research should look for low cost options besides good shelf-life characteristics for the bio-product. There are several agro-industrial residues that fulfill the pre-requisite for low-cost-raw-material/high-yield-performance of the fermentative process. If it can be used within a process that runs in a low-complexity platform, then there could be a big income at the end. In the case of biopesticides, regulators should have special registration taxes and preferential analysis for environment-friendly products because they are intended to reduce the environmental impact of agriculture.

The solid-state, solid substrate or semi solid fermentation (FSS), as one can find in the literature, presents some advantages over the liquid fermentation techniques developed in deep agitated tanks, such as low water input, small space requested for equipment installation – if compared to the yield in final product - and no substrate pre-treatment required.

In this paper it is presented Brazilian studies developed for FSS production of *Bacillus thuringiensis* (Bt) bioinsecticide, mainly the range of substrate available and tested, the bio-reactors developed, the process characterization and research groups involved in such topics. It will also be presented the research groups that study FSS for bio-fungicide and bio-herbicide production.