



Brazilian Journal of
OTORHINOLARYNGOLOGY

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ORIGINAL ARTICLE

In vitro* antimicrobial activity of *Luffa operculata^{☆,☆}



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Received 23 June 2014; accepted 24 July 2014

Available online 25 December 2014

KEYWORDS

Luffa operculata;
Sinusitis;
Products with
antimicrobial action;
Phytotherapeutic
drugs

Abstract

Introduction: *Luffa operculata* is probably one of the most popular herbal medicines used in the treatment of rhinitis and rhinosinusitis. However, its specific mechanism of action is still unknown.

Objective: To evaluate *in vitro* antibacterial activity of *L. operculata* against three ordinary agents of upper respiratory tract infection: *Staphylococcus aureus*, *Streptococcus pneumoniae* and *Streptococcus pyogenes*.

Methods: Different concentrations of *L. operculata* alcoholic extract were applied to bacterial broth containing reference and community strains of the three described agents. After a 24-h incubation period, the bacterial culture turbidity was measured. The samples were then inoculated onto Mueller-Hinton and human blood agar plates. Bacterial growth was analyzed after 24- and 48-h incubation period. The test was considered negative when there was no environmental turbidity, confirmed by the absence of bacterial growth into the inoculated plates. Tests were considered positive when either turbidity changes were observed on the bacterial broth or when bacterial growth was detected on inoculated plates. Appropriate statistical analysis of the data was performed.

Results: *L. operculata* extracts showed antibacterial activity mainly to *S. pyogenes* followed by *S. pneumoniae* and *S. aureus*.

Conclusions: *L. operculata* extract showed promising antibacterial activity *in vitro* against the studied agents.

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[☆] Please cite this article as: Scalia RA, Dolci JEL, Ueda SMY, Sassagawa SM. *In vitro* antimicrobial activity of *Luffa operculata*. Braz J Otorhinolaryngol. 2015;81:422–30.

[☆] Institution: Study conducted at Medical Sciences School, Santa Casa de São Paulo (FCMSCSP), to obtain Doctorate's degree in Surgery Research.

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PALAVRAS-CHAVE

Luffa operculata;
Sinusite;
Produtos com ação
antimicrobiana;
Medicamentos
fitoterápicos

Atividade antimicrobiana *in vitro* da *Luffa operculata***Resumo**

Introdução: A *Luffa operculata* é, provavelmente, o fitoterápico mais utilizado no tratamento das rinites e rinosinusites. Apesar de amplamente utilizada pela população, seus mecanismos de ação ainda não estão completamente estabelecidos.

Objetivo: Avaliar a atividade antimicrobiana *in vitro* da *Luffa operculata* em agentes causadores de infecções de vias aéreas superiores: *Staphylococcus aureus*, *Streptococcus pneumoniae* e *Streptococcus pyogenes*.

Método: Foram utilizadas diferentes concentrações de extrato alcoólico de *Luffa operculata* em caldo de bactérias dos agentes avaliados. Após incubação de 24 horas foi realizada a leitura de turvação do meio, e posteriormente, semeadura em placas de ágar-sangue e ágar Muller-Hinton, após 24 e 48 horas de incubação. Foram considerados testes negativos aqueles em que não houve a turvação do meio, confirmados pela ausência do crescimento das bactérias nas semeaduras. Foram considerados positivos os testes que apresentaram turvação do caldo ou positividade nas semeaduras de 24 ou 48 horas. Os resultados foram submetidos à análise estatística pertinente.

Resultados: Os extratos de *Luffa operculata* apresentaram atividade antimicrobiana, especialmente para *Streptococcus pyogenes*, seguido dos *Streptococcus pneumoniae* e *Staphylococcus aureus*.

Conclusões: O extrato de *Luffa operculata* apresentou promissora atividade antimicrobiana *in vitro* contra os agentes estudados.

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Introduction

The widespread use of antibiotics to treat bacterial rhinosinusitis, besides the elimination of the offending organism, aims to restore the normal function of the nasal mucosa and the paranasal sinuses, shortening the duration of symptoms and preventing local and intracranial complications.¹

Although widely used, antibiotics are not the only therapeutic option for rhinosinusitis.² Adjuvant treatments should be used, in accordance with the symptoms, needs and limitations of each patient. In general, nasal washes with saline solutions, topical and systemic corticosteroids, antihistamines, nasal decongestants, and mucolytics, among others, may also be used.¹⁻⁴

One of the therapeutic options employed by a large portion of the population in the treatment of rhinosinusitis is the use of phytotherapy, or herbalism. Traditionally used by the poor segment of the Brazilian rural population, especially in North, Northeast and Midwest regions of the country, herbal medicine has been used increasingly in urban centers across the country, by patients of various cultural and socioeconomic levels.⁴

Among the medicinal plants used informally for the treatment of rhinitis and rhinosinusitis, *Luffa operculata*, known in Brazil as "cabacinha" or "buchinha-do-norte", is probably the most commonly used.^{5,6} *L. operculata* possesses a number of therapeutic properties, according to the Brazilian population. Although several studies in the literature sought to identify the mechanisms by which *L. operculata* exhibits such properties, no evidence of antihistamine, vasoconstrictor, anti-inflammatory, or antiviral activity of this

herbal medicine was found.⁷⁻¹⁰ Structural changes in the respiratory mucosa were described by experimental studies; however, the concentration and the way in which *L. operculata* was used were not clearly stated.^{4,11}

In a recent systematic review on *L. operculata* effectiveness in the clinical treatment of rhinosinusitis, it was concluded that many clarifying scientific data on the subject are still missing, and that the data currently available are still very controversial.¹² Thus, new, insightful and reliable studies are in order, so that *L. operculata* can be used safely and effectively in the treatment of sinonasal diseases.^{12,13}

In an attempt to elucidate these properties, the aim of this study was to evaluate the *in vitro* antimicrobial activity of *L. operculata* against some causative agents of rhinosinusitis.

Methods

The study was conducted in the Laboratory of Microbiology, Department of Pathological Sciences and Department of Otorhinolaryngology, after approval of the relevant Scientific Committees. The Research Ethics Committee of the institution waived the evaluation of the project, because there is no involvement of human beings or experimental animals.

Obtaining microorganisms

To conduct the microbiological assay, specimens of clinical origin were selected and stored in the Laboratory

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