INTERNATIONAL JOURNAL OF MEDICAL SCIENCE AND PUBLIC HEALTH RESEARCH (ISSN – 2767-3774)
VOLUME 03 ISSUE 04 Pages: 01-04
SJIF IMPACT FACTOR (2021: 5.456)
METADATA IF – 7.236

International Journal of Medical Science and Public Health Research

Journal Website: https://ijmsphr.com/index.php/ijmsphr

Research Article

CAPPARIS SPINOSA EXTRACTS

Submission Date: April 20, 2022, Accepted Date: April 25, 2022,
Published Date: April 30, 2022
Crossref doi: https://doi.org/10.37547/ijmsphr/Volume03Issue04-01

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ABSTRACT

This article describes in detail where the capparis spinosa plant is found, its medicinal properties and methods of extracting it.

KEYWORDS

Capparis spinosa, Pharmacological effect, Chemical investigation, antibacterial activity, phenolic compounds, antifungal activity.

INTRODUCTION

Capparis spinosa (Capparidacea), is one of the most used medicinal plants worldwide. It is used for the treatment of various diseases because of its biological and pharmacological effect, such as antioxidant, anticancer, antihypertensive, antidiabetic and antibacterial. Phytochemical analysis of the plant showed that it is a rich source of bioactive constituents, including alkaloids, glucosinolates, tocopherols, carotenoids and polyphenols, which have led to C. spinosa being considered as a promising medicinal plant. Our study aims to detail the chemical profiles of the present bioactive responsible for the pharmacological effects of C. spinosa; it also aims to experimentally demonstrate the presence of

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polyphenols in different parts of the plant as well as their antimicrobial effects. For this, we used methanolic and aqueous extracts of the different parts of the plant picked in Beni Aziz in the Sétif region (North-east of Algeria). The extracts subjected to TLC and HPLC showed that they were rich in flavonoids and phenolic acids. This led to find that rutin was the most dominant compound in most of our extracts. On the other hand, the antimicrobial effect was tested by the disk diffusion method on three bacterial strains: E. coli, P. aeruginosa and S. aureus and two fungi: C. albicans and A. flavus. Candida albicans's antifungal effect of our extracts was absent. While the same extracts showed a slight inhibitory activity against Aspergillus flavus. As for the antibacterial effect, it exists only for the methanolic extract of the twigs against Staphylococcus aureus. While the other extracts only showed a slight inhibitory activity against the same strain. The other strains of bacteria were resistant to all extracts at any used concentration.

Caper (Capparis spinosa L.) belongs to the Capparaceae family native to the Mediterranean region. C. spinosa is one of the most widespread aromatic plants that grows everywhere, on slopes, rocky and stony and generally well adapted to the basin of the dry zones. The wild species of Capparis are found in the surrounding Mediterranean countries extending as far as the great desert in North Africa and in the dry regions of western and central Asia. In the Mediterranean coast, the caper tree can grow wildly only in the Algerian coast. Where it prefers light, well-draining soils with a neutral to alkaline pH. It can also be found in light, sandy or loamy soils (pH = 7.5-8). The harvest's perfect time of caper in Algeria is June, and it is mainly used for traditional remedies. Plants are a valuable source of a wide range of secondary metabolites, which are used as pharmaceuticals, agrochemicals, flavors, fragrances, colors, biopesticides and food additives. As a result of accumulated experience from the previous generations, today, all the world's cultures have an extensive knowledge of herbal medicine. Capparis spinosa which was commonly used as medicinal plant, contains many biologically active chemical groups including, alkaloids, glycosides, tannins, phenolics, flavonoids, triterpenoids steroids, carbohydrates, saponins

and a wide range of minerals and elemental electrolytes. It exerted many pharmacological effects including antimicrobial, cytotoxic, antidiabetic , antioxidant , cardiovascular, bronchorelaxant , antihepatotoxic, antiproliferative agent Moreover, n-butanol extract of C. spinosa inhibits the growth of tumor cells,. It has anti-hyperglycemic and anti-obesity effects.

Also, its aqueous extract reduced cholesterol, triglycerides and glucose in normal and severe hyperglycemic rats, Clinical studies have shown that the caper extract has anti-arthritic effect . Phytochemical studies have reported

that the extract of C. spinosa contains antioxidant compounds such as flavonoids, quercetin and kaempferol glycosides. .

Preparation of Capparis spinosa extracts . To obtain the aqueous extracts, 10 g of the powder of each of the different plant parts (roots, leaves, flowers,seeds and fruits) we have mixed with 100 mL of distilled water, heated for 15 min, and stirred 24 hours in the darkness at 4°C. We have filtered the aqueous extract through a glass with cotton to remove particles. The filtrate has been lyophilized and stored at –20°C until to use. We have put the dried plant material in a blender and subsequently

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mixed with a 10–20 volumes of 85% aqueous methanol. The slurry has been placed at room temperature for one week and we filtered the extract through a Buchner funnel. The methanol has been removed by rotary evaporation.

Antifungal activity. Antifungal susceptibility test in vitro has been tested against pathogenic human fungi Candida albicans and Aspergillus flavus. We used Sabouraud dextrose medium containing chloramphenicol for the fungal suspension from three to five days old, it was made in sterile distilled water and its turbidity was adjusted to 0,5 Mc Farland (10CFU/ml). An aliquot of 0.1 ml of this fungal suspension was spread over the surface of agar plate. The disc technique was used for the antifungal activity; sterile paper discs of 6 mm diameter impregnated with 30 µl of plant extract. The same procedure was used as described previously. The discs impregnated

with DMSO and Fluconale 10 mg / ml are respectively used as negative and positive controls.

CONCLUSION

Our attention was focused on Capparis spinosa, which is a

Mediterranean plant that is widely used in Algeria, particularly in the region of Sétif, where it was collected for this study. Many in vivo and in vitro studies are being carried out around the world in order to be able to evaluate the clinical and pharmacological applications of C. spinosa with the aim of developing a new natural drug with less toxic and undesirable effects. Besides that, other studies are done to characterize and quantify the different bioactive molecules present in the plant by using different techniques, such as HPLC and TLC which we used in our study and which have showed that the methanolic and aqueous extracts exhibit are rich source of

antioxidant such as flavonoids and phenolic acids with the presence of Rutin and Quercetin in considerably high amounts. The extracts showed significant effects on bacteria: Staphylococcus aureus. Capparis spinosa L could be used as a potential source of natural antimicrobial agents with beneficial therapeutic effects. A moderate anti-fungal activity was observed against Aspergillus flavus. Our current research offers the possibility of developing strategies for controlling human pathologies with natural extracts or bioactive metabolites of medicinal plants. Further, phytochemical studies are ongoing to define the chemical structure and characteristics of bioactive

compounds especially present in flowers and twigs of this botanical genus.

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