

## EVALUATION OF ANTIMICROBIAL ACTIVITY OF EXTRACTS OF CRAJIRU (*ARRABIDAE CHICA*) AGAINST PATHOGENIC BACTERIA

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**Abstract:** The *Arrabidaea chica*, popularly known in the Amazon as *craijirú*, is a plant in sheets long and green, quite consumed in form in tea, this one it presents an color red strong and what in Agreement with The knowledge popular, treat several diseases, but its anti-inflammatory and healing properties are what call Warning. At researches aiming prove scientifically The Benefits of this plant, as well as the investigation of new biological applications, among them the activity against fungus and bacteria, he has increased and obtained results promising. The World Health Organization (W.H.O.), so as several specialists in the field of health comes warning about you dangers of emergence in each turn more strains in microorganisms resistant to the antibiotics used currently, emphasizing the need to seek new ways to combat these strains, one of the alternatives being explored is the extracts produced from natural components, such as plants, that can alone or in conjunction with other chemical components exert greater effect on combating these microorganisms. This research aims to evaluate the inhibitory potential of ethanolic extracts, obtained the leave of the process static, ultrasound and soxleht, of *Arrabidaea* leaves \_ *chica* against the growth of pathogenic microorganisms: *Staphylococcus aureus*, *escherichia coli*, *Pseudomonas aeruginosa* and *Klebsiella pneumonia* e. In the petri dishes \_ containing *Staphylococcus aureus* and *Pseudomonas aeruginosa* microorganisms grew freely, indicating what not there was inhibition, However, in the plates containing *Escherichia coli* and *Klebsiella pneumoniae* showed halos, indicating a result positive inhibitor. The observations followed for three consecutive days and the tests were executed in quadruplicates.

**Keywords:** *Arrabidaea girl*, Crajirú, activity antimicrobial, extract ethanolic.

## INTRODUCTION

At plants medicinal they can to be used popularly in miscellaneous ways, in the form of infusions, decoctions or macerations, teas being the forms most used. Natural substances extracted from plants are used for the treatment of several diseases, demonstrating itself as a manifestation of the men for to understand and enjoy The nature (Azevedo, 2008). Among at innumerable plants popularly used in the Amazon, we will give highlight the *Arrabidaea chica*.

Second Corrêa (1984), is characterized per to be a bindweed in branches cylindrical and glabrous when young, then tetragonous, lenticulate-verrucous and striated. It presents petiolate leaves, composed of two or three leaflets with a cirrus intermediate simple and terminal; you leaflets they are petiolated, being able to be oblong, oblong-lanceolate or oval-lanceolate, rarely ovals and almost ever short-acute-acuminate, obtuse at the base, glabrous on both pages, leathery, reticulate-venous, discolored or concolored. The calyx is densely powdery with flowers campanulate-infundibiliform, rosy or violaceous or purple- white with face white, velvety, willing in panicle terminal pyramidal, loose, up to 22 cm long. It has a linear, elongated, acute capsular fruit. on both sides and with a protruding midrib on the valves, glabrous, brownish rusty, seeds ovoid.

Known popularly as *crajiru*, *carajiru*, *carajuru*, *cashew*, *crejeru*, *carajunu*, *girl*, *China*, *vine cross*, *coá-piranga*, *cuica*, *guajuru*, *guajuru-piranga*, *guarajuru*, *oajuru*, *oajuru-piranga*, *pariri*, *paripari*, *crejer* (Mors et al., 2002; Van den Berg, 1993; Von Poser, 2000; Correa, 1984). The main distribution centers geographical area of *A. chica* are the Central Americas - from Mexico, Belize, Guyanas and Puerto Rico, especially Peru and Central Brazil, with a prevalence from the Region

amazonian until The River Big of South, including regions in thick and in Woods Atlantic (Lorenzi et al., 2002; Poulletti et al., 2003; sandwich and hunt, 1974).

At sheets in *Arrabidaea chica* they are maids popularly at the treatment in intestinal colic, bleeding diarrhea, anemia, uterine and wound inflammation cutaneous as healing. At medicine traditional they are used also at the treatment in illnesses gives skin as psoriasis, foist, ulcers and pyoderma. Second reports, some tribes indigenous did use of infused of sheets in the treatment of acute conjunctivitis and in the form of a poultice against the attack of insects. In the Amazon it is also used as an anti-inflammatory, astringent and in disinfection of women's intimate parts (Borrás, 2003; Chapman et. al, 1927; Correa, 1984; Oliveira et al., 2009; Kalil Filho et al., 2000). In Maranhão, it is used in control gives blood pressure (Rego, 1995).

Its leaves are rich in red-red anthocyanin pigments. dark to brick red, produce coloring matter used in dyeing handicraft fibers, decorations, utensils and clothing, as well as for tattooing, as repellent in insects and protector solar. Also used per communities indigenous people in their body painting. The pigments obtained from the leaves of *Arrabidaea chica* had high value commercial in seasons previous. At the moment, several cosmetics and products containing Those pigments they are industrialized and marketed, mainly in the northern region of Brazil. Such products exploit the brownish-red color of the leaf extracts of the species, as well as its properties anti-infective and astringent (Schiozer et al. al., 2012).

Behrens et al., 2012 surveys antianemic properties, anti-hypertensive, anti-hepatotoxic, cytotoxic and pro-apoptotic in cell lines leukemic and mammary tumors in vitro, antioxidant, antitumor, healing and activity diuretic.

Barbosa and cols., 2018 demonstrated the potential of extract ethanolic of sheets in *Arrabidaea chica* at inhibition of growth total of fungus *Trichophyton mentagrophytes*, when evaluated at concentration in 3.1 mg/ml. THE It is made observed was associated with the presence of quinones and flavonoids in the extract. Ribeiro et al., 2008 evaluated the antifungal activity of the ethanolic extract of the leaves of *Arrabidaea chica* against the yeast *Candida albicans*, determining the inhibitory concentration of 500 mg/ml. brook et al., 2008 evaluated the activity antibacterial of extract ethanolic of sheets in *Arrabidaea chica* front The *Staphylococcus aureus*, determining the inhibitory concentration of 62.5 mg/mL, and *Pseudomonas aeruginosa*, which is not showed active (Behrens, 2012).

The emergence of pathogenic bacteria resistant to antibiotics exists practically since the beginning of the use of this therapeutic class. Over the recent decades, the massive use of antibiotics and other antimicrobials has revolutionized The treatment in illnesses infectious, allowed The improvement general of health of populations, with an reduction dramatic gives Morbidity and mortality.

Nowadays, however, there is a decrease in the effectiveness of drugs that were once very potent, with reappearance of microorganisms resistant to all drugs available, increasing the risk of regression to the pre-antibiotic era, in which many people died from infections not treatable (Days, 2010).

Due to this, this work aimed to verify the antimicrobial activity of the extracts obtained from *Arrabidaea chica* against the microorganisms *Staphylococcus aureus* (ATCC25923), *Escherichia coli* (ATCC25922), *Pseudomonas aeruginosa* (ATCC27853) and *Klebsiella pneumoniae* (ATCC13899).

## **MATERIALS AND METHODS**

### **COLLECT DAS LEAVES OF CRAJIRU.**

The leaves of *Arrabidaea chica* were collected on the campus of the University Federal do Amazonas (UFAM), from August to December 2021, with the help of scissors, branches were removed and placed in plastic bags, identified and transported to the Research Laboratory in Microbiology, in the building 1 of the Institute of Biological Sciences (ICB). After collection and transport, the material was sterilized in running water, left to dry, weighed, separated and taken to the air circulation oven, where a constant temperature of 55 °C, for a period of 4 to 5 days, after the period in drying, the sheets were macerated with the aid of mortar and pestle, producing a dust thin in color brown reddish.

### **EXTRACT FOR METHOD STATIC**

Were added to the material vegetable (50g) and the solvent alcohol ethyl 100%, being 500 ml in a Becker in 1000 ml per a period in 15 days in room temperature. The result obtained was filtered and focused in a rotary evaporator at 40°C, under reduced pressure. After obtaining the extract, it was placed in vials of glasses and stored at refrigerator for the posterior realization from experiments.

### **EXTRACT FOR ULTRASOUND METHOD**

50g of plant material and 500 ml of ethyl alcohol solvent were added 100% PA was deposited in an opaque glass vial, after which it was taken to ultrasound to agitate, mix and extract the compounds through mechanical waves, on the one period of 30 minutes (Chemat et al., 2011; Vilkhov et al., 2008) the resulting material was processed in a rotary evaporator for the withdrawal of excess in

solvent. The result was stored in bottles in glass and kept in a refrigerator and later used for the experiments.

### **EXTRACT USING THE SOXHLET METHOD**

The materials with a proportion of 50g of processed vegetable materials for 500 ml of methanol extractor solvent were deposited in an amber flask where hot extraction was performed using the soxhlet equipment, at a temperature of 50 °C, for a period of 4 h under stirring with a glass rod. After extracting the plant material, the solution was filtered and the solvent evaporated using a rotary evaporator.

### **PREPARATION OF INOCULUM MICROBIAL**

For the tests in diffusion in agar at bacteria were inoculated in tubes in assays containing 5mL of Mueller-Hinton Agar medium for each of the strains, where grown in broth for 24 hours, then placed in an agar culture medium. Mueller-Hinton and incubated for 24 hours. Subsequently, for the inoculum as colonies obtained on Mueller-Hinton Agar, were used to obtain a suspension bacteria by its cell density standardized by turbidity adjusted according to the scale 0.5 by McFarland.

### **EXPERIMENT GIVES ACTIVITY ANTI-MICROBIAL GIVES *Arrabidaea chica***

The tests in parts were performed at the Laboratory in Microbiology- UFAM, where it was analyzed four (4) strains bacterial in standards international (ATCC- American type Culture Collection) Maria Deane-FIOCRUZ, being they: *AND. coli* (ATCC 25922), *P. aeruginosa* (ATCC 27853) *S. aureus* (ATCC25923) and *K. pneumoniae* (ATCC 13899), where they were maintained in the

culture medium Agar Muller- Hinton (MH) until the test to be started. For The assessment in sensitivity From microorganisms to the extracts, the bacteria were reactivated in Muller-Hinton broth (MH) and in then scattered in plates Petri containing quite in culture agar Muller- Hinton (MH), in triplicates, each which containing 4 discs with many different extract concentrations mg/ mL: C1 (0.010), C2 (0.015), C3 (0.020) and C4 (0.050) on filter paper with 0.5 mm each, all were soaked with the extracts of crajiru and the other two with Dimethylsulfoxide (DMSO) negative control and antibiotic (tetracycline) positive control, the discs were positioned keeping a reasonable distance from each other to avoid interference between possible halos of inhibition.

The plates were incubated at 35°C in BOD (Biological Oxygen Demand) for 72h, during which the development from microorganisms and the emergence of halos.

### ASSESSMENTS OF POTENTIAL ANTIMICROBIAL FROM EXTRACTS

To evaluate the experiment, a caliper was used to measure the inhibition halos, the reading was performed for three days, at the end of the third day the values obtained were added to remove the averages.

### ANALYZE STATISTIC

The experiments were carried out in four repetitions per concentration, for comparing

the growth of values from each concentration, and the data were analyzed using Analysis of Variance (ANOVA) and Tukey's Test The 95% in significance. For analyze From Dice was used the program with the software sisvar, version 5.6, second at recommendations in Ferreira (2014). THE leave of which at tables will be built.

## RESULTS AND DISCUSSIONS

The experiment with the extract obtained through the soxhlet method did not obtain positive results with any of the bacteria used; the experiment with the extract obtained through the ultrasound method did not obtain positive results against the bacteria *Staphylococcus aureus* and *Pseudomonas aeruginosa*; the experiment with the extract obtained from the static method did not obtain positive results against the bacteria *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Klebsiella pneumoniae*.

However, with the extract obtained by the ultrasound method, halos were obtained against the bacteria *Escherichia coli* and *Klebsiella pneumoniae*, and with the extract obtained from the static method, halos were obtained against the bacteria *Escherichia coli*, as can be seen in the table, graphs and figures below.

These tests were performed according to the diffusion methods in plates and diffusion in disks. The test in diffusion in agar, also called in diffusion on plates, is a

STRAIN	METHOD	C1		C2		C3		C4	
		0.10	0.15	0.15	0.20	0.20	0.50	0.50	
<i>K. pneumoniae</i>	ultrasound	0.2	a1	0.3	a2	0.5	a3	0.6	a4
<i>E coli</i>	ultrasound	0.35(5)	a1	0.35(5)	a1	0.45(5)	a2	0.55(5)	a3
<i>E coli</i>	Static	3.8	a1	4.5	a2	5.4	a3	6.5	a4

Table 1: measurements in mm (mm) From halos of inhibition bacterial obtained at the experiment using the extract ethanolic through of the method ultrasound and static.



physical method, in which a microorganism is challenged against a biologically active substance in solid culture medium and the size of the zone in inhibition in growth (halo) of microorganism challenged with the concentration of the substance rehearsed (pinto et al., 2003).

Illnesses what he has per origin infections per bacteria they are routinely treated using antibiotics. Currently, there are a variety of classes of antibiotics to treat bacterial infections. However, the use of antibiotics inappropriately and without prior guidance from a qualified health professional, he has brought consequences serious, there is View what It is each turn more remarkable The appearance of bacterial strains that no longer respond to these drugs, leading to increasing difficulty in treating infections (Bizerravs et al., 2020).

Studies show that by the year 2050, world mortality will have a significant increase, as resistance to antibiotics is already a reality and until then, infections bacterial will go cause more deaths what cancer and diabetes. That possibility has generated apprehension among health authorities. case none project or action is instituted, the prediction is that 10 million people will die until 2050 (From Brito et al., 2021).

At the moment combinations multiple in drugs they are being used at the combat the spread of pathogenic bacteria resistant to antibiotics. Report s indicate what, many different combinations antibiotics tested in vitro and applied in clinics, they are common. IT IS The case gives combination in penicillin with the gentamicin. That combination has also been used between antibiotics and natural origin plant, changing the action of antibiotics, be increasing the activity antibiotic or reversing the resistance (Coutinho et al., 2008).

The use of plants as a therapeutic alternative is an ancient practice and the potential what you same have stimulates researchers for an intense study for health promotion. Brazil, for having a valuable ethnobotanical knowledge and a wide natural biodiversity, has received incentives from the World Organization of Health for practices in scientific research on medicinal plants with goal therapy (Haraguchi; Oak et al., 2010).

Due to the facts exposed above, if see the extreme importance in extracts what have activity in inhibition bacterial front The bacteria pathological multiresistant, the what become you results obtained, relevant.

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