**Antimicrobial Effect of Extracts from Leaves of Native Brazilian Plants**

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**Highlights**

* Leaves from sweet passion fruit and araçá tested against *S. aureus* and *A. parasiticus*.
* Crude and lyophilized extracts from Araçá had highest inhibitory activity on *S. aureus*.
* None of the extracts demonstrated effective results against *A. parasiticus*.

**1. Introduction**

*Staphylococus aureus* and *Aspergillus parasiticus* are important causative agents of foodborne diseases and mycotoxin-producing in cereals [1], respectively. In the food industry, antimicrobial agents are generally not permitted as additives in raw or processed products. Thus preventive measures to control the microbial contamination of foods are of particular importance to avoid foodborne infections. The possibility of using natural antimicrobial agents is an attractive alternative to control or reduce the bacterial and fungal load in food products, provided that they are biodegradable, environmental friendly, and biologically safe [2]. Previous studies indicated that essential oils and plant extracts containing secondary metabolites have antimicrobial properties similar to common antimicrobials [3]. The Brazilian native flora is very rich in diversity of species due to the presence of different regions and biomass in the country. A large number of Brazilian plants are popularly used as medicinal herbs, although the pharmacological bases of action for some plants are not completely understood. The objective of this study was to evaluate crude and lyophilized extracts of leaves from two Brazilian native plants with little information regarding their antimicrobial action, sweet passion fruit and araçá, regarding their *in vitro* antimicrobial effects on planktonic cells of *S. aureus* and *A. parasiticus*.

**2. Methods**

Leaves from *Passiflora alata* (sweet passion fruit) and *Psidium cattleianum* (araçá) were collected during the summer and fall period of 2017 in the Southern region of Brazil. Extracts were prepared according to recommendations of the Brazilian Pharmacopeia (20), after the leaves were dried, grinded and mixed (4 g) with 100 mL of ethyl alcohol (96 °GL). The organic solvent was evaporated by fractional distillation under reduced pressure in an evaporator (Heidolph, Schwabach, Germany). Next, the aqueous extract from each plant was divided into 2 aliquots, one (crude extract) reserved for direct evaluation of antimicrobial activity, and the other submitted to freeze-drying (lyophilized extract) (lyophilizer LC 1500, Terroni Equipment Ltda., São Carlos, Brazil) before running the antimicrobial evaluation. The concentrations of dry matter in crude extracts of sweet passion fruit and araçá were 28.3 and 60.0 mg/mL, respectively. The lyophilized extracts were re-dissolved in sterile water at 40 mg/mL.

The antimicrobial activities of crude and lyophilized plant extracts were evaluated using strains of *S. aureus* (ATCC 29213) and *A. parasiticus* (NRRL 2999), previously cultured until reaching the turbidity of 0.5 on the McFarland scale. The minimum inhibitory concentration (MIC) of plant extracts was tested using the broth microdilution reference technique [4]. Data were analyzed by the MIXED procedure of Statistical Analyses System, considering P<0.05 (28).

**3. Results and discussion**

Table 1 presents the in vitro antibacterial activities of crude and lyophilized extracts against *S. aureus* and *A. parasiticus*. Extracts from sweet passion fruit had no antibacterial activity against the S. aureus strain tested, since its MIC values could not be determined (>14.15 and >20 mg/mL for crude and lyophilized extracts, respectively). However, crude and lyophilized extracts from leaves of araçá inhibited *S. aureus*. Similarly to results obtained in the antibacterial assays, both types of extracts from araçá had lowest (P < 0.05) MIC values against *A. parasiticus*.

Table 1. Mean values ​​of minimal inhibitory concentration of plant extracts against *Staphylococcus aureus* (ATCC 29213) and *A. parasiticus* (NRRL 2999).

|  |  |  |
| --- | --- | --- |
| Plant extract | Minimum inhibitory concentration (mg/mL) | |
|  | *S. aureus* | *A. parasiticus* |
| Crude extracts: |  |  |
| Sweet passion fruit (*P. alata*) | > 14.15 a | > 14.15 a |
| Araçá (*P. cattleianum*) | 0.39 b | 3.12 b |
| Standard error | 0.12 | 0.44 |
| Lyophilized extracts: |  |  |
| Sweet passion fruit (*P. alata*) | > 20.00 a | > 20 a |
| Araçá (*P. cattleianum*) | 0.45 b | 10 b |
| Standard error | 0.11 | 0.31 |

a-b Mean values within each column with no common superscript differ significantly (*P* < 0.05).

**4. Conclusions**

Sweet passion fruit showed no action against any of the micro-organisms tested. However, crude and lyophilized extracts from Araçá had the highest antimicrobial effects against two microorganisms of public health importance, *S. aureus* and *A. parasiticus*. This is the first preliminary evidence of antibacterial effects of extracts from Araçá leaves.

**References [Calibri 10]**

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