



Evaluation of Antibacterial activity of *Hibiscus Sabdariffa* flower extract

N Sekhar^{1*}, *K Rama Rao*¹, *P.V. Madhava Reddy*², *K. Yalla Reddy*², *M Santhosh Aruna*²

¹Sultan-ul-Uloom College of Pharmacy, Banjara Hills, Hyderabad, Telangana

²Jagans College of Pharmacy Nellore, Andhra Pradesh

ABSTRACT:

The study was aimed at evaluating the antibacterial activity of the aqueous and solvent extract of Red flowers of *Hibiscus sabdariffa*. The extract contains large amounts of phenolic compounds and flavonoids. There are a lot of phenolic chemicals and flavonoids in the extract. Disc diffusion was used to test the antibacterial activity of aqueous and solvent extracts of *Hibiscus sabdariffa* flowers. The flower material can be used as an antibacterial agent against human infections as an alternative..

Key words: Antibacterial Activity, Human Pathogens, Flavonoids, Phenolic Compounds.

INTRODUCTION

Hibiscus sabdariffa belongs to the Malvaceae family of plants. Hibiscus plants are extensively planted as ornamentals and are utilized in traditional medicine because of their lovely and vivid blossoms. Hibiscus species have traditionally been used as a folk cure for skin ailments, anti-fertility, antiseptic, and carminative. Hibiscus Rosa Sinensis has a wide range of biological effects, including antipyretic, analgesic, and anti-inflammatory properties (1, 2). The plant's flower has also been discovered to have anti-spermatogenic, androgenic, anti-tumor, and anticonvulsant qualities, and the leaves and flowers have been proven to aid in ulcer healing. The petals' infusion is used as a refrigerant and demulcent. Many chemical substances have been identified, including cyandin, quercetin, hentriacontane, calcium oxalate, thiamine, riboflavin, niacin, and ascorbic acids (3, 4).

Antibiotic resistance has become prevalent among bacteria and fungi, necessitating the development of a new class of antimicrobial compounds. There have been multiple studies that show the existence of antibacterial chemicals in diverse plant sections. In most plants, the petals feature a defensive mechanism against microbial attack (5). The antibacterial activity of *Hibiscus sabdariffa* flower petals from a variety of plant species growing in the proximity of our surroundings was tested.

The current study examines the antibacterial efficacy of *Hibiscus sabdariffa* flower extract against human pathogens such as *Escherichia coli* and *Bacillus subtilis*.

MATERIALS AND METHODS

Collection of samples: First, *Hibiscus sabdariffa* flowers were picked, cleaned with distilled water, and dried in the shade. The powder was then homogenized and stored in airtight bottles

A.Extraction of components

Aqueous Extraction: 4 g of air-dried *Hibiscus sabdariffa* flower powder was boiled in 100 ml distilled water and filtered using Whatman filter paper no. 1. The filtrate was collected and kept at 5°C for further use.

Solvent Extraction: In a plugged conical flask, 4g air dried powder of *Hibiscus sabdariffa* flower was inserted in 100 ml of organic solvent Hexane. After that, it was shaken for 24 hours at 190-220 rpm in a rotary shaker. Then it was filtered and centrifuged for 5 minutes at 10000 rpm. Solvent distillation device was used to collect the filtrate and evaporate the solvent. It was then stored in airtight bottles at 40°C for further research.

B.Test microorganism for antibacterial assay

For the in vitro antibacterial assay the following human bacterial were studied such as *E. coli* *B. subtilis*.

Culture preparation for antibacterial assay: First and foremost, culture was prepared. Cultures were cultivated on nutrient agar for 18 hours at 34°C, then suspended in saline (0.75 percent NaCl) with the turbidity adjusted to 0.5 McFarland Standards (108 CFU/ml). To inoculate the plates, a saline culture was created.

A. Antibacterial assay

Disc Diffusion: Aqueous and organic floral extracts were placed into a 0.5 mm (hi- media) disc and allowed to dry in this approach. At a concentration of 40 mg/ml, the test substance was entirely saturated on the disc. The disc was then placed directly on the surface of Muller Hinton agar plates that had been swamped with the test organism and cultured for 24 hours at 34°C.

B. Statistical Analysis

The standard deviation (SD) statistical approach was used to assess the results.

RESULTS AND DISCUSSION

The result showed that aqueous extraction illustrated a maximum zone of inhibition against *Bacillus subtilis* (*B. subtilis*) *Escherichia coli* (*E. coli*) viz. (15.00 + 2.81), (12.50 + 1.81) mm.

Solvent (Hexane) Extract showed the highest zone of inhibition recorded against *B. subtilis* and *E. coli* as (19.86 + 0.15), (18.00 + 1.53) mm.

Antibacterial activity of aqueous extract and solvent (Hexane) extract of flower of *H. Rosa sinensis* in disc diffusion method are shown in Table 1.

Table 1: Antibacterial activity of aqueous extract of solvent extract of *H. rosa-sinensis* in disc diffusion method (Mean+SD) (mm).

| Test Organism | Disc diffusion method | |
|--------------------|-----------------------|-----------------|
| | Aqueous extract | Solvent extract |
| <i>B. subtilis</i> | 15.00 + 2.81 mm | 19.86 + 0.15 mm |
| <i>E. coli</i> | 12.50 + 01.81 mm | 18.00 + 1.53 mm |

Hibiscus sabdariffa flower extracts include a variety of organic components, including flavonoids, tannins, alkaloids, and terpenoids, all of which are known to have antibacterial properties (6). These extracts also contain phenolic compounds like as tannins, which are potent antimicrobials.

Medicinal herbs are a culturally appropriate and accessible source of basic health care. After then, the treatments based on these herbs have very few negative effects. Plants create bioactive chemicals as secondary metabolites, which can be particular to not only growth stages but also organs and tissues (7). Secondary metabolites from the polyketide and non-ribosomal peptide families are a large group of natural compounds with a wide range of biological roles and pharmaceutically significant features.

Hibiscus sabdariffa flowers were tested for antibacterial activity. The floral extract has antibacterial activity against *E. coli* and *B. subtilis*, two human diseases (8). The fact that flower extracts suppress bacterial growth in vitro could be related to the presence of active chemicals in the extracts. To limit bacterial growth, these active substances may work alone or in combination (9). Several studies on the antibacterial activity of various plant extracts have been reported. ten, eleven, and twelve.

Hibiscus rosa-sinensis flower extracts were tested for antibacterial efficacy against human pathogenic bacterial strains in this study. *E. coli* is a common part of the large intestine's natural flora (13, 14). It colonizes the gastrointestinal tract and is the most common facultative organism there. It's the one who makes you throw up. As a result, floral extracts can be utilized as a significant antibiotic to treat diseases caused by various bacteria strains (15, 16). According to the findings, these extracts may prevent the growth of human infections. The results are promising, and the most active extracts can be used to isolate therapeutic antimicrobials and undergo further pharmacological testing.

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