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**RI-I-SMGA-rhizobial inoculation increases soil microbial functioning and gum arabic production in 13-years old *Senegalia senegal* (L.) Britton trees in the north part of Senegal****Dioumacor Fall**

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Rhizobial inoculation has been widely used in controlled conditions as a substitute for chemical fertilizers to increase plant growth and productivity. However, very little is known about such effects on mature trees in natural habitats. In this study, we investigated the effect of rhizobial inoculation on soil total microbial biomass, mineral nitrogen content, potential CO<sub>2</sub> respiration, fluorescein diacetate (FDA), acid phosphatase activities and gum arabic production by 13-years old *Senegalia senegal* (Syn. *Acacia senegal*) under natural conditions in the north part of Senegal during two consecutive years. Rhizobial inoculation was performed at the beginning of the rainy season (July) for both years with a cocktail of four strains (CIRADF 300, CIRADF 301, CIRADF 302 and CIRADF 303). Rhizospheric soils were collected in both dry and rainy seasons to a depth of 0-25 cm under uninoculated (UIN) and inoculated (IN) trees. Trees were tapped in November (beginning of dry season) using traditional tools. Gum arabic was harvested every 15 days from December to March. The results obtained from both years demonstrated that rhizobial inoculation increased significantly the percentage of trees producing gum arabic, gum arabic production per tree, soil microbial biomass, FDA and acid phosphatase activities. However, there was no significant effect on C mineralization and mineral nitrogen (N) content. Gum arabic production was positively correlated to rainfall, soil microbial biomass and mineral nitrogen content. Our results showed a positive effect of rhizobial inoculation on soil microbial functioning and gum arabic production by mature *S. senegal* trees. These important findings deserve to be conducted in several contrasting sites in order to improve gum arabic production and contribute to increase rural population incomes.

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