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Evaluation of Phytochemical and Anti Bacterial Potential of Helicteres Isora l. Leaves Extract Against Enteric Bacterial Pathogens

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ABSTRACT

Phytochemical screening and anti bacterial activity of ethanolic extract of Helicteres isora (East Indian screw tree) leaves were studied.The active constituents were identified by GC-MS analysis.The ethanolic extract of Helicteres isora leaves showed significant antibacterial activities against Bacillus cereus; moderate activity against Staphylococcus aureus, Klebsiella oxytoca and least activity against Seratia marcescens. Phytochemical screening reveals the presence of Carbohydrates, Proteins, Reducing sugars, Amino acids, Steroids, Glycosides, Cardiac glycosides, Saponin glycosides, Alkaloids, Flavanoids, Tannins, Terpenoids, Phenolic compounds and Saponins. These anti bacterial properties supports its traditional use of leaves of H.isora in the treatment of skin diseases against enteric pathogens.

Keywords: Antibacterial activity, Helicteres isora, enteric pathogens, Bacillus cereus, Staphylococcus aureus

1. INTRODUCTION

Medicinal plants of Indian origin possess excess of therapeutic compounds useful for treating various diseases. Many plants contain an excellent combination of nutritive and medicinal properties which are easily available, cheaper with no side effects. Among several medicinal plants *Helicteres isora* is an important medicinal plant with various therapeutic properties.

BOTANICAL NAME	Helicteres isora.L
COMMON NAME	East Indian screw tree
FAMILY	Sterculiaceae
DISTRIBUTION	Tropical and sub tropical regions India

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LEAVES OF HELICTERES ISORA(Fig)

Different parts of plants are traditionally used in Indian System of Medicine(ISM) to cure various disease. Fruit pod extracts are found to be anti-dysentric, vermifuge(colic) and as astringent. The root decoction and the paste are reported to be traditionally used in ISM against diabetes, diarrhoea, stomach afflictions and asthma. The extract from the bark possess insulin uptake sensitizing properties, Hypolipidemic activity and has the potential for use in the treatment of type-2 diabetes. Leaf paste is claimed to be effective against various skin ailments such as eczema and scabies.

Besides the plant is reported to exhibit various bioactivities such as antioxidant,hypolipidemic,antimicrobial,antiviral,analgesic,hepatoprotective,anticancer,anti diarrhoeal and wormicidal activity, so far no information on antimicrobial activities of leaves of *H.isora* is available hence, attempt was made to find out phyto-chemical contents and anti bacterial potential of leaves of *H.isora* against enteric pathogens.

2. MATERIALS AND METHODS

The leaves of *Helicteres isora L*.were collected from kollimalai hills, Namakkal Dt, Tamil Nadu and authenticated by Rapinet Herbarium, St Joseph's college, Trichy.

The leaves were separated, washed well using clean water to remove adhering matter, dried under shade and finely powdered. The 20 g fine powder was suspended in an organic solvent Ethanol (250 ml) and extracted in soxhlet apparatus and vaccum dried. Amount of dried powder extract was recorded. This dry mass of ethanolic extract of H.isora L served for experimentations.

3. BACTERIAL CULTURES

The tested microbes (bacterial species) were maintained in Nutrient Agar Slants. The cultures were sub cultured and then the cultured strains were allowed to grow about two days and they were stored at 5^0C for the future studies.

4. AGAR DISC DIFFUSION ASSAY(MARUZELLA AND HENDRY,1958)

The Disc Diffusion method is used for the rapid determination of a drug or a particular substance on a specific bacterium. This method consists of impregnating small circular disc of standard filter paper with the given amount of a chosen concentration of substance. This discs are placed on plated of culture medium that has been seeded with the tested bacteria. After incubation the diameter of the clear zone inhibition surrounding the deposit of the substance is taken as a result.

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5. RESULTS AND DISCUSSIONS

Nowadays, traditional systems of medicine have become increasingly important in view of their safety. A current study suggests that, in many developing countries, a greater portion of population relies mostly on traditional practitioners and medicinal plants to meet their primary health care needs. The present study was conducted to investigate antibacterial properties of leaves of *H.isora*, which is less studied and used in Indian Folkloric Medicine. Herbal remedies play a vital role in traditional medicine in rural areas of India where the therapeutic treatment of choice as antiseptic, anti-inflammatory and in treatment of infectious diseases including diarrhoea. In present study attempt was made to correlate traditional herbal medicinal knowledge held by the Indian native people with modern scientific laboratory-based assay.

- Antibacterial activity of ethanolic extract of *Helicteres isora L.* leaves were studied.
- The ethanolic extract of *Helicteres isora* leaves showed prominent antibacterial activities against *Bacillus cereus*; moderate activity against *Staphylococcus aureus*, *Klebsiella oxytoca* and least activity against *Seratia marcescens.*
- Phytochemical screening reveals the presence of Carbohydrates, Proteins, Reducing sugars, Amino acids, Steroids, Glycosides, Cardiac glycosides, Saponin glycosides, Alkaloids, Flavanoids, Tannins, Terpenoids, Phenolic compounds and Saponins.

PHYTOCHEMICAL ANALYSIS OF H.ISORA LEAVES

PHYTOCONSTITUENTS	INFERENCE	PHYTOCONSTITUENTS	INFERENCE
Carbohydrates	+	Proteins	+
Reducing sugars	+	Amino acids	+
Cynogenic glycosides	_	Steroids	+
Non Reducing Sugars	_	Glycosides	+
Saponin Glycosides	+	Cardiac Glycosides	+
Alkaloids	+	Flavanoids	+
Tannins	+	Terpenoids	+
Phenolic compounds	+	Saponins	+

TABLE NO 1

The results given below are the anti-bacterial activity for the various concentrations 50,100,200 µg/ml of ethanolic extract of H.isora.It is observed that the ethanolic extract of the plant at 200 µg/ml of concentration has a high inhibition activity against the bacteria.On comparing the standard Tetramycin,the inhibitive property of the plant Helicteres isora.L has been analyzed in TABLE 3.

BACTERIAL SPECIES	ZONE OF INHIBITION (MM)		
	50µg/mL	100 µg/mL	200 µg/mL
E.Coli	Nil	Nil	Nil
S.aureus	8	8	8
K.oxtoca	12	Nil	9
B.cereus	Nil	9	9
S.marcescens	9	11	8

TABLE NO 2

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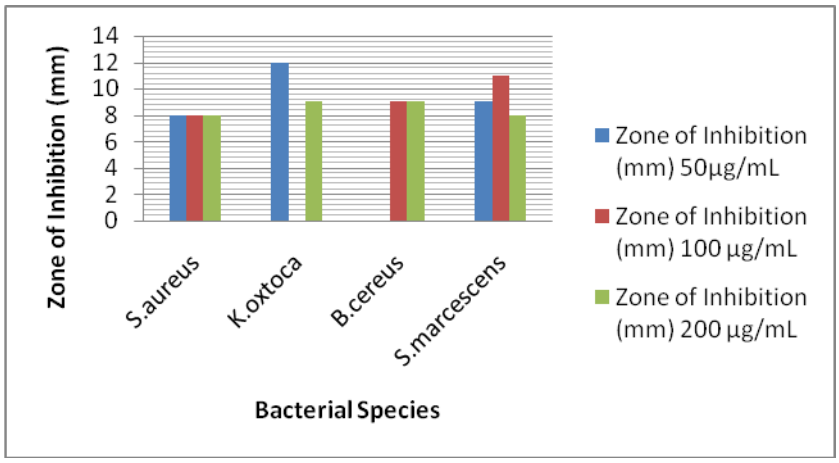


BACTERIAL SPECIES	TETRAMYCIN-STANDARD	ETHANOL -SOLVENT	ZONE LENGTH OF INHIBITION OF CON.200PG/ML (MM)	INHIBITION EFFICIENCY (%)
E.Coli	15	5	0	0
S.aureus	13	5	8	23
K.oxtoca	15	6	9	20
B.cereus	13	5	9	30
S.marcescens	14	6	8	14

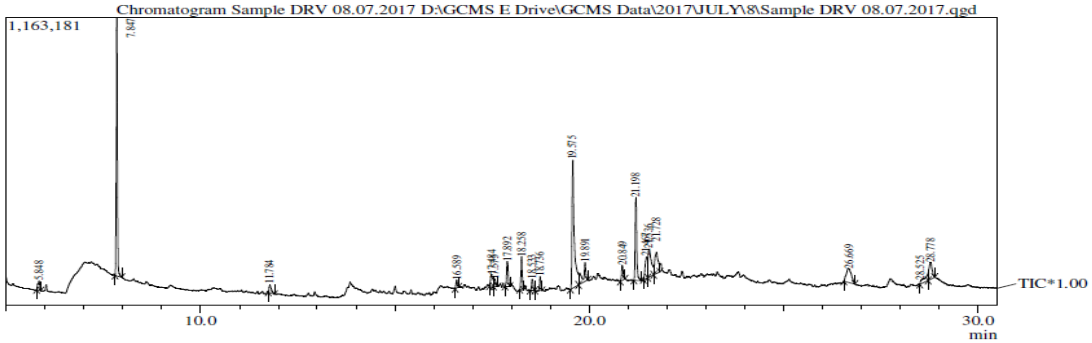
TABLE NO 3

In the present study the ethanolic extracts of leaves of *Helicteres isora.L* leaves showed antibacterial activity against the above tested bacterial pathogens.It authenticates the use of leaves of *H.isora* in the treatment of enteric infections.

GC- MS Analysis

The GC-MS analysis of the ethanolic extract of *Helicteres isora* leaves shows about 20 active phyto constituents present in it.The names and the parameters such as retention time(RT),peak area(%) and peak height (%) of the active constituents are given in the **Table(4).**

GC-MS chromatogram of ethanolic extract of Helicteres isora leaves



GC MS Analysis report of ethanolic extract of *Helicteres isora* leaves

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Peak Report TIC

Peak#	R.Time	I.Time	F.Time	Area%	Height%	A/H	Mark	Name
1	5.848	5.783	5.892	1.18	1.28	3.02		PENTANE, 1,1-DIETHOXY-
2	7.847	7.800	7.975	21.35	35.15	2.00		Propane, 1,1,3-triethoxy-
3	11.784	11.742	11.900	1.22	1.09	3.70		2-Methoxy-4-vinylphenol
4	16.589	16.550	16.642	0.92	1.11	2.73		2-Propenoic acid, octyl ester
5	17.484	17.433	17.533	1.89	1.62	3.82		2-(2-HYDROXY-2-P-CHLOROPHENYLET
6	17.575	17.533	17.650	1.07	0.92	3.79	V	2-Bromopropionic acid, 6-ethyl-3-octyl ester
7	17.892	17.833	17.958	2.89	3.41	2.79		2(4H)-BENZOFURANONE, 5,6,7,7A-TETR
8	18.258	18.208	18.308	3.12	4.53	2.27		3,7,11,15-Tetramethyl-2-hexadecen-1-ol
9	18.533	18.483	18.600	1.24	1.49	2.74		Z-8-Octadecen-1-ol acetate
10	18.736	18.600	18.783	1.12	1.90	1.94		Oxirane, tetradecyl-
11	19.575	19.517	19.725	21.03	17.41	3.97		n-Hexadecanoic acid
12	19.891	19.725	19.958	4.28	2.57	5.49	V	Octadecanoic acid, ethyl ester
13	20.849	20.800	20.917	1.74	2.05	2.79		PHOSPHONIC ACID, DIOCTADECYL EST
14	21.198	21.150	21.325	9.41	11.28	2.74		2-HEXADECEN-1-OL, 3,7,11,15-TETRAMI
15	21.467	21.392	21.500	3.71	2.88	4.24		9,12-OCTADECADIENOIC ACID (Z,Z)
16	21.536	21.500	21.658	6.81	3.78	5.93	V	9,12,15-Octadecatrienoic acid, (Z,Z,Z)-
17	21.728	21.658	21.817	5.56	2.92	6.26	V	9-OCTADECENOIC ACID (Z)-
18	26.669	26.550	26.833	5.30	1.92	9.05		Squalene
19	28.525	28.500	28.717	2.25	0.42	17.81		cis-5-Dodecenoic acid, dimethyl(3,3,3-trifluor
20	28.778	28.717	28.883	3.92	2.27	5.68	V	Di-n-octyl phthalate
				100.00	100.00			

TABLE NO 4

6. CONCLUSION

- The ethanolic extract of *Helicteres isora* leaves has been prepared and the phytochemical screening has been carried out and it was found that Carbohydrates, Proteins, Reducing sugars, Amino acids, Steroids, Glycosides, Cardiac glycosides, Saponin glycosides, Alkaloids, Flavanoids, Tannins, Terpenoids, Phenolic compounds and Saponins are present
- The ethanolic extract of *Helicteres isora* leaves showed prominent antibacterial activities against *Bacillus cereus*; moderate activity against *Staphylococcus aureus, Klebsiella oxytoca* and least activity against *Seratia marcescens*
- The GC-MS analysis of the ethanolic extract of *Helicteres isora* leaves shows about 20 active phyto constituents present in it.

7. IMPACT OF STUDY

It is clear that *H.isora* L plant's leaves used by people showed antibacterial activities. Although the nature and number of active antibacterial principles involved in leaves of *H. isora* are not clear in present research, but the broad spectrum activity of leaf paste especially on enteric pathogens, is promising. The present study suggests that leaves of *H.isora* L are antibacterial against enteric bacterial pathogens. The results of present study may form the basis for further investigation to isolate active compounds, elucidate the structure and evaluate them against wider rage of drug-resistant bacterial strains.

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