

**TITLE:** ARBUSCULAR MYCORRHIZAL FUNGI INOCULATION INCREASES THE *IN VITRO* ANTIBACTERIAL ACTIVITY OF *LIBIDIBIA FERREA* EXTRACTS

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**ABSTRACT:**

Arbuscular mycorrhizal fungi (AMF) are known to provide plant species with several benefits, such as increased production of bioactive compounds; however, it is yet to be defined whether extracts of mycorrhizal plants have more efficient *in vitro* antibacterial activity when compared to non-mycorrhizal plants. We tested the hypothesis that methanolic extracts of *L. ferrea* fruits, from plants established in the field, inoculated with AMF, have greater antibacterial activity when inoculated with *Acaulospora longula* (UFPE 21), *Claroideoglomus etunicatum* (UFPE 06) or *Gigaspora albida* (UFPE 01). Methanolic extracts of *L. ferrea* fruits non-inoculated and inoculated with *A. longula*, *C. etunicatum* and *G. albida* were tested. In addition, native *L. ferrea* fruits collected in Caatinga area, were also tested. The susceptible strains *Escherichia coli* (ATCC® 25922) and *Staphylococcus aureus* (ATCC® 25923) as well as two strains of resistant bacteria, ESBL-producing *Escherichia coli* (ATCC® 35218) (ESBL- Extended spectrum beta-lactamase) and MRSA- *Staphylococcus aureus* (ATCC® 33591) (MRSA- Methicillin resistant *Staphylococcus aureus*) were used. Only the extracts of *L. ferrea* fruits inoculated with *A. longula* had higher *in vitro* antibacterial activity in comparison to the extracts of fruits from non-inoculated plants ( $p < 0.05$ ), characterizing the first description of different antibacterial activities of plant extracts due to inoculation with AMF. The extracts of *L. ferrea* fruits inoculated with *A. longula* were more efficient in inhibiting growth of Gram-negative bacteria susceptible and resistant. The inhibition zones produced by methanolic extracts of *L. ferrea* fruits inoculated with *A. longula*, against *E. coli* strains (ATCC® 25922 and ATCC® 35218), *S. aureus* strains (ATCC® 25923 and ATCC® 33591) were 7.56 %, 5.22 %, 2.74 %, and 2.48 % greater, respectively, than those by methanolic extract from control. This effect is most likely probably due to the increased concentration of phenols and tannins observed, in the phytochemical analyses, when compared to the methanolic extract of non-inoculated *L. ferrea* fruits. The inoculation of *L. ferrea* with AMF may represent an alternative to produce fruits with different antibacterial activity.

**Keywords:** antimicrobial activity, biocompounds, Caatinga, fruits, mycorrhization.

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