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Bacteria, yeasts and fungi are capable to grow on solid substrates. Amongst these microorganisms, filamentous fungi are the most important for Solid Substrate Fermentation (SSF), owing to their physiological and biochemical properties. Growth at low water activity (a_w) and low pH, production of extra-cellular hydrolytic enzymes and sporulation are some of the characteristics of filamentous fungi that make them suitable for SSF. Parameters such as temperature, a_w (water activity), pH, oxygen levels and concentration of nutrients and products are important in SSF processes. This paper deals with the production by Solid State Fermentation of *Bacillus thuringiensis*, a bacterium that produces some toxins, mainly biopesticides, against agricultural pests and public health vectors. This case study treat to optimize mass production of the *Bacillus thuringiensis* var. *thuringiensis*, *Btt* and *Bacillus thuringiensis* var. *israelensis*, *Bti*, in FSS, using as an alternative reactor a plastic bag autoclavable with 1 liter capacity. The culture media for *Bacillus thuringiensis* was 25/75 and 15/85 g/g sugar cane bagasse/corn grits. Water activity adjusted to the range 0.955 – 0.975. The plastic bag with the substrate in the center received a thermal treatment of 2 x 2 minutes (heat and wait) using a Panasonic domestic microwave oven high potency. The substrate after treatment didn't present contamination. With the parameters: rate of inoculum for *Bt* (10 and 15%) and temperature (28 and 32 °C), *Btt*, *Bti* and bagasse/corn rates 25%, 15% it was applied a factorial planing 2^4 that resulted in 16 experiments. The SSF was conducted in a fermentation chamber, during 96 hours and was sampled each 24 hours. It was verified that the inoculum rate was a factor not significative. The best results presented as relations between CFU_f / CFU_i , Colony Formation Unities final and initial occurred with *Bacillus thuringiensis israelensis* and with 25% bagasse and 32°C independent of being *Btt* or *Bti*. The plastic bag with bocal, used as an alternative reactor, presented an optimum behavior due to its characteristics of size, weight, flexibility and resistance.