First bioprospecting of *Fomes fasciatus*: evaluation, selection, domestication, and biotechnological profiling of strains from Paraguay

Michelle Geraldine Campi Gaona, Claudia Raquel Mancuello Chaparro, Hajime Guillermo Kurita Oyamada, Brenda Abigail Veloso Paredes, Yanine Elizabet Maubet Cano, Enzo Leonardo Cristaldo Centurion, Paulo Francisco Ferreira Benitez, Edher Zacarias Herrera, Gerardo Lucio Robledo

Abstract

Background. Fomes fomentarius is a medicinal mushroom from the Northern Hemisphere, recognized for its therapeutic and biotechnological applications. In contrast, tropical Fomes species remain poorly characterized, and information on their properties and cultivation is limited. We evaluated the biotechnological potential of the Neotropical species Fomes fasciatus. Four strains from Paraguay were isolated and assessed for growth on solid media, using both potato dextrose agar and oat seeds, and for indoor basidiomata production using a sawdust-based substrate. The strain showing the best performance on solid media was further evaluated for mycelial growth and exopolysaccharide production in liquid culture. Additionally, the nutritional and mineral composition of wild and cultivated basidiomata and mycelium was analyzed.

Results. Fomes fasciatus optimal growth on solid media was observed at approximately 32 °C, with no significant differences in basidiomata yield across strains under indoor cultivation. Successful domestication was achieved for three of the four strains studied. Exopolysaccharide production remained statistically unaffected by elicitor supplementation (i.e., CaCl2 or Tween 40) or variation in carbon and nitrogen sources of the liquid media. In contrast, mycelial biomass was significantly higher in the basal medium than in modified treatments. The wild and domesticated basidiomata and mycelium exhibited high protein content, a balanced amino acid profile, dietary fiber, and unsaturated fatty acids, along with essential macroelements such as zinc.

Conclusion. These findings highlight that F. fasciatus is a promising medicinal mushroom species with potential for indoor cultivation, characterized by fast mycelial growth and valuable nutritional and bioactive properties.