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RESEARCH ARTICLE
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PHYTOCHEMICAL SCREENING , ISOLATION AND SPECTROSCOPIC CHARACTERIZATION OF BIOACTIVE COMPOUNDS FROM DIFFERENT PARTS OF *HELICTERES ISORA*

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Abstracct
Helicteres isora is a well-known traditional medicinal plant widely used for treating various ailments such as gastrointestinal disorders, infections, and inflammation. However, systematic comparative studies on different plant parts using modern analytical techniques remain limited. **Aim:** The present study aimed to evaluate the phytochemical composition, extraction yield, and isolation as well as spectroscopic characterization of different parts (leaves, stem, root, and fruit) of *Helicteres isora*. **Materials and Methods:** Dried plant materials underwent Soxhlet extraction with petroleum ether and methanol. Qualitative phytochemical screening followed standard methods, while total phenolic content (TPC) and total flavonoid content (TFC) were quantified using the Folin–Ciocalteu and aluminium chloride methods, respectively. Thin-layer chromatography (TLC) provided preliminary profiling, and column chromatography facilitated fractionation. Isolated fractions were characterized using UV–Visible spectroscopy, FTIR, ^{1}H NMR, and mass spectrometry. **Results:** Methanolic extracts showed higher extraction yields compared to petroleum ether extracts across all plant parts. Phytochemical screening confirmed the presence of carbohydrates, alkaloids, flavonoids, terpenoids, glycosides, tannins, phenolics, and saponins. The TPC values were found to be 42.80, 105.62, 53.22, and 49.02 mg/g for leaves, stem, root, and fruit, respectively, while TFC values were 159.33, 248.03, 232.03, and 218.66 mg/g. TLC analysis revealed distinct Rf values corresponding to phenolics, triterpenoids, sterols, and flavonoids. Column chromatography successfully isolated bioactive fractions, which were further confirmed through spectroscopic techniques. Mass spectrometry indicated the presence of phenolic, triterpenoid, sterol, and flavonoid compounds in different plant parts**. Conclusion** The study demonstrates that *Helicteres isora* is a rich source of bioactive phytoconstituents, particularly phenolics and flavonoids, with significant variation across different plant parts. These findings support the potential use of this plant in pharmaceutical and therapeutic applications and provide a basis for further isolation and biological evaluation of its active constituents.

Keywords: *Helicteres isora,* Phytochemical, Column chromatography, Thin-layer chromatography and UV–Visible spectroscopy.

1. Introduction

According to WHO 11% of the basic and essential drugs are obtained from plant and number of synthetic drugs are also obtained from natural precursors. Besides, the origin of most of the drugs available now a days, are from medicinal plants. Research on medicinal plants is increasing day by day due to high cost and possible side effects associated with the use of modern drugs **(Levison et al., 2016).**

Helicteres isora L., an ayurvedic herb, is distributed widely in forest throughout India. Almost every part of the plant is used traditionally. Parts of plant are useful in ailments such as gastric problems diarrhoea, dysentery, wounds, ulcers, hemorrhages snake bite, worm infections, and diabetes **(Akshatha et al., 2015, Elsa et al., 2012).** *Helicteres isora* L. is a large genus of tropical trees and shrubs (family Sterculiaceae). *Helicteres isora* L. is medicinally important and is used in the treatment of several diseases **(HaydelbaD'Armas et al., 2018).** It is distributed in dry forests throughout Central and Western India, from Bihar to Jammu and Western Peninsula. It is sub-deciduous small tree or large shrub with long, greenish-brown, beaked and cylindrical fruits. It is commonly known as East India Screw tree **(Akshatha et al., 2015).**

Despite the extensive use of *Helicteres isora* in traditional medicine, there is a need for systematic evaluation of its different plant parts using appropriate extraction methods and analytical techniques **(Satake et al., 1999).** Extraction using solvents of varying polarity, such as petroleum ether and methanol, enables the isolation of different classes of phytoconstituents. Furthermore, chromatographic techniques like thin-layer chromatography (TLC) and column chromatography are essential tools for the separation, identification, and characterization of these compounds **(Mahire & Patel, 2020).**

However, there is limited comparative data available on the phytochemical profiling, quantitative estimation (TPC and TFC), and chromatographic characterization of different parts (leaves, stem, root, and fruit) of *Helicteres isora* Therefore, a comprehensive study focusing on extraction yield, phytochemical screening, quantitative estimation of phenolic and flavonoid content, and chromatographic profiling of different plant parts is essential to better understand the phytochemical diversity of this plant.

2. Materials and Methods

2.1Plant collection and Soxhlet extraction:

Dried powered of *Helicteres isora* (Leaves, Stem, Root and Fruit) were successively defatted with petroleum ether and then placed in a thimble of Soxhlet apparatus. The extraction was carried out using methanol solvent system at 40-60ºC temperature of the heating mantle for 8-12 hours. After the extraction process, the extract of sample was filtered and concentrated to dryness. Obtained extracts were evaporated using rotary vacuum evaporator at 40°C. Extracts were collected in air tight container **(Evans, 2009 and Alara *et al.,* 2019).** Extraction yield of all extracts were calculated using the following equation below:

$$\text{Formula of Percentage yield} = \frac{\text{Actual yield}}{\text{Theoretical yield}} \times 100$$

2.2 Qualitative Phytochemical Estimation of Extracts

Detailed phytochemical testing was performed to identify presence or absence of different phytoconstituents in extracts of *Helicteres isora* (Leaves, Stem, Root and Fruit)by using standard procedures **(Kokate *et al*., 2006).** The extracts were subjected to tests for carbohydrates, alkaloids, flavonoids, glycosides, protein and amino acids, triterpenoids and steroids, tannin and phenolic compounds.

2.3 Quantitative Phytochemical estimation-

2.3.1 Spectrophotometric Quantification of Total Phenolic Content: -

The total phenolic content of plant extract was determined using the Folin-Ciocalteu Assay. The estimation of the phenolic compounds was carried out in triplicate. The TPC was expressed as milligrams of gallic acid equivalents (GAE) per g of dried sample. **(Saeed *et al.,* 2012).**

2.3.2 Spectrophotometric Quantification of Total Flavonoid Content: -

The flavonoid content was determined using Aluminium chloride method **(Chang *et al.,* 2002)**. The total flavonoid was expressed as milligrams of rutin equivalents per g of dried sample. **(Senguttuvan *et al.,* 2014).**

2.4 Thin layer chromatography

Thin-layer chromatography (TLC), a solid–liquid adsorption chromatographic technique, was performed using pre-coated silica gel 60 F_{254} TLC plates with a layer thickness of 0.2 mm. Different solvent systems were employed as the mobile phase. Samples were applied manually as small spots near the lower edge of the plate using capillary tubes. The plates were allowed to air-dry before development. The prepared TLC plates were placed in a TLC chamber previously saturated with the respective solvent system and developed at room temperature. The mobile phase migrated upward through the stationary phase by capillary action, carrying the analytes along the plate at different rates. Separation of the components was achieved based on differences in their polarity and interactions with the stationary phase and mobile phase. The rate of upward migration depended on the polarity of the analytes, the nature of the stationary phase, and the composition of the solvent system **(Ozlem *et al.,* 2016).**

$$\mathbf{R_f\ Value} = \frac{\text{Distance traveled by solute}}{\text{Distance traveled by solvent}}$$

Preliminary thin-layer chromatography (TLC) was carried out to optimize the solvent systems for *Helicteres isora* leaf, stem, root, and fruit extracts. Various solvent combinations were tested, and the solvent systems showing the maximum number of well-resolved spots were selected. Based on these preliminary TLC results, the respective solvent systems Toluene: Ethyl acetate: Acetic acid (3:2:0.2) for leaves, Toluene: Ethyl acetate: Acetic acid (3.5:1.5:0.1) for stem, Hexane: Acetone (4:1) for root, and Toluene: Ethyl acetate: Acetic acid (2.5:2:0.25) for fruit were selected as mobile phases for subsequent column chromatography.

2.5 Column chromatography

Isolation of phytoconstituents from *Helicteres isora* was carried out using silica gel column chromatography. Phenolic compounds were isolated from leaf extract, triterpenoids from stem extract, sterols from root extract, and flavonoids from fruit extract. A vertical borosilicate glass column (250 × 30 mm) was used for chromatographic separation. The column was thoroughly rinsed with acetone and completely dried prior to packing. Wet packing technique was employed using silica gel (60–120 mesh size) as the stationary phase. Uniform slurry of silica gel was prepared in toluene and carefully poured into the column to avoid air bubbles. Approximately 3 g each of leaf, stem, root, and fruit extracts of *Helicteres isora* were separately loaded onto the top of the packed column. Gradient elution technique was employed for separation of compounds. The column was eluted with different solvent systems depending on the plant part:

- Leaf extract: Toluene : Ethyl acetate : Acetic acid (3:2:0.2)
- Stem extract: Toluene : Ethyl acetate : Acetic acid (3.5:1.5:0.1)
- Root extract: Hexane : Acetone (4:1)
- Fruit extract: Toluene : Ethyl acetate : Acetic acid (2.5:2:0.25)

Eluted fractions were collected separately and concentrated. The concentrated fractions were analyzed by thin-layer chromatography (TLC) to identify fractions containing the desired compounds. Fractions showing similar TLC profiles were pooled and used for further analysis **(Srivastava *et al.,* 2021).**

2.5 Spectroscopic characterization: -

2.5.1 UV-visible Spectroscopy

The isolated fraction (H) of leaf extract, isolated fraction (D) of stem extract, isolated fraction (F) of root extract and isolated fraction (E) of fruit extract of *Helicteres isora* , was scanned from 200 to 800 nm wavelength using UV-Visible Spectrophotometer (Shimadzu UV-1700) and the characteristic peaks were detected and recorded **(Patel *et al.,* 2022)**.

2.5.2 FT-IR

To establish the presence of the functional groups in the isolated fraction (H) of leaf extract, isolated fraction (D) of stem extract, isolated fraction (F) of root extract and isolated fraction (E) of fruit extract of *Helicteres isora* , FT-IR spectroscopy was performed using Perkin Spectrum BX spectrophotometer **(Luciene *et al.,* 2008).**

2.5.3 NMR Spectroscopy

NMR spectroscopy was performed for the isolated fraction (H) of leaf extract, isolated fraction (D) of stem extract, isolated fraction (F) of root extract and isolated fraction (E) of fruit extract of *Helicteres isora* , to identify the structure of the compound present in the isolated fraction. JEOL RESONANCE NMR spectroscopy for this purpose was Nuclear Magnetic Resonance spectroscopy **(Zia *et al.,* 2019).**

2.5.4 Mass Spectroscopy

The mass spectrometer used for the identification of the molecular weight of isolated fraction (H) of leaf extract, isolated fraction (D) of stem extract, isolated fraction (F) of root extract and isolated fraction (E) of fruit extract of *Helicteres isora* , was recorded on mass spectrometer instrumentmicrOTOF-Q 228888.10348 **(Wiley *et al.,* 1995).**

3. Results

3.1 Plant Collection

Table 1: Plant collection

S. No.	Plant name	Plant part used	Weight
1.	*Helicteres isora*	Leaves	200.00 gm
2.		Stem	300.00 gm
3.		Root	250.00 gm
4.		Fruit	350.00 gm

3.2 Percentage yield

Table 2: Percentage yield of extracts

S. No.	Plant name and Part	Solvent	Color of extract	Theoretical weight (gm)	Yield (gm)	% Yield
1.	*Helicteres isora* (Leaves)	Petroleum Ether	Dark yellow to brown	200.00 gm	1.757	0.87
2.	*Helicteres isora* (Leaves)	Methanol	Dark Greenish	198.20 gm	21.081	10.63
3.	*Helicteres isora* Stem)	Petroleum Ether	Dark yellow to brown	300.00 gm	0.897	0.29
4.	*Helicteres isora* (Stem)	Methanol	Brown	299.10 gm	18.146	6.06
5.	*Helicteres isora* (Root)	Petroleum Ether	Dark yellow to brown	250.00 gm	0.629	0.25

6.	*Helicteres isora* (Root)	Methanol	Brown	249.30 gm	14.836	5.95
7.	*Helicteres isora* (Fruit)	Petroleum Ether	Dark yellow to brown	350.00 gm	2.292	0.65
8.	*Helicteres isora* (Fruit)	Methanol	Brown	347.70 gm	6.680	1.92

3.3 Qualitative Phytochemical Analysis of different extracts

Table 3: Phytochemical analysis of *Helicteresisora (Leaves)* Extracts

S. No.	Experiment	Result							
		Petroleum ether				Methanol			
		Leaves	Stem	Fruit	Roots	Leaves	Stem	Fruit	Roots
Test for Carbohydrates									
1.	Molisch's Test	+	+	-	+	+	+	+	+
2.	Fehling's Test	-	-	+	+	+	+	+	+
3.	Benedict's Test	+	-	+	-	+	+	+	+
4.	Barfoed's test	-	+	+	-	+	+	+	-
Test for Alkaloids									
1.	Mayer's Test	+	-	+	+	+	+	+	+
2.	Hager's Test	+	+	+	+	+	+	+	+
3.	Wagner's Test	+	+	+	+	+	+	+	+
Test for Terpenoids									
1.	Salkowski Test	+	+	+	+	+	+	+	+
2.	Libermann-Burchard's Test	-	-	-	-	+	-	+	+
Test for Flavonoids									
1.	Lead Acetate Test	+	+	+	+	+	+	+	+
2.	Alkaline Reagent Test	-	-	+	+	+	+	+	+
Test for Tannins and Phenolic Compounds									
1.	Ferric chlorideTest	-	-	-	-	+	+	+	+
2.	Lead Acetate Test	+	+	+	+	+	+	+	+
3.	Gelatine Test	+	-	+	+	+	+	+	+
Test for Saponins									
1.	Froth Test	+	+	+	+	+	+	+	+
Test for Protein and Amino acids									
1.	Ninhydrin Test	-	+	-	-	+	+	+	+
2.	Biuret's Test	+	-	+	+	+	+	+	+
Test for Glycosides									
1.	Legal's Test	-	-	-	-	-	+	+	+
2.	Keller Killani Test	-	-	+	+	+	-	+	+
3.	Borntrager's Test	+	+	-	-	+	+	-	+

3.4 Solubility determination of methanolic extractsofMethanol extracts of Leaves, Stem, Root and Fruit of *Helicteresisora*-

Table 4: Solubility Determination of methanolic extract of Leaves of *Helicteresisora*

S. No.	**Solvent**	Root	**Leaves**	Stem	Fruit
1.	Water	Slightly soluble	Slightly soluble	Sparingly Soluble	Insoluble
2.	Ethanol	Slightly soluble	Sparingly soluble	Soluble	Sparingly soluble
3.	Ethyl Acetate	Soluble	Soluble	Sparingly soluble	Soluble
4.	DMSO	Insoluble	Soluble	Soluble	Freely Soluble
5.	Petroleum Ether	Freely soluble	Slightly soluble	Insoluble	Soluble
6	Methanol	Slightly soluble	Soluble	Soluble	Soluble
7	Chloroform	Soluble	Freely soluble	Sparingly soluble	Slightly soluble
8	Acetone	Sparingly soluble	Soluble	Slightly soluble	Partially soluble

3.5 Quantitative Phytochemical analysis of Methanol extracts of Leaves, Stem, Root and Fruit of *Helicteres isora* –

3.5.1 Total Phenolic Content (TPC) Estimation

Table 5 Standard table for Gallic acid

Concentration (µg/ml)	**Absorbance (nm)**
20	0.111
40	0.236
60	0.353
80	0.445
100	0.577

Figue 1: Represent standard curve of Gallic acid

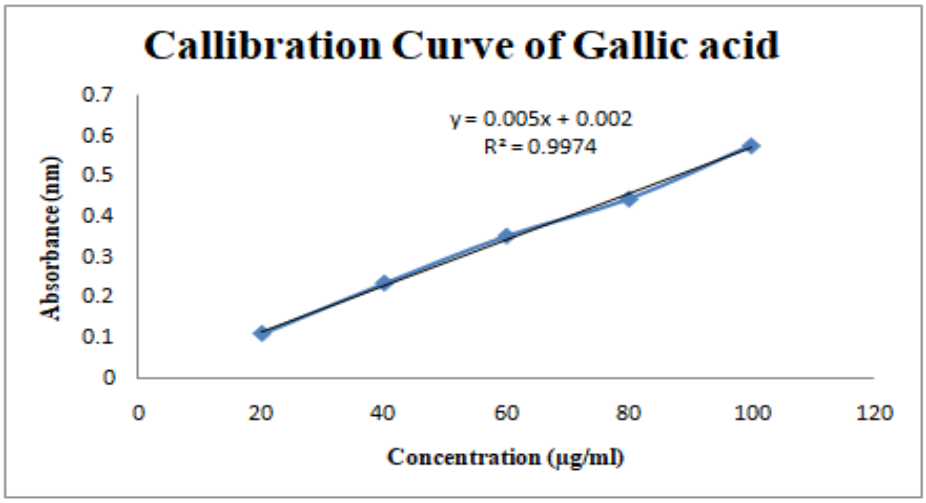


Table 6 Total Phenolic Content in Methanolic *Helicteres isora* extracts-

Total Phenolic content (mg/gm equivalent to Gallic acid)				
Extracts	***Leaves***	***Stem***	***Root***	***Fruit***
Absorbance Mean±SD	0.2160±0.003	0.5301 ±0.003	0.2681±0.002	0.2471±0.004
TPC	42.80	105.62	53.22	49.02

3.5.2. Total Flavonoid Content (TFC) Estimation:

Table 7 Standard table for Rutin

Concentration (µg/ml)	**Absorbance (nm)**
20	0.087
40	0.158
60	0.227
80	0.307
100	0.395

Figure 2 Graph represent standard curve of Rutin

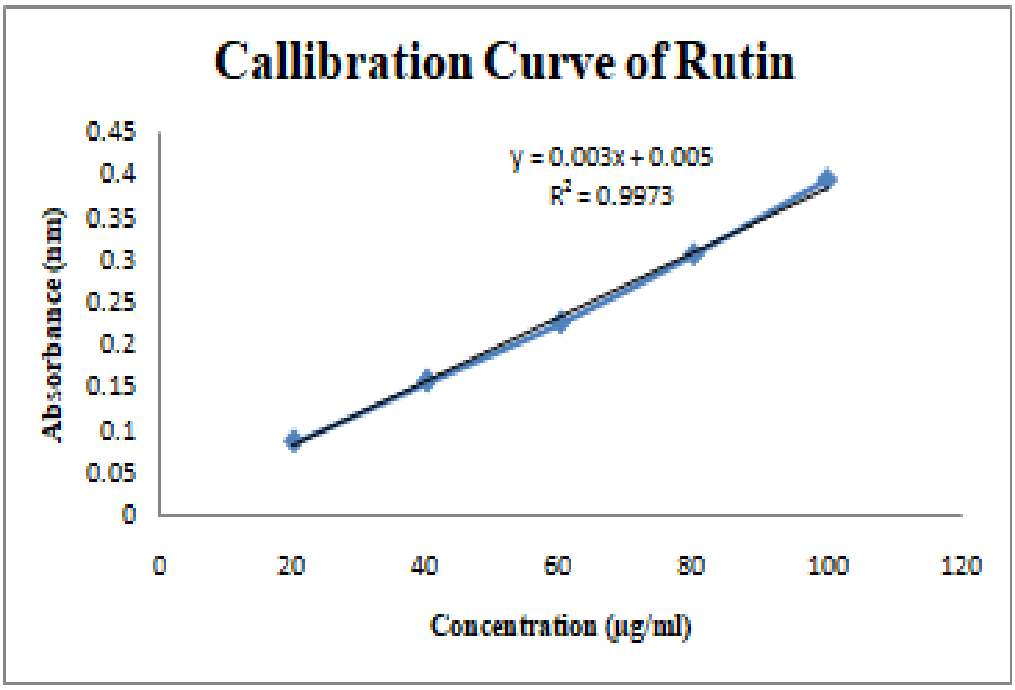


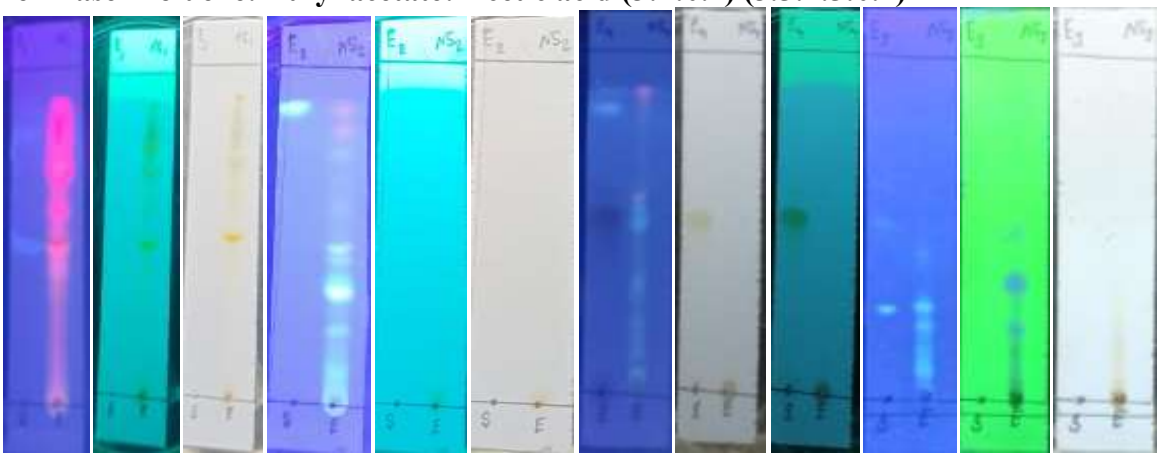
Table 8 Total Flavonoid Content in Methanolic *Helicteres isora* extracts -

Total Flavonoid content (mg/gm equivalent to Rutin)				
Extracts	***Leaves***	***Stem***	***Root***	***Fruit***
Absorbance Mean±SD	0.4830±0.002	0.7491±0.004	0.7011±0.002	0.6610±0.003
TPC	159.33	248.03	232.03	218.66

3.6 Preliminary TLC preparation for the estimation of active constitutes

1. Phenolic compound for *Helicteres isora* Leaf, stem, Root, Fruit extract

Mobile Phase- Toluene: Ethyl acetate: Acetic acid (3:2:0.2) (3.5:1.5:0.1)



a) Short-UV Long UV Visible (365 nm) (254 nm) Light

b) Short-UV LUV Visible (365 nm) (254 nm) Light

c) Short-UV Long-UV Visible (254 nm) (365 nm) Light

d) Short-UV Long-UV Visible (365 nm) (254 nm) Light

Figure 3: TLC estimation of different *Helicteres isora*

The presence of phenolics was shown by the leaf extract's conspicuous spots that developed in the toluene:ethyl acetate:acetic acid (3:2:0.2) solvent solution, with an Rf value of 0.48 that nearly

matched that of the reference phenolic compound. Similar to the typical triterpenoid, the stem extract made with toluene:ethyl acetate:acetic acid (3.5:1.5:0.1) has an Rf value of 0.92. The Rf values of 0.54 and 0.82 for the root extract, which was prepared in hexane:acetone (4:1), were in line with those of typical sterols. The fruit extract's development in toluene:ethyl acetate:acetic acid (2.5:2:0.25) showed an Rf value of 0.30, which matched the standard flavonoid. All of these findings support the existence of various phytoconstituent classes in various plant sections.

3.7 Column Chromatography

The ten fractions (A–J) eluted with solvent system toluene:ethyl acetate:acetic acid (3:2:0.2). Thin-layer chromatography (TLC) profiling of these fractions revealed multiple spots with varying Rf values. Among these, fraction H exhibited a single prominent spot with an Rf value (0.36) comparable to that of the standard phenolic compound, suggesting the presence of phenolic constituents.

Similarly, the stem extract using toluene:ethyl acetate:acetic acid (3.5:1.5:0.1), producing nine fractions (A–I). TLC analysis demonstrated that fraction D showed a distinct spot with an Rf value of 0.72, closely matching that of the standard triterpenoid. This indicates the enrichment of triterpenoid compounds in this fraction.

The root extract, separated using hexane:acetone (4:1), yielded ten fractions (A–J) with color variations ranging from white to orange. TLC analysis indicated that fraction F exhibited a prominent spot with an Rf value of 0.68, corresponding to the standard sterol compound, confirming the presence of sterols.

In the case of the fruit extract, column chromatography using toluene:ethyl acetate:acetic acid (2.5:2:0.25) resulted in six fractions (A–F). TLC profiling revealed that fraction E showed a distinct spot with an Rf value of 0.88, consistent with the standard flavonoid, indicating the presence of flavonoid constituents.

3.8 Spectroscopic characterization: -

3.8.1 Active constitutes estimation by UV-Spectroscopy-

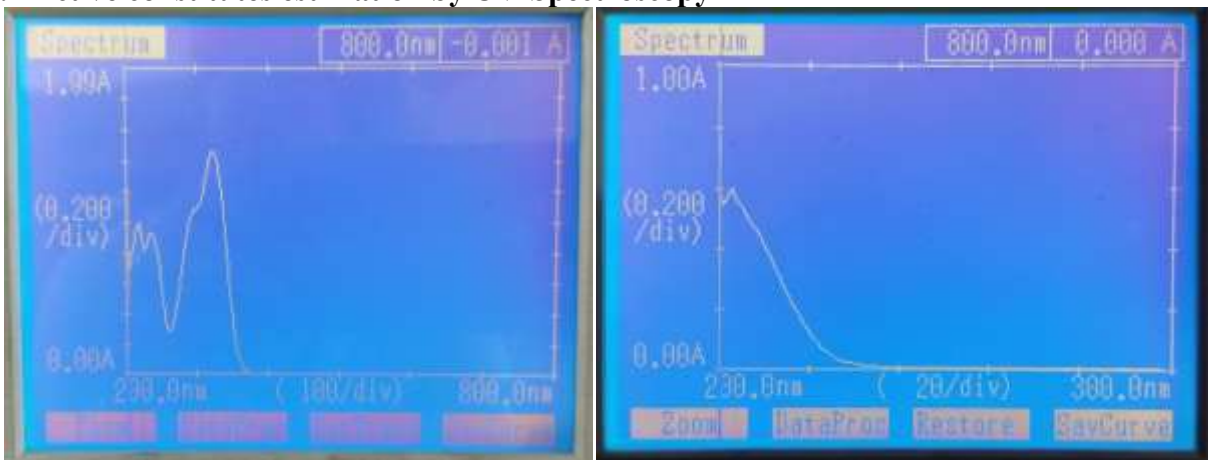


Figure 4 Active constitutes estimation by UV- Spectra of isolated fraction (H) of *Helicteres isora* leaf extract and isolated fraction (D) of *Helicteres isora* stem extract after column chromatography

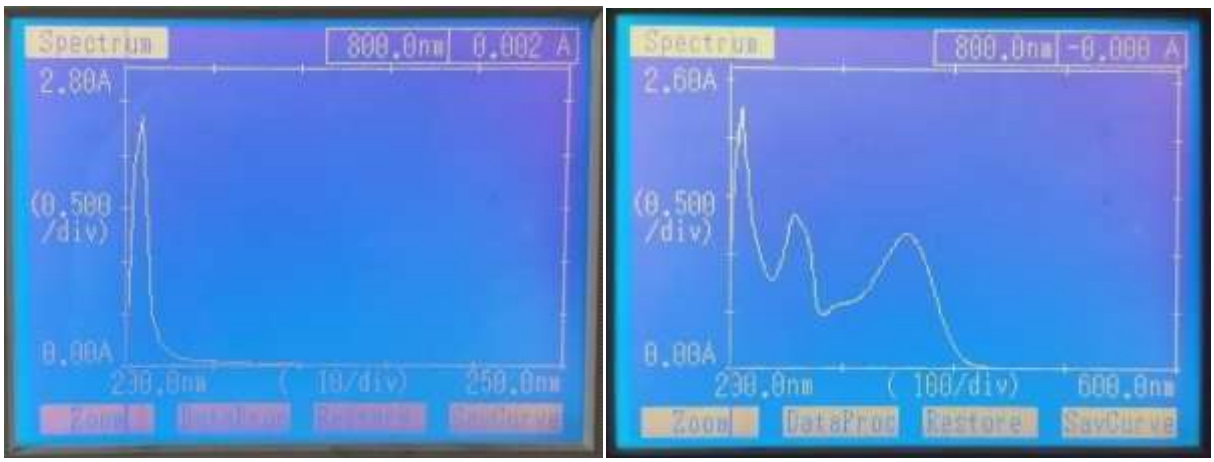


Figure 5 Active constitutes estimation by UV- Spectra of isolated fraction (F) of *Helicteres isora* root extract and isolated fraction (E) of *Helicteres isora* fruit extract after column chromatography

3.8.2 Active constitutes estimation By FTIR – Spectroscopy

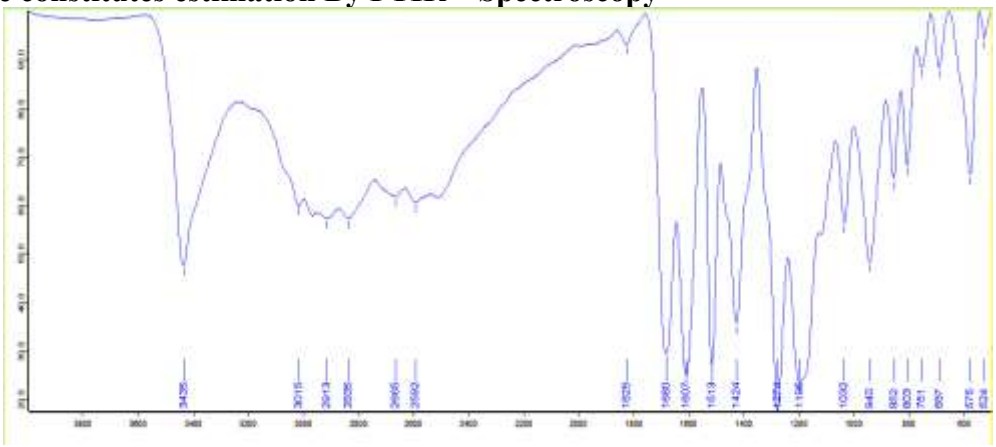


Figure 6 FTIR spectra of the isolated fraction (H) of *Helicteres isora* leaf extract

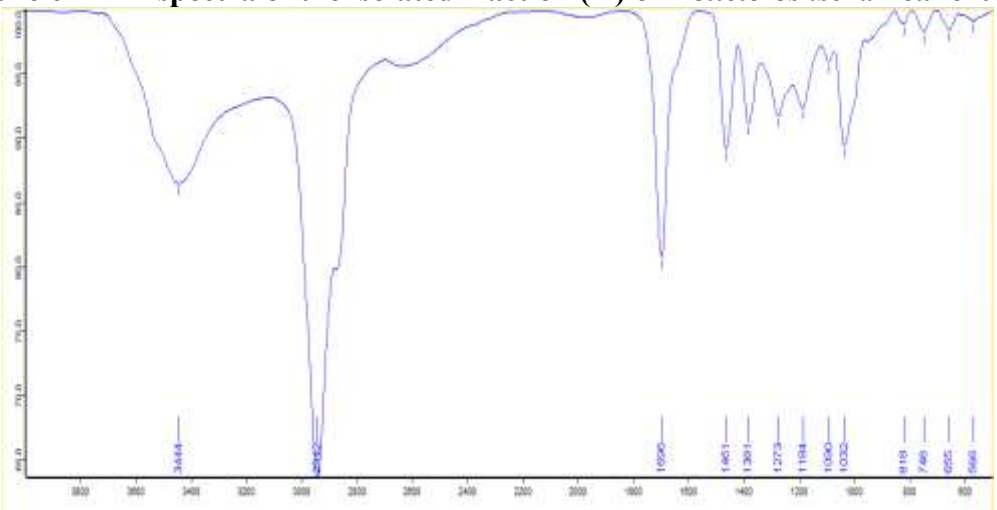


Figure 7 FTIR spectra of the isolated fraction (D) of *Helicteres isora* stem extract

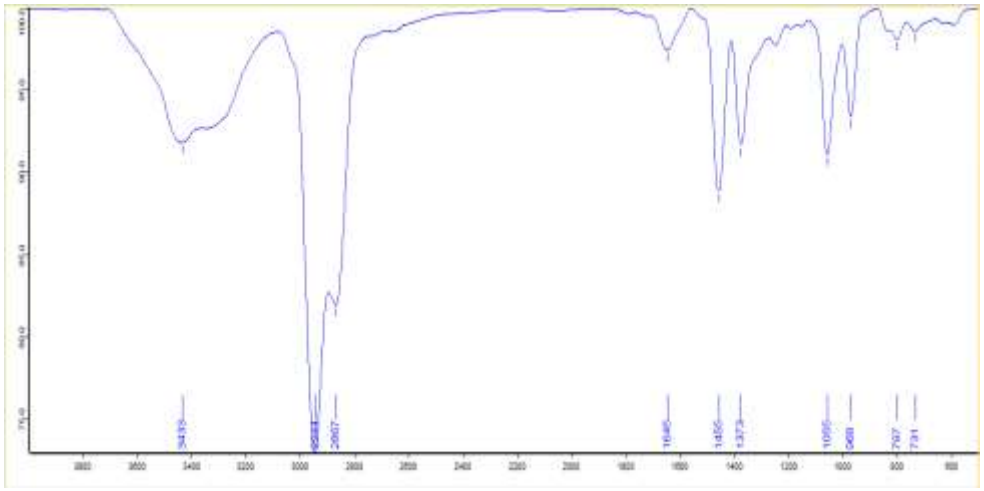


Figure 8 FTIR spectra of the isolated fraction (F) of *Helicteres isora* root extract

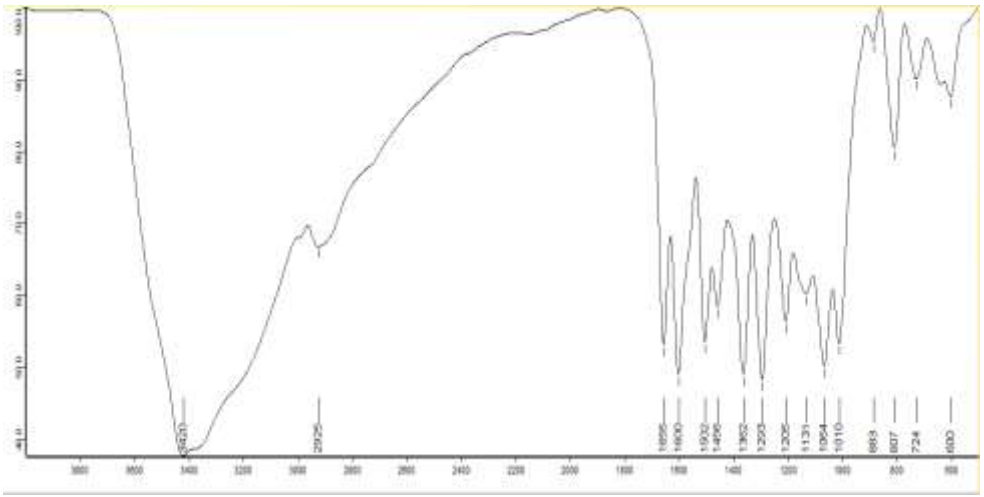


Figure 9: FTIR spectra of the isolated fraction (E) of *Helicteres isora* fruit extract

3.8.3 ^{1}H NMR - Spectroscopy

H NMR spectra of the isolated fraction (H) of *Helicteres isora* leaf extract



Figure 10: ^{1}H-NMR spectra of the isolated Fraction (H) of *Helicteres isora* leaf extract and isolated Fraction (D) of *Helicteres isora* stem extract

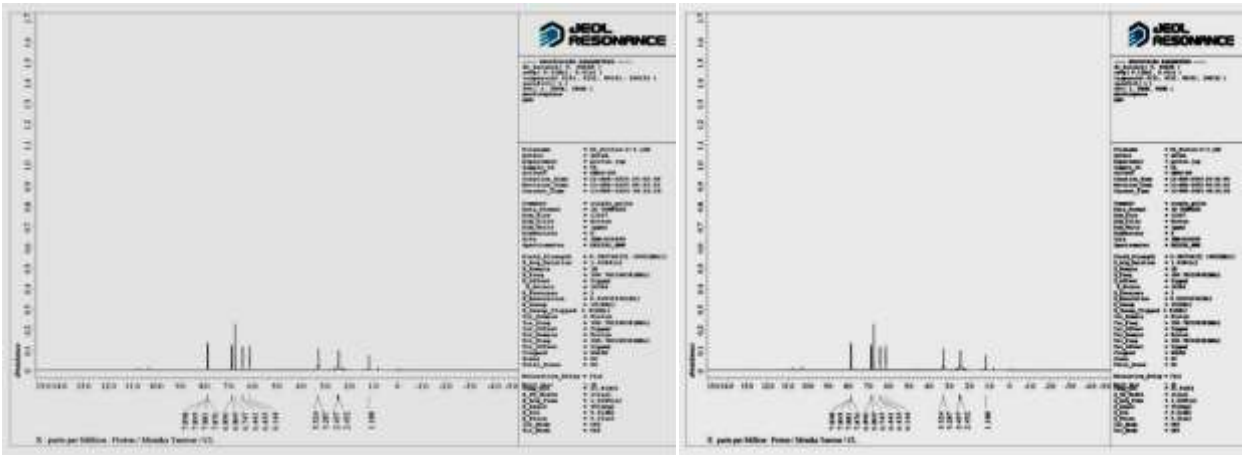


Figure 11: ^{1}H-NMR spectra of the isolated Fraction (F) of *Helicteres isora* root extract and the isolated Fraction (E) of *Helicteres isora* fruit extract

3.8.4 Mass – Spectroscopy

(A) Mass spectra of the isolated fraction (H) of *Helicteres isora* leaf extract

The mass spectrum of the isolated fraction (H) from *Helicteres isora* leaf extract showed a molecular ion peak [M^+] at m/z 194.1000, corresponding to the compound (*E*)-3-(4-hydroxy-3-methoxyphenyl)prop-2-enoic acid

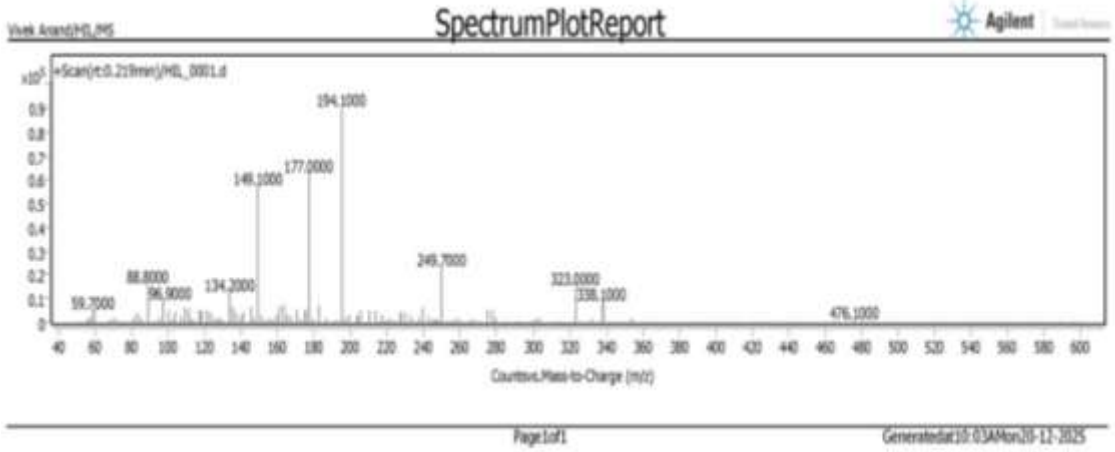


Figure 12: **Mass spectra of the isolated fraction (H) of *Helicteres isora* leaf extract**

(B) **Mass spectra of the isolated fraction (D) of *Helicteres isora* stem extract**

The mass spectrum of the isolated fraction (D) from *Helicteres isora* stem extract showed a molecular ion peak [M^+] at m/z 456.7000, corresponding to the compound (1*S*,2*R*,4*aS*,6*aR*,6*aS*,6*bR*,8*aR*,10*S*,12*aR*,14*bS*)-10-hydroxy-1,2,6*a*,6*b*,9,9,12*a*-heptamethyl-2,3,4,5,6,6*a*,7,8,8*a*,10,11,12,13,14*b*-tetradecahydro-1*H*-picene-4*a*-carboxylic acid

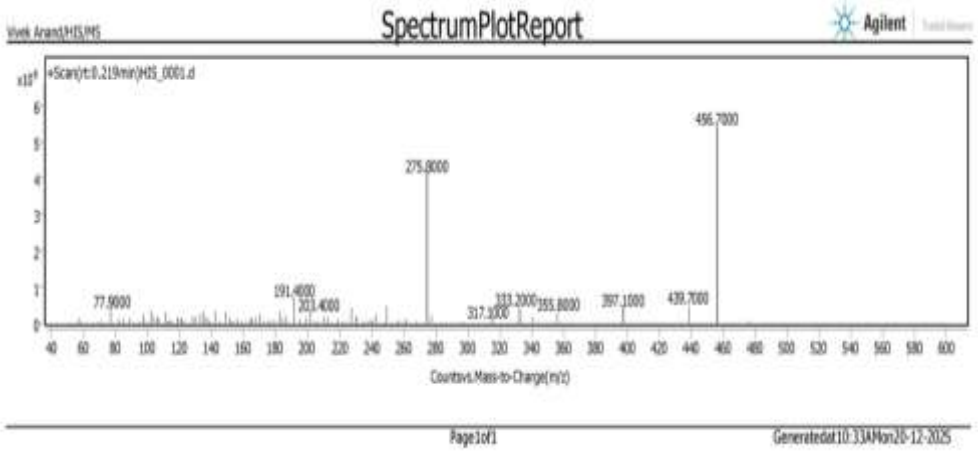


Figure 13: **Mass spectra of the isolated fraction (D) of *Helicteres isora* stem extract (C) Mass spectra of the isolated fraction (F) of *Helicteres isora* root extract**

Mass spectra of isolated fraction (F) of *Helicteres isora* root extract showed molecular ion [M^+] peaks at mlz 412.7000 corresponding to the compound (3*S*,8*S*,9*S*,10*R*,13*R*,14*S*,17*R*)-17-[(*E*,2*R*,5*S*)-5-ethyl-6-methylhept-3-en-2-yl]-10,13-dimethyl-2,3,4,7,8,9,11,12,14,15,16,17-dodecahydro-1*H*-cyclopenta[a]phenanthren-3-ol.

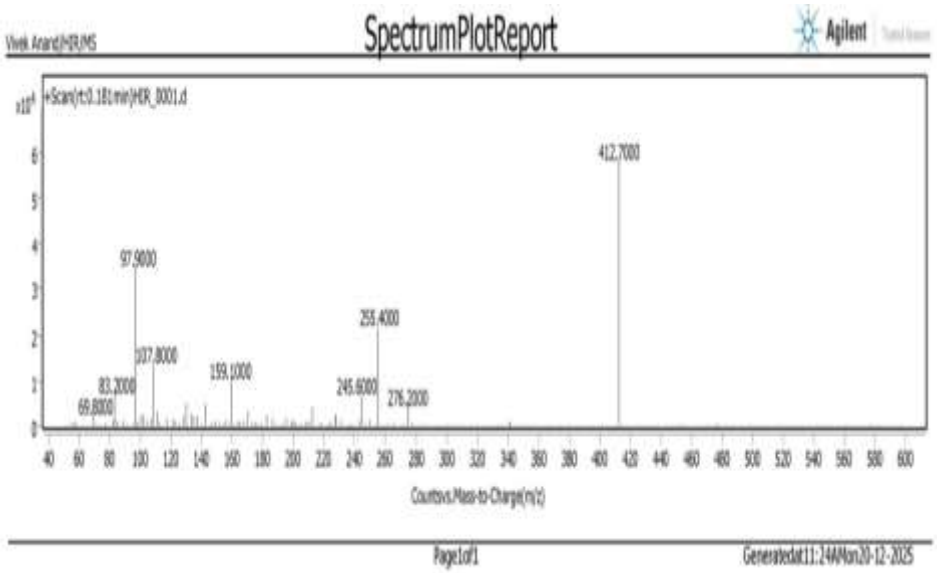


Figure 14: **Mass spectra of the isolated fraction (F) of *Helicteres isora* root extract *(D) Mass spectra of the isolated fraction (E) of Helicteres isora fruit extract* -**

Mass spectra of isolated fraction (E) from *Helicteres isora* fruit extract showed molecular ion [M^+] peaks at mlz 610.5000 corresponding to the compound 2-(3,4-dihydroxyphenyl)-5,7-dihydroxy-3-[(2*S*,3*R*,4*S*,5*S*,6*R*)-3,4,5-trihydroxy-6-[[(2*R*,3*R*,4*R*,5*R*,6*S*)-3,4,5-trihydroxy-6-methyloxan-2-yl]oxymethyl]oxan-2-yl]oxychromen-4-one.

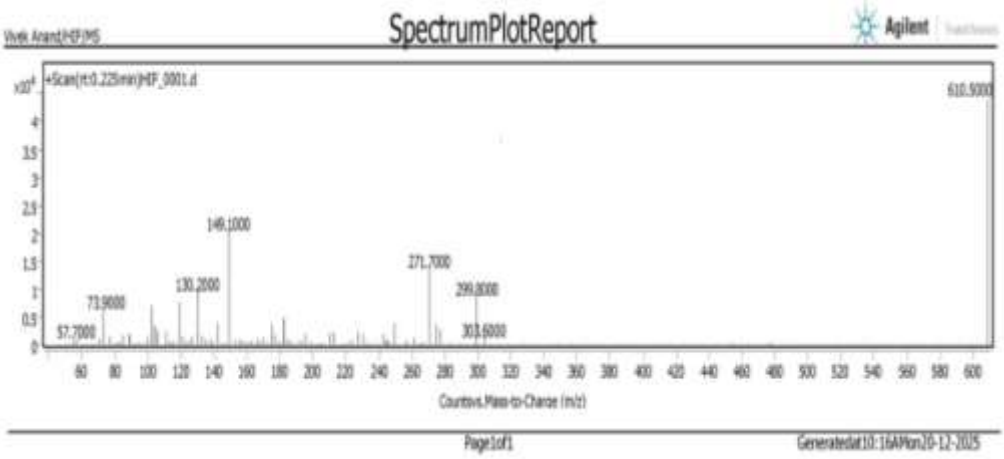


Figure 15: **Mass spectra of the isolated fraction (E) of *Helicteres isora* fruit extract**

4. Discussion

The present study revealed that the total weight of *Helicteres isora* (Leaves, Stem, Root and Fruit)Plants used were 200, 300, 250 and 350 gm. After performing extraction of *Helicteresisora*(Leaves, Stem, Root and Fruit),the percentage yield of leave extracts in petroleum ether solvent were found to be 0.87 % (1.757 gm), 0.29 % (0.897 gm), 0.25 % (0.629gm) and 0.65 % (2.292 gm) respectively. The percentage yield of leave extracts of *Helicteresisora*(Leaves, Stem, Root and Fruit) in methanolic extracts was found to be 10.63 % (21.081gm), 6.06 % (18.146gm), 5.95 % (14.836gm) and 1.92 % (6.680gm) respectively.

The methanolic extracts of *Helicteresisora (Leaves, Stem, Root and Fruit)*contains Phytochemical constituents like carbohydrates, alkaloids, flavonoids, terpenoids, steroid, glycosides, protein & amino acid, tannins, phenolic, saponin and compounds by phytochemical investigation with respect to chemical tests.

The determination of the total phenolic content of methanolic extracts of *Helicteresisora*(Leaves, Stem, Root and Fruit)were expressed as mg gallic acid equivalents and per mg/gram dry weight of sample. TPC of methanolic extracts of *Helicteresisora*(Leaves, Stem, Root and Fruit)showed the content values of 42.80, 105.62, 53.22 & 49.02 mg/gm respectively.

The total flavonoids content of the methanolic extracts of *Helicteresisora*(Leaves, Stem, Root and Fruit)were expressed as percentage of Rutin equivalent per mg/gm dry weight of sample. The total flavonoids content of methanolic extracts of *Helicteresisora*(Leaves, Stem, Root and Fruit)showed the content values of 159.33, 248.03, 232.03 & 218.66 mg/gm respectively.

5. Conclusion

The present study on Helicteres isora demonstrated that different plant parts, namely leaves, stem, root, and fruit, are rich sources of diverse phytoconstituents with potential biological significance. The extraction results indicated that methanolic extracts yielded a significantly higher percentage of extractive values compared to petroleum ether extracts, suggesting the abundance of polar compounds in the plant material. Preliminary phytochemical screening of methanolic extracts from Helicteres isora identified key bioactive constituents, including phenolics, flavonoids, alkaloids, terpenoids, glycosides, tannins, and saponins. Significant amounts of total phenolic content (TPC) and total flavonoid content (TFC) suggest robust antioxidant properties. Thin-layer chromatography (TLC) confirmed the presence of various phytochemical classes, and column chromatography enabled effective fractionation, highlighting the suitability of solvent systems for compound separation. The study underscores Helicteres isora as a promising source of bioactive compounds, especially phenolics and flavonoids, warranting further research on their pharmacological applications.

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