

Title: ANTIMICROBIAL AND CITOTOXIC ACTIVITIES OF AQUEOUS EXTRACT *Agaricus brasiliensis* GROWN IN *Ilex paraguariensis*

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Abstract:

The interaction between fungi/plants are not yet well understood, but may be symbiotic, neutral or antagonistic. Currently, few studies have evaluated the benefits or harms of macrofungi growing as *Agaricus brasiliensis* which is rich in polysaccharides and important immunomodulatory action, with medicinal plants, such as *Ilex paraguariensis*. This plant is popularly known as yerba mate, rich in phenolic compounds and has antimicrobial properties, antioxidant and anti-inflammatory been described. Thus, this study aimed to evaluate the antimicrobial and cytotoxic activities of the aqueous extract from the association of *A. brasiliensis* grown in *I. paraguariensis*. The solid cultivation of *A. brasiliensis* in yerba mate leaves lyophilized was provided by the Department of Food Engineering at the State University in the Midwest (UNICENTRO)/PR. The antimicrobial activity of extract was tested against bacteria: *Staphylococcus aureus* ATCC 6538 (gram-positive) and *Escherichia coli* ATCC 8739 (Gram-negative). The aqueous extract was prepared at a stock solution of 200 mg/mL and the antimicrobial activity was performed using the microdilution assay and Resazurin staining obtaining the Minimum Inhibitory Concentration (MIC). The Minimum Bactericidal Concentration (MBC) was obtained by count of colony forming units. Furthermore, it was found bacterial inhibition percentage and the inhibitory concentration 50% (IC50%). The cytotoxicity of the extract into peripheral blood mononuclear cells (PBMC's) was performed by the MTT (3-(4, 5-dimethylthiazolyl-2)-2,5-diphenyltetrazolium bromide) method, to find the cytotoxic concentration 50% (CC50%) and subsequently was calculated the selectivity index (SI). Our data showed that the the extract of *A. brasiliensis* grown in *I. paraguariensis* had moderate antimicrobial activity against both *S. aureus* and *E. coli*, MIC and MBC values ranging between 50 to 25 mg/ml and the IC50% were of 80.1 and 71.47 mg/mL, respectively. Regarding the cytotoxic activity, the CC50% was of 88,64 mg/mL and the SI calculation showed that aqueous extract had low selectivity both to gram-positive bacteria (*S. aureus* = 1.24) and gram-negative (*E. coli* = 1.10). Thus, we conclude that this association was less effective and low selectivity against bacteria and mammals eukaryotic cells, however, further studies should be performed with other pathogenic microorganisms.

Keywords: *Agaricus brasiliensis*, *Ilex paraguariensis*, *Staphylococcus aureus*, *Escherichia coli*, Antimicrobial activity.

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