

SCREENING OF *ZIZIPHUS JUJUBE* LAM. LEAF EXTRACT FOR ANTIMICROBIAL ACTIVITY

Senthamarai R*, Ismail A M, Shri Vijaya Kirubha T, Balasubramanian P

Department of Pharmacognosy, Periyar College of Pharmaceutical Sciences
Tiruchirappalli – 620 021, TamilNadu, India.

Corresponding Author: tsvkirubha@rediffmail.com

Received 25-02-17; Revised & Accepted: 12-03-17

ABSTRACT

Many medicinal plants are considered to be potential anti microbial crude drugs as well as a source for novel compounds with anti microbial activity with possibly new modes of action. The development of anti microbial compounds from natural sources is considered to be a promising approach. The present work was aimed to screen a selected plant for (novel) anti microbial compounds. Leaves of *Ziziphus jujube* (Rhamnaceae) - one of the 40 species of the genus *Ziziphus* have been reported to possess anti microbial properties. The coarsely powdered leaves were subjected to Soxhlet extraction using organic solvents of increasing polarity. The extracts were subjected to preliminary phytochemical screening and the ethanolic extract showed the presence of more phytoconstituents including flavanoids. Thence, ethanolic extract was subjected to anti microbial screening which showed significant anti bacterial activity against gram positive bacteria – *Bacillus subtilis*, *Staphylococcus aureus* & gram negative bacteria - *Escherichia coli*, *Klebsiella pneumonia* as compared to standard drug – ciprofloxacin and anti fungal activity against *Candida albicans*, *Aspergillus niger* as compared to standard drug nystatin. The anti microbial activity exhibited by the selected plant - *Ziziphus jujube* may be due to the presence of flavanoids which possesses significant anti microbial activity. Thereby, it may be concluded that *Ziziphus jujube* leaves may be a drug of choice as good natural anti microbial agent.

Keywords: *Ziziphus jujube*, Flavanoids, Anti microbial activity

INTRODUCTION

The plant kingdom is a very rich resource for discovering new anti-microbial compounds for human medicine. Anti-microbial agents are undeniably one of the most important therapeutic discoveries of the 20th century [1]. In recent years, many possible sources of natural antibiotics have been in use for several infectious diseases, mostly bacterial and fungal [2]. Many medicinal plants are considered to be potential anti-microbial crude drugs as well as a source for novel compounds with anti-microbial activity, with possibly new modes of action [3]. The goal of this work was to screen plants for (novel) anti-microbial compounds. *Zizyphus jujube* (ZJ) is one of the 40 species of the genus *Zizyphus* and leaves are reported to possess anti-microbial activity [4].

EXPERIMENTAL

Description of Plant

The plant consists of dried ripe fruits, leaves, roots and seeds of *Ziziphus jujube* of family Rhamnaceae. Popularly called as Elandhai in Tamil. The leaves found to contain flavonoids, tannins, and holosides, sterol, mucilages, triterpenoids, cardiotoxic glucosides, and leucoanthocyanins.

Preparation of Extracts

Coarsely powder subjected to extraction in a Soxhlet apparatus with solvents of increasing polarity.

Screening of Antimicrobial Activity of *Ziziphus jujube*

The anti-microbial activity for the given sample was carried out by disc diffusion technique. The test micro-organism of *Staphylococcus aureus*, *E.Coli*, *Bacillus subtilis*, and *Klebsiella pneumonia* and Fungus *Aspergillus niger*, *Candida albicans* were obtained from National Chemical Laboratory (NCL) Pune and maintained by periodical sub culturing on nutrient agar and Sabouraud dextrose agar medium for bacteria and fungi respectively. The effect produced by the sample was compared with the effect produced by the positive control (Reference standard Ciprofloxacin 5µg/ disc for bacteria; Nystatin 100µg/ disc for fungi [5,6].

RESULTS AND DISCUSSION

The results of the plant *Ziziphus jujube* which has a number of therapeutic potentials has not been scientifically validated for its anti-microbial activity which are reported in ethno-medical information. Thereby the present study was focussed that the ethanolic leaf extracts showed a significant anti-microbial activity. Leaf extracts of *Ziziphus jujube* showed a significant anti-microbial activity as compared to standard drugs of Ciprofloxacin (anti-bacterial) and Nystatin (anti-fungal).

Table 1: Anti-microbial activity of the sample

S.No.	Name of the Microorganisms	Zone of inhibition in mm (<i>Ziziphus jujube</i> extract)			
		A	B	C	D
1.	<i>Bacillus subtilis</i> (NCIM 2063)	06	11	-	16
2.	<i>Staphylococcus aureus</i> (NCIM 2079)	11	09	-	31
3.	<i>E. coli</i> (NCIM 2065)	08	09	-	45
4.	<i>Klebsiella pneumonia</i> (NCIM 2098)	11	09	-	46
5.	<i>Aspergillus niger</i> (NCIM 105)	09	07	-	11
6.	<i>Candida albicans</i> (NCIM 3102)	20	14	-	16

A= 200 µg ; B= 400 µg ; C= DMSO; D=standard (Ciprofloxacin 5µg/ disc for bacteria; Nystatin 100 µg/ disc for fungi)

Anti fungal activity



(Fig.1 Resistance against *Aspergillus niger*)



(Fig.2 Resistance against *Candida albicans*)

Anti bacterial activity

GRAM POSITIVE



(Fig.3 Resistance against *Bacillus subtilis*)



(Fig.4 Resistance against *Staphylococcus aureus*)

GRAM NEGATIVE



(Fig.5 Resistance against *E.coli*)



(Fig.6 Resistance against *Klebsiella pneumoniae*)

CONCLUSION

The plant *Ziziphus jujube* belonging to family Rhamnaceae was selected for our studies to submit the report on Anti-microbial activities of *Ziziphus jujube* Leaves. The Pharmacognostical studies on the leaves of *Ziziphus jujube* include macroscopy and microscopy which gives more information to identify the plant for future studies. *Ziziphus jujube* possesses a good anti-microbial activity. The leaf extract showed a significant anti-microbial activity when compared with standard antibiotic discs. The anti-microbial activity exhibited by the selected plant *Ziziphus jujube* may be due to the

presence of flavanoids which possesses significant anti-microbial activity. Thereby the leaves of *Ziziphus jujube* may be a drug of choice for natural Anti-microbial agent.

REFERENCES

- [1] Farnsworth N R Ethnopharmacology and future drug development: The North American experience. J. Ethnopharmacol. 1993, 38, 145–52.
- [2] Dubey N K, Kumar R, Tripathi P Global promotion of herbal medicines: India's opportunity. Curr. Sci.2004, 86, 37–41.
- [3] Abalaka M E, Daniyan SY, Mann A Evaluation of antimicrobial activities of two *Ziziphus* species (*Ziziphus mauritiana* L. and *Ziziphus jujube* L.) on some microbial pathogens. African J Pharm Pharmacol. 2010, 4,135-9.
- [4] Edwards (1952). Fruit components of *Ziziphus xylopyra* Willd. like Oleanolic acid, For. Rec .N. S. Chem, & Minor For. Prod., 1(2), 74.
- [5] Reddy P S, Jamil K, Madhusudhan P. Antibacterial activity of isolates from *Piper longum* and *Taxus baccata*. Pharmaceutical Biol. 2001, 39, 236–8.
- [6] Adamo HM, Ali B, Odis M, Matchawe C, Antimicrobial activity and phytochemical screening of some selected medicinal plants in Bauchi (Nigeria). J. Econ. Taxon. Bot., 2000, 24(1), 123-127.