

TITLE: EVALUATION OF DIFFERENT CULTURE CONDITIONS OF *Beauveria bassiana* FOR MICOSYNTHESIS OF SILVER NANOPARTICLES

AUTHORS: SILVA, J.A.; CALUMBY, R.J.N.; GRILLO, L. A. M.; NASCIMENTO, T.G.; ALVINO, V.; DORNELAS, C. B.

INSTITUTION: UNIVERSIDADE FEDERAL DE ALAGOAS, MACEIÓ, AL (AVENIDA LOURIVAL MELO MOTA – TABULEIRO DOS MARTINS , CEP 57072-900, MACEIÓ – AL, BRAZIL)

ABSTRACT:

Beauveria bassiana is an entomopathogenic fungus found mainly in soils around the world. Used in the biological control of important agricultural pests and insect vectors of animal and human diseases, possessing a wide variety of secondary metabolites. In addition to the interest as a biological agent, it is known that some *B. bassiana* strains can catalyze hydroxylation, oxidation and reduction reactions, and can be used as reducing agents in silver nanoparticle biosynthesis (AgNPs). AgNPs are used, mainly, in the healing of wounds in function of the biological properties found, as antimicrobial, promoter of re-epithelization, among others. In this context, the present study had the objective of evaluating different conditions of *B. bassiana* cultivation and its use for the production of reduced metal species, allowing the reduction of toxicity during this process. The cultures of *B. bassiana* were submitted to different conditions such as: luminosity, agitation, nutrients and pH. The harvested spores were inoculated into sterile saline (0.9%) to obtain a concentration of approximately 1.5×10^6 conidia/mL. Then, 1 ml of the conidia suspension was poured into an Erlenmeyer flask containing 50 ml dextrose potato broth. The fungi were incubated for a period of 15 days at a temperature of approximately 25°C. After this time, the fungal viability was evaluated. Subsequently, the fungal cultures were filtered through a paper filter to obtain the fungal mycelium mass and the cell filtrate. Soon after, the mycelium and cell filtrate were inoculated into Erlenmeyer flasks. In each flask was added silver nitrate to obtain a final concentration of 6 mM Ag⁺ ions. Finally, the reducing potential (ORP) and pH were measured at 0, 5, 10 and 15 days. After the cultivation, incubation and crossing of the variables 36 different formulations were obtained. The results showed that pH=6 associated with other culture conditions favored the production of metabolites by the fungus, making the medium rich in electrons and, consequently, showing a higher capacity of the medium as a reducing agent when compared to pH=3. The addition of the nutrient whey also clearly affected the ability of the fungus to oxidize. Thus, the ability of *B. bassiana* to catalyze oxidation and reduction reactions when exposed to certain culture conditions is demonstrated, making it useful for the development of silver nanoparticles.

Keywords: *Beauveria bassiana*, optimal culture conditions, silver nanoparticles