WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.074
Volume 7, Issue 6, 524-529. Research Article ISSN 2277– 7105

ANTIBACTERIAL EFFECTS OF ETHANOLIC EXTRACT OF *SARACA ASOCA* LEAVES ON HUMAN PATHOGEN WITH SPECIAL REFERENCE TO *ESCHERICHIA COLI* AND *STAPHYLOCOCCUS AUREUS*

D. S. Rathore* and Neha Sharma

Department of Botany/Biotechnology, Govt. K.R.G.P.G. (Autonomous) College, Gwalior, (M.P.).

Article Received on
25 Jan. 2018,

Revised on 15 Feb. 2018,
Accepted on 06 March 2018,

DOI: 10.20959/wjpr20186-11350

***Corresponding Author**
D. S. Rathore
Department of Botany/Biotechnology, Govt. K.R.G.P.G. (Autonomous) College, Gwalior, (M.P.).

ABSTRACT

The ethanolic leaf extracts of *Saraca asoca* showed significant antibacterial activity against human pathogens i.e. *Escherichia coli* and S*taphylococcus aureus*. In the experimental design, the *Escherichia coli* and *Staphylococcus aureus* were purchased from the MTCC, Chandigarh. Antibacterial effects of the leaves extract against pathogenic bacteria were evaluated by well diffusion method and resistance of antibiotics against isolates were evaluated by using hexa UTI disc 4 (Himedia pvt limited). Ampicillin, Gentamycin, Nitrofurantoin, Ciprofloxacin, Nalidixic acid, Co-trimoxazole was the antibiotics present in hexa UTI disc-4, tested against *E. coli* and *S. aureus.* Now a day, detection of antibiotic resistance against isolates are important for prevention and control of infection. In this study, the ethanolic leaves extract of *Saraca asoca* were showed greater zone of inhibition comparatively to Ampicillin, Gentamycin, Nitrofurantoin, Nalidixic acid and Co-trimoxazole except Ciprofloxacin. Antibacterial activity of *Saraca asoca* was due to saponins, tannins, flavanoids, and glycosides. Increasing bacterial resistance against antibiotics is an emerging problem for human health. Therefore, this study was aimed using ethanolic extract of leaves of *Saraca asoca* and assessing their effect *in vitro* on bacterial pathogens, and also compared the effect of these extracts with common antibiotics.

KEYWORDS: *Saraca asoca***,** Ethanolic leaf extract, Agar well diffusion method, Antibacterial properties.

INTRODUCTION

In different countries, various parts of plants are used as source of potent and powerful drugs. It is believed that the phytomedicines are more acceptable by human body than the modern synthetic drugs (Chandra, 2013). Extraction of complete phytoactive compounds from plant material is mostly dependent on the type of solvents being used in the extraction procedure. Mostly used organic solvents are ethanol, acetone, and methanol to extract phytocompounds from plants (Wendakoon *et al*, 2012). *Ashoka tree or Sorrow less tree* important legendary and sacred trees in the cultural tradition of the Indian subcontinent and adjacent areas. It is universally known by its binomial Latin name *Saraca asoca* (Roxb.) Willd is an accepted name, sometimes incorrectly known as *Saraca indica* belonging family *Caesalpinaceae* (The plant list.2015). It is an ever green tree variously known as Ashoka (Hindi, Gujrati, Bengali, Assamese, Oriya), Ashok (Marathi, Kashmiri, punjabi), Kankeli (Sanskrit), Asokam (Malayalam), Asogam (Tamil), Ashokadamara (Kannada) Ashokapatta (Telugu). Ashoka is one of the sacred plants of Hindus, and is especially sacred to the Hindu God of Love, Kamadeva, for whom it is worshipped every year on December 27; it is mentioned in Hindu mythology as the Ashoka tree, beneath which the Indian philosopher and founder of Buddhism, Gauthama Siddhartha (c.563 - 483 B.C) was said to have been born under this tree (Athiralakshmy et al. 2016).

Classification

Kingdom: Plantae

Division: Magnoliophyta

Class: Magnoliopsida

Order: Fabales

Family: Caesalpinaceae

Genus: *Saraca*

Species: *asoca*

It is found throughout India *Escherichia coli* is a Gram-negative, facultative anaerobic, rod-shaped virulent strains can cause gastrentritis, urinary tract infection, neonatal meningitis, hemorrhagic colitis and Crohn's disease. Uropathogenic *E. coli* (UPEC) is one of the main causes of urinary tract infections. *Staphylococcus aureus* (also known as *golden staph*) is a Gram-positive, round-shaped pathogenic bacterium (Nova publishers, 2013). The present work was undertaken to study antibacterial properties of ethanolic extract of leaves of *Saraca*

asoca against *Escherichia coli* and *Staphylococcus aureus*. The aim of the present study is to provide complete information about the medicinal & pharmacological importance of the *Saraca asoca* against *Escherichia coli* and *Staphylococcus aureus*.

MATERIAL AND METHOD

Plant Samples: Leaves of *Saraca asoca* was collected from Deendayal Arogya Dham, Chitrakoot, M.P.

Pathogen: Two different pathogen namely *Escherichia coli* and *Staphylococcus aureus* collected from MTCC, Chandigarh, were sub cultured and used throughout the project work.

Preparation of Ethanolic Pltant Extracts: The plant part *viz* leaves were washed with distilled water, dried in the air and pulverized. Twenty grams of pulverized material was used for extraction with 99.9% ethanol using Soxhlet's apparatus. The solution were filtered and left in oven at 50°C to evaporate excess amount of ethanol till the extract dried. Hundred milligram of residue of ethanolic extract was dissolved in 10 ml of ethanol to get final concentration of 1 %.

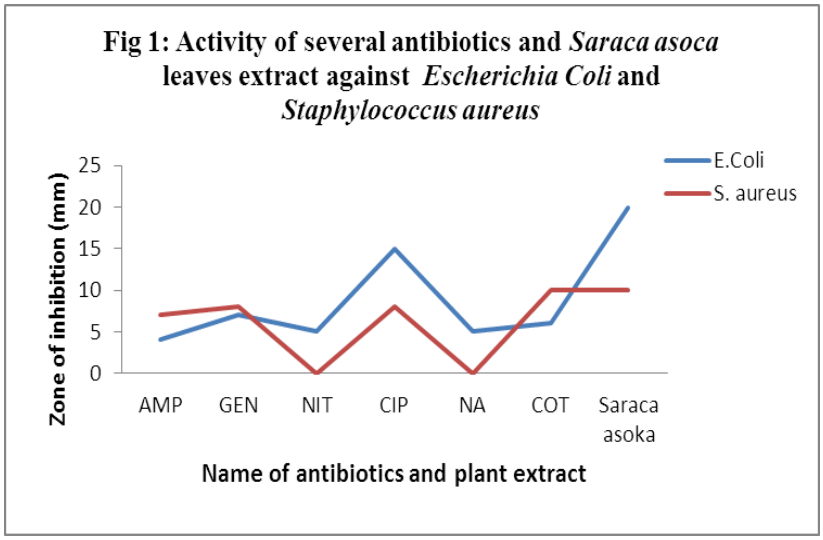
Testing of antimicrobial activities: Antimicrobial activity was studied by well agar plate diffusion method according to Pandey *et al*, (2011) and Jahir Alam Khan *et al*, (2011). Antimicrobial activity test of ethanolic extract of *Saraca asoca* leaves was carried out against *Escherichia coli* and *Staphylococcus aureus* along with chosen antibiotics for their comparative study.

RESULT

Ethanolic extracts of *Saraca asoca* showed notable antibacterial activity against *Escherichia coli* and *Staphylococcus aureus*. When tested by the disc diffusion method, it showed significant inhibitory activity against both microorganisms. *Saraca asoca* showed maximum zone of the inhibition against *E.coli* with 20 mm diameter as compared to Ampicillin, gentamycin, nitrofurantoin, ciprofloxacin, nalidixic acid and co-trimoxazole with 4mm, 7mm, 5mm, 15mm, 5mm, 6 mm zone of inhibition respectively. It was also observed that *Saraca asoca* leaves extract worked against *Staphylococcus aureus*. In case of *Staphylococcus aureus*, ampicillin, gentamycin, ciprofloxacin, co-trimoxazole was showed 7mm, 8mm, 8 mm,10mm respectively where as *Saraca asoca* showed 10mm zone of inhibition which is greater than nitrofurantoin and nalidixic acid which did not show any zone of inhibition.

Table 1: Activity of several antibiotics and *Saraca asoca* leaves extract against *Escherichia Coli* and *Staphylococcus aureus.*

S.No.	Name of the antibiotics and plant material	Zone of Inhibition (mm)	
		Escherichia coli	*Staphylococcus aureus*
1.	Ampicilin (AMP)	4 mm	7 mm
2.	Gentamicin (GEN)	7 mm	8 mm
3.	Nitrofurantoin (NIT)	5 mm	0 mm
4.	Ciproflaxacin (CIP)	15 mm	8 mm
5.	Nalidixic acid (NA)	5 mm	0 mm
6.	Co-trimoxazole (COT)	6 mm	10 mm
7.	*Saraca asoka*	20 mm	10 mm



AMP: Ampicilin, GEN: Gentamicin, NIT: Nitrofurantoin, CIP: Ciproflaxacin, NA: Nalidixic acid, COT: Co-trimoxazole, *Saraca asoka*

DISCUSSION

Herbal medicines are valuable and readily available resources for primary health care system. Undoubtedly the plant kingdom still hold many species of the plant containing substances of medicinal value that are yet to be discovered, though large number of plant are constantly being screened for this antimicrobial properties. This plant may prove to be rich source of compounds with possible antimicrobial properties. But more pharmacological investigation is necessary. Plant extracts were prepared from dried samples in this research work as has been reported earlier by Mahesh B, *et al.,* 2008.

Recently many scientists have showed their interest in the use of different plant parts as alternative agents to control the pathogenic and antibiotic resistant microorganisms (Aqil *et. al.,* 2005, Nostro *et. al*., 2006). The increasing drug resistance of many pathogens is a serious

problem in developing countries like India (Gopalakrishna Sarala *et. al*., 2010). Many reports are available on the antiviral, antibacterial, antifungal, anthelmintic, antimolluscal and anti inflammatory properties of plants and plants products (Mahesh and Satish, 2008).

The results obtained in the present study indicated that ethanolic extract of *Saraca asoca* leaves exhibited more inhibitory effect as compared to ampicillin, gentamycin, nitrofurantoin, nalidixic acid, co-trimoxazole and ciprofloxacin,. Because of the increase in the level of antibiotic resistance, some herbal medicinal plant extracts could be considered as new source of material for the treatment of patients suffering from the infection. It is also reported that plant extracts could eliminate chemotactic behavior of these agents with less possibility of causing side effects.

The plants extracts have no or minimum side effects so plant parts may be one of our choices because it contains hydrophobic liquid which can be easily extracted by the process of distillation. Plant products or oils contain volatile aroma and phytochemicals which show the antimicrobial activity. More over plants can be grown easily and proportion of their products is less sophisticated and expenditure of their product is bearable by common people than using antibiotics. Therefore more attempts may be made towards the development of effective natural, non-toxic drug for treatment of diseaese.

Saraca indica are rich in flavonoids, glycosides, saponins and steroids. These phytochemicals present in leaves of *Saraca indica* probably confer the antimicrobial activity on the ethanolic extracts of leaves.

CONCLUSION

The present study was undertaken to identify effective herbal medicines to control diseases caused by bacterial organisms. Results shown that the extract of *Saraca asoca* plants origin has remarkable antibacterial activity as compared to antibiotics therefore can be used by all human beings as these are easily available in our environment, less expensive as well as safe. It is also envisaged that further work should be done in this direction.

ACKNOWLEDGEMENT

Authors are thankful to the UGC for providing financial assessment and Principal, Govt. Kamla Raja Girls P.G. (Autonomous) College, Gwalior (M.P.) for providing laboratory facilities and giving us permission to undertake the above work.

REFERENCES

1. Aqil F, Khan M S, Owais M, Ahmad I. "Effects of certain bioactive plant extracts on clinical isolates of beta-lactamase producing methicillin resistant *Staphylococcus aureus*", J. Basic Microbiol, 2005; 45: 106-114.
2. Athiralakshmy T. R, Divyamol A. S. and Nisha P. "Phytochemical screening of *Saraca asoca* and antimicrobial activity against bacterial species", Asian Journal of Plant Science and Research, 2016; 6(2): 30-36.
3. Chandra M. "Antimicrobial Activity of Medicinal Plants against Human Pathogenic Bacteria". Int. J. Biotechnol. Bioengg. Res., 2013; 4(7): 653-658.
4. Gopalkrishnan S, George S, Benny P J, "Antimicrobial effect of *Punica grantum* on pyogenic bacteria", J. Pharma. Biomed. Sci., 2010; 3(6).
5. Khan Jahir Alam and Tiwari Saurabh., Asian J. Plant Sci. Res., 2011, 1(1): 22-30.
6. Mahesh B, and Satish S. "Antimicrobial activity of some important medicinal plant extract against plant and human pathogens", World J. of Agri. Sci., 2008; 4(5): 839-843.
7. Nostro A, Cellini L, Bartolomeo S. "Effects of combining extracts (from propolis or Zingiber officinale) with clarithromycin on Helicobacter pylori", *Phytotherapy Res.*, 2006; 20(3): 187-190.
8. Pandey A, Ali I, Butola K.S, Chatterji T. "Isolation and characterization of actinomycetes against pathogen", Inter. J. appl. Biol. Pharma. Technol, 2011; 2(4): 384-392.
9. "Saraca asoca (Roxb.) Willd – The Plant List" – The Plant List. 5 January 2015.
10. "Uropathogenic Escherichia coli: The Pre-Eminent Urinary Tract Infection Pathogen 2013, Nova Publishers. Retrieved 27 November.
11. Wendakoon C, Calderon P, Gagnon D. "Evaluation of Selected Medicinal Plants Extracted in Different Ethanol Concentrations for Antibacterial Activity against Human Pathogens". J. Medic. Active Plants, 2012; 1(2): 66-68.