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Research Article

Pharmacological Evaluation of Anti-Arthritic Activity of Helictress Isora Plant Leaves

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Abstract:

In this study, pharmacognostic and phytochemical investigations on the various fractions of Helicteres isora leaves was carried out with the standard procedures. The phytochemical analysis shows the presence of flavonoids, tannins, saponin, alkaloids, amino acids, proteins, carbohydrates, steroids, terpenoids, and fats in the Helicteres isora leaves that support the traditional use of the plant in the management of various ailments. Information regarding chemical constituents and physicochemical characteristics of Helicteres isora leaves would be useful for standardization and formulation of herbal drugs for the treatment of various diseases. Results obtained in the present study, it may be concluded that Helicteres isora leaves possesses significant anti-arthritic activity. Further, research may be planned as an extension of this work which could prove Helicteres isora leaves as a potent anti-arthritic agent.

Keyword: Helicteres isora leaves, phytochemical investigations, Anti-arthritic activity

INTRODUCTION

Arthritis

Arthritis is a term often used to mean any disorder that affects joints. Symptoms generally include joint pain and stiffness. Other symptoms may include redness, warmth, swelling, and decreased range of motion of the affected joints. In some types other organs are also affected. Onset can be gradual or sudden. There are over 100 types of arthritis. The most common forms are osteoarthritis (degeneccrative joint disease) and rheumatoid arthritis.

Osteoarthritis usually occurs with age and affects the fingers, knees, and hips. Rheumatoid arthritis is anautoimmune disorder that often affects the hands and feet. Other types include gout, lupus, fibromyalgia, and septic arthritis. They are all types of rheumatic disease.

Signs and Symptoms

Pain, which can vary in severity, is a common symptom in virtually all types of

arthritis. Other symptoms include swelling, joint stiffness and aching around the joint. Arthritic disorders like lupus and rheumatoid arthritis can affect other organs in the body, leading to a variety of symptoms. Symptoms may include:

- Inability to use the hand or walk
- Stiffness, which may be worse in the morning, or after use
- Malaise and fatigue
- Weight loss
- Poor sleep
- Muscle aches and pains
- Tenderness
- Difficulty moving the joint

2. Experimental Work

a. Collection of plant material

Fresh plant *Helicteres isora* were collected from collected from local market of Bhopal (M.P.).

b. Extraction of plant material

Dried powdered leaves of *Helicteres isora* has been extracted with hydroalcoholic using maceration process for 48 hrs, filtered and dried using vaccum evaporator at 40^0C.

c. Determination of percentage yield

The percentage yield of each extract was calculated by using following formula:

$$\text{Percentage yield} = \frac{\text{Weight of Extract}}{\text{Weight of powder drug Taken}} \times 100$$

d. Phytochemical Screening

The *Helicteres isora* extract acquire was subjected to the precursory phytochemical analysis following standard methods by Khandelwal and Kokate. The extract was screened to identify the presence of various active principles of alkaloids, glycosides, phenols, flavonoids, Terpenoids, Saponins, Steroids.

2.1 Estimation of total Phenolic and flavonoid Content

Total Phenolic content estimation

The total phenolic content of the extract was determined by the modified Folin-Ciocalteu method.

Total flavonoids content estimation

Determination of total flavonoids content was based on aluminium chloride method.

2.3 In vivo anti-arthritic activity

All the experiments were carried out using Swiss albino male rats weighing between 180-250 gm. All animals were housed in polypropylene cages and maintained under standard laboratory conditions. Animals were housed at a temperature of 24±2°C and relative humidity of 65-75% RH.

a. Freund's adjuvant induced Anti-arthritic activity

The male albino rats were divided into Five groups, *i.e.* control, standard, drug treated (two groups of hydro-alcoholic extract of *Helicteres isora* leaves (low and high dose).

b. Experimental protocol

- **Group I (Normal control group):** Rats received 1% CMC (1 ml/kg body weight) only daily for 14 days
- **Group II (Negative control group):** Received 1% CMC (1 ml/kg body weight) +FCA (0.1 ml) daily for 14 days
- **Group III (Standard group):** Diclofenac sodium 15 mg/kg suspended in CMC+FCA (0.1 ml) daily for 14 days
- **Group IV (Treatment control group):** hydro-alcoholic extract of *Helicteres isora* leaves at dose of 250 mg/kg orally suspended in CMC +FCA (0.1 ml) daily for 14 days
- **Group V (Treatment control group):** hydro-alcoholic extract of *Helicteres isora* leaves

3. Results and Discussion

3.1 Results of percentage yield

Table No. 3.1: % Yield of hydroalcoholic extract

S. No.	Plant	% Yield (w/w)
1	Helicteres isora leaves	14.72

3.2 Results of Phytochemical screening

The results of the phytochemical screening of leaves extract of Helicteres isora were presented in Table-3.2.

Table No. 3.2: Results of Phytochemical screening of *Helicteres isora*

S. No.	Phytochemicals	Tests	Inference
1.	Alkaloids	Iodine Test	-
		Wagner's Test	-
		Dragendorff's Tests	+
2.	Flavonoids	Lead acetate test	+
		Shinoda Tests	+
3.	Glycosides	Keller-Kiliani Test	+
		Legal's test	+
4.	Phenols	Phenol Tests	+
5.	Saponins	Foam Test	+
6.	Tannins	Gelatin Test	+
		Dilute HNO3 test	+
7.	Carbohydrates	Molisch's test	-
		Fehling's test	-
		Benedict test	+
8.	Proteins and Amino acid	Millon's test	-
		Ninhydrin test	+
		Xanthroprotective reaction	+
		Ninhydrin test	+

3.3 Results of Estimation of Total flavanoid content estimation

Table 3.3: Total Phenolic and Total flavonoid content of *Helicteres isora*

S. No.	Extracts	Total Phenol (GAE) (mg/100mg)	Total flavonoid (QE)(mg/100mg)
1.	Helicteres isora	0.728	1.836

3.4 Results of in vivo anti-arthritic activity

Freund's adjuvant induced Anti-arthritic activity

There is a significant increase in rat paw volume in FCA injected control rats when compared to the standard and drug treated rats. Hydro-alcoholic extract treatment at the dose of 250 mg/kg and 500 mg/kg showed significant reduction in rat paw edema volume when compared with the control group. Table 7.6 shows the effect of extract on Freund′s adjuvant model induced arthritis. After 21 days it was found that hydro-alcoholic extract of *Helicteres isora* leaves significantly shows dose dependant inhibition in paw thickness *i.e.* the chronic inflammation induced by adjuvant shows decrease in paw thickness. Standard diclofenac sodium significantly decreased the paw thickness 6.15 ± 0.04 mm inhibition after induction of Freund′s adjuvant; whereas the extract at high dose (500 mg/kg) significantly decreased the paw thickness. It was found that in case of the high dose of the hydro-alcoholic extract, the protection against increase in paw volume was found to be 6.68 ± 0.05 as compared to that of the low dose which was found to be 13.08 ± 0.04%.

Table No. 3.4: Effect of Hydroalcoholic extract of Helicteres isora *leaves* on FCA induced arthritis in rats

Group	**Dose of extract (mg/kg, p.o.)**	**Change in paw thickness (mm)±SD (% inhibition)**			
		1 Day	**7 Day**	**14 Day**	**21 Day**
Group I (Normal control)	1% CMC (1 ml/kg body weight)	4.07 ± 0.16***	4.07 ± 0.16***	4.07 ± 0.09***	4.07 ± 0.08***
Group II (Negative control)	1% CMC (1 ml/kg body weight) +FCA (0.1 ml)	6.04 ± 0.04	14.13 ± 0.03	19.30 ± 0.02	24.57 ± 0.04
Group III (Standard control)	Diclofenac sodium (15 mg/kg) +FCA (0.1 ml)	4.62 ± 0.03***(21.23)	7.05 ± 0.03***(41.64)	7.47 ± 0.03***(58.78)	6.15 ± 0.04***(68.54)
Group IV (Treatment Control)	Hydro-alcoholic (250 mg/kg) +FCA (0.1 ml)	4.93 ± 0.09*(13.62)	10.25 ± 0.04***(28.75)	12.10 ± 0.07***(36.24)	13.08 ± 0.04***(47.53)
Group V (Treatment Control)	Hydro-alcoholic (500 mg/kg) +FCA (0.1 ml)	4.55 ± 0.04***(20.23)	7.93± 0.03***(40.74)	7.18 ± 0.0***(59.21)	6.68 ± 0.05***(69.64)

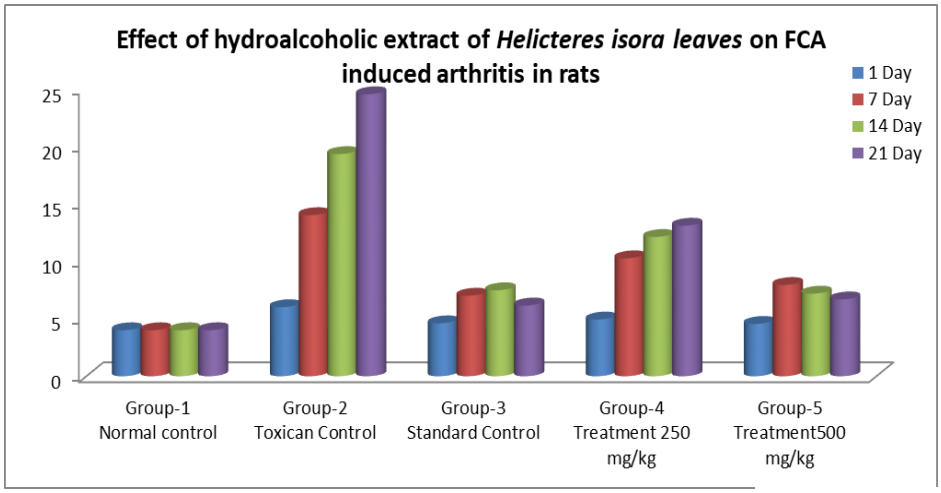

Figure 3.1: Percentage protective effects of hydroalcoholic extract *Helicteres isora leaves* on hand paw thickness in FCA induced arthritis in rats

Conclusion

Rheumatoid arthritis is a systemic autoimmune disease characterized by articular inflammation that eventually leads to the destruction of joints. Rheumatoid arthritis (RA) is an autoimmune disease that affects approximately 1% of the population. Prevalence of RA increases with age, approaching 5% in women over the age of 55. The incidence and prevalence of RA is 2-3 times greater in women than in men. Effective treatment of RA has been impeded by a paucity of accurate diagnostic and prognostic tests, owing in part to the heterogeneity of the disease. Helicteres isora leaves is a medicinal plant which is used in several diseases. It is commonly known as Avartani. due to screw like appearance of its fruit. Avartani is used as a folk medicine to treat snake bite, diarrhoea and constipation of new born baby. Therefore, an attempt has been made to assess the medicinal potential of the species both in traditional as well as in modern medicine system. The phytoconstituents present in it can to be cured arthritis effectively. From the results obtained in the present study, it may be concluded that Helicteres isora leaves possesses significant anti-arthritic activity. Further, research may be planned as an extension of this work which could prove Helicteres isora leaves as a potent anti-arthritic agent.

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