

**Title: STUDY OF BIOFILM FORMATION BY BACTERIA ISOLATED IN RICE ROOT NODULES CULTIVATED IN THE BRAZILIAN CERRADO.**

**Authors:** OLIVEIRA, M.S.<sup>1</sup>; OLIVEIRA, A.J.C.<sup>1</sup>; LIMA, L.M.<sup>1</sup>; MALAQUIAS, N.A.M.<sup>1</sup>; MARTIN-DIDONET, C.C.G.<sup>1</sup>; NAVES, P.L.F.<sup>1</sup>;

**Institution:** 1 UEG – Universidade Estadual de Goiás, (Br153, nº 3.105, Fazenda Barreiro do Meio, Anápolis – GO, Brasil)

Soil micro-organisms help in the biological nitrogen fixation process providing the development of different legume crops without the use of nitrogen fertilizers. Generally, *Rhizobacteria* persist in nature in form of microbial biofilm, which are composed by associated cells covered by an extracellular polymeric matrix. At this context, this study aims to determine the Biofilm Formation Index (BFI) and Cell Viability (CV) of fifteen isolated from nodules of cultivated rice root in the Brazilian Cerrado and five ATCC standard strains belonging to *Rhizobiaceae* family in order to obtain potential agricultural inoculants. Biofilm production were performed in potato broth, bacteria were incubate at 30 °C for 24 h in 96 wells polystyrene microplates and biofilm formation was determined staining adhered bacteria with violet crystal dye, and obtaining the optical densities at 630nm and 492nm. The BFI was performed using equation  $BFI = (OD_{492nm} / OD_{630nm}) \cdot 100$ . The cell viability was carried out staining the biofilm with vital dye resazurin, obtaining the optical densities at 570nm and 600nm. The CV was determined by calculating the percentage of metabolism of resazurin by the equation  $CV = [(117216 \cdot OD_{570nm}) - (80586 \cdot OD_{600nm}) / (155677 \cdot OD_{600nm}) - (14652 \cdot OD_{570nm})] \cdot 100$ . All strains showed biofilm production with associated viable cells. Strains that show BFI higher than 10% were considered high producing and CV greater than 50% were considered high viability. This allowed the division of the strains into four groups. In the first group bacteria with high BFI and CV, the second low BFI and CV, the third high BFI and low CV and the fourth with low BFI and high CV. Seven strains were allocated in group 1, two in group 2, three in group 3 and eight in group 4. This study allowed the classification of *Rhizobacteria* according the biofilm characteristics, indicating the efficiency of the methodologies for the biofilm study. The strains identified as high BFI and CV will be used with inoculants in *in vitro* and field tests for the evaluation of the nodulation capacity in symbiosis with leguminous in a future studies of research group.