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Anti-ulcer activity evaluation of hidroethanolic extract of basil (*Ocimum basilicum* L) leaves

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Abstract

The use of medicinal plants to cure ulcer is a research of great interest, since the treatment for ulcer is expensive and the majority of the population can not afford it. The antiulcer activity of hydroethanolic extract of *Ocimum basilicum* L. (basil) was tested. Material and Methods: The assay of acute antiulcer activity with the extract of *Ocimum basilicum* L aerial parts (1mL/kg and 0,5 mL/kg) was done in male wistar rats, and lanzoprazole (30mg/kg) and water (1mL/100g) were the controls. Thirty minutes after the treatment the animals received, by v.o, solution 0,3M HCl/60% ethanol (1mL/100g). After one hour of administration of ulcer inductor, the animal was sacrificed. The stomach was removed, opened by the major curvature, and the ulcerations were evaluated. This assay was approved by Committee of Ethic Research (CoEP) – UNINOVE. The results showed the *Ocimum basilicum* L extract in the dosage 1 mL/kg is significant, but with 0.5 mL/kg is extremely significant, and it can be a potential phytotherapic to the population.

Key words: anti-ulcer acute, Ocimum basilicum L, basil, hydroethanolic extract.

Introduction

Many spices commonly used in the culinary to enhance flavor and improve recipes are classified as medicinal and aromatic plants[1]. They are popularly used as treatment for several diseases, such as stomachache and inflammations[2,3]. The basil (*Ocimum basilicum* L.), specie of Lamiaceae family, is an aromatic plant from Asia and North Africa [1]. It is largely used in medicinal, pharmaceutical and food industries[4,5]. Its leaves and flowers are used, in the non-scientific medicine, for teas to treat respiratory problems, rheumatism, as antiseptic, digestive tonic and important antimicrobial activity [6,7,8] . Peptic ulcers of the stomach problems are highly prevalent worldwide, reaching different ages and social classes. Arising from exogenous factors (abuse of anti-inflammatory drugs as NSAIDs, smoking or alcohol consumption, *Helicobacter pylori* infection) and sometimes by endogenous imbalance between aggressive factors of the gastric mucosa (excessive secretion of acid and pepsin) and defensive factors (sodium bicarbonate secretion, mucus secretion and production of prostaglandins).[2-4] The treatment still quite expensive and much of the population has no access to it. In addition, some of the drugs used can cause some serious side effects such as thrombocytopenia, nephrotoxicity, hepatotoxidade.[4, 5, 10] Some studies have shown that plants with substances such as flavonoids, tannins and terpenoids have anti-ulcer activity quite significant and are important alternative sources for new drugs to treat gastric ulcers.[2, 4.5, 10] Basil (*Ocimum basilicum* L) is grown and marketed by small producers for culinary, ornamental and essential oil extraction. By having in its chemical composition elements such as linalool, methyl chavicol, eugenol and monoterpenes - in its essential oil, flavonoids, coumarins, phenylpropanoids, tannins - the aerial parts, saponins, mucilage and sugars - in their seeds[7, 9], was the chosen plant for this experiment. Oxidative stress generated by increased activity of phagocytic cells at the sites of injury is a common inflammation and ulcers. Research shows that plants exhibit antioxidant properties with potential anti-ulcer and anti-inflammatory.[2]

Objective

The objective of the research was to verify anti-ulcer acute activity of the hidroethanolic extract 70% of basil leaves in different concentrations.

Methodology

The leaves of *Ocimum basilicum* L. were planted and collected in the Wadt farm, Valinhos city, São Paulo state, Brazil. They were dried in hot air house at 30°C, by 48 hours. After that, the leaves were triturated and the extract was done by fractionate percolation using ethanol 70% as solvent [11, 12].

The test used the acute induction model by ethanol 60% and chloridric acid 0.3M, in Wistar female rats [12, 13]. The rats were under fasting by 24 hours, free access to water, in appropriate room at 22°C and weight by 150-180g each. To the control group it was administered, by oral (gavage), distilled water in the dosage 1mL/100g of body weight. In the test groups it has been administered: ethanol 70% (0,5mL/Kg), pantoprazole 40mg/kg, in the dosage of 1mL/kg, and the basil hydroethanolic extract, in the dosages of 1mL and 0.5 mL/kg. After 30 minutes, all the animals received by oral via the inducing agent, 1mL of chloridric acid solution by 0.3M in ethanol 60%. Within an hour, the animals were sacrificed in CO_2 chamber. Their stomachs were extracted, washed in physiological solution 0.9%, opened by the major curvature and fixed in cork in order to count lesions (by caliper rule) and calculate their areas. The statistics results were submitted to the Tukey/Anova program. The assay was approved by Ethical Commit of UNINOVE, under register number 34/2010.

Results and discussion

see Table 1.

see Table 2.

For hemorrhagic ulcers, the hidroethanolic

extract 70% of *Ocimum basilicum* L. leaves in dosage of 1mL/Kg, inhibited significantly the ulcer formation, and in dosage of 0.5mL/Kg the inhibition was extremely significant when compared to water.

These results demonstrated that ingestion of *Ocimum basilicum* L. leaves extract was more effective after dilution, probably because ethanol 70% is aggressive for the stomach. In table 1 is possible see that the ethanol 70% is not significant when compared with water, probably because the agent induced the ulcer have the same and chloridric acid, according Oga *et al* the ethanol has an anti-inflammatory action. Ethanol 70% (solvent control) and pantoprazole (positive control) has not shown significant results, which indicated that the basil has substances that inhibit the ulcer formation and could be indicated to their treatment.

Table 2 shows that pantoprazole was chosen as the active control because it is a proton pump inhibitor (H^+), one of the most popular drugs in cases of ulcers of various etiologies, and test has showed that the basil hydroethanolic extract had a better protection than the drug. This could be explained by two reasons: first, the test used pantoprazole in tablet dosage form, it was necessary to mill the same to administer it. The loss of the enteric coating by grinding may lead to the inactivation of the active ingredient and/or contribute to the irritation of the gastric mucosa [15]. On the other side, the basil has substances such as tannins and flavonoids, which, in the case, would be protecting the stomach for his actions: healing (formation of tannin-protein precipitate, probably this complexation leads to the formation of a protective layer on the mucosa of the stomach, making it less permeable and more resistant to chemical attack or mechanical [4]), anti-inflammatory (flavonoids can inhibiting cyclooxygenase, and free radicals), antimicrobial (tannins complex with proteins from the bacterial cell wall preventing reproduction of the same, complex with metals of microorganisms and flavonoids difficult enzymatic reactions)[10].

When the most common factors of pain are considered, the bleeding ulcer is the most serious and basil extract showed protection in small doses. This indicates that the basil extract is a very interesting plant for medical use in the Unified Health System (Brazil), because the population could buy their extract (with proved accuracy of the plant and under correct preparation) and eat it safely (if taken at the correct dosage). Although the WHO (World Health Organization) had recognized the use of herbal medicines in 1978 (Ministry of Health, 2006), in Brazil, this practice has been growing slowly. However, only after the creation of the National Policy of Medicinal Plants and Herbal Medicines, adopted in 2006, is that the use of herbal medicine has been established around the actions and goals, ensuring secure access to the population and quality.

Conclusion

The hydrothanolic extract of basil (*Ocimum basilicum* L.) leaves was effective in controlling bleeding ulcers, in the assay of acute ulcer induced by hydrochloric acid and ethanol, and it could be a potential herbal medicine for the population.

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Group	Number of animals	Mean (area of ulcers)	Standard deviation	significance
Water	5	1.691	0.1706	
Ethanol	5	0.6287	0,02875	p>0.05 ns
Basil extract (1mL/Kg)	5	0.3090	0.01406	p<0.05*

Table 1: Anti-ulcer assay using water and ethanol 70% (solvent control) and extract of Ocimum basilicum L, for hemorrhagic ulcer

ns = not significant, * = significant

Group	Number of animals	Mean (area of ulcers)	Standard deviation	significance
Water	5	1.4020	0.1706	
Pantoprazole	5	1.0500	0,4504	p>0,05 ns
Basil extract (0.5mL/kg)	5	0.199	0.1546	P<0.001***

Table 2: Anti-ulcer assay using water and pantoprazole (as control) and extract of Ocimum basilicum L., for hemorrhagic ulcer

ns = not significant, *** = extremely significant