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Research Article

A Study on Pharmacognostical Approach on *Taraxacum officinale*

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Abstract

The dandelion, or *Taraxacum officinale*, is a perennial herb that forms a rosette leaf and has golden yellow flowers that bloom all year long. It is a member of the Asteraceae family and is typically found in the temperate zone of the Northern hemisphere. Many conventional and modern herbal medical systems use dandelion leaves, roots, and flowers. According to a phytochemical analysis, dandelion herb contains one or more important phytochemical components. Similarly, one of the most significant dandelion compounds contains bitter sesquiterpene lactones, particularly taraxacin and taraxacerin, which play a key role in the mechanism of liver functions associated with hepatoprotective action. Additionally, the results of the phytochemical investigation showed the presence of sterols, phenolic acids, and flavonoids, all of which have been linked to a variety of pharmacological effects, including antioxidants and anti-inflammatory effects.

Keywords: *Taraxacum officinale*, sesquiterpene lactone; hepatoprotective; anticancer; antioxidant; anti-inflammatory.

INTRODUCTION:

The Asteraceae family contains a sizable genus of flowering pl ants called Taraxacum. Commonly known as dandelion, the he rbaceos perennial plant *Taraxacum officinale* (L.) Weber is reg arded as an invasive species. Common Dandelion is considered a nontoxic herb that may be probably exploited for its choleretic, diuretic, antirheumatic, and anti-inflammatory properties. Dandelion is a perennial plant. It grows 3-35cm tall, forming a rosette of leaves at ground level. It's single, golden yellow flowers on straight leafless hollow stems that emerge from the centre of the rosette[1]. Every flower consists of a set of florets. This herb has tap roots, tapering from 2 to 3cm wide and a minimum of 15cm long. Roots are fleshy and brittle, and area dark brown colour on the outside and white on the inside. According to many publications this plant has been used to treat diabetes, cystitis, liver and stomach disorders, hepatic, and renal detoxification, and, to a lesser extent, as an anti-inflammatory and anticarcinogenic agent. Medicinal plants typically contain several different chemical compounds that may act individually or synergistically to improve health. As one of the bioactive triterpenoids found in dandelion, taraxasterol has become a focus of pharmacological studies [2]. According to ethnopharmacology, despite always being given as a cataplasm (poultice) or infusion, its usage as an antibacterial agent has been well-known throughout the world among numerous civilizations[3].

Synonyms of Dandelions: Blowball, Cankerwort, Clockflower, Common dandelion, Irish daisy, Lion's tooth, Piss-in-bed, Pissinlit, Priest's Crown, Puffball, Swine's snout, Tell time, Yellow gowan, Bitterwort, Lentodon taraxacum.

Taxonomical Classification:

Kingdom:	Plantae
Clade:	Tracheophytes
Clade:	Angiosperms
Clade:	Eudicots
Clade:	Asterids
Order:	Asterales
Family:	Asteraceae
Genus:	Taraxacum
Species:	*T. officinale*

MATERIALS AND METHODS:

Plant Material

Leaves and Roots of *Taraxacum officinale* were collected from collected from the local nursery and its identification was confirmed.

Standardization Parameters

1. **Macroscopic characteristics:**

Morphological studies were conducted on the Taraxacum Officinale and leaf for various parameters such as shape, size, colour, odour, and taste, as well as fracture The macroscopy of

the leaf and roots was investigated by comparing their macroscopical characteristics with those described in the literature. Size was determined by using a graduated ruler in millimetres to determine the length, width. The colour was examined by exposing the untreated seed sample to diffuse daylight and studying the colour of the seed sample. The untreated sample was examined with a magnifying lens (6X to 10X) to determine the surface characteristics, texture, and fracture characteristics; [4,5] the leaf and roots surface was touched to determine the texture, whether soft or hard; bent or ruptured, and to obtain information on brittleness and the appearance of the fracture plane-whether it is fibrous, smooth, rough granular, etc. [4,5]

2. **Microscopic studies and powder analysis:**

The extracts were subjected to preliminary phytochemical analysis to determine the presence of various phytoconstituents, and results are tabulated in Table 1. The method described was used to determine leaf constants such as stomata index, stomata number, vein islet, vein termination, and palisade ratio of the drug. Microscopical examination of plant drugs is necessary for the study of for correct identification. [6,7] as shown in the Table no 1.

Table 1: microscopic study of the *Taraxacum Officinale*

Vein Termination Number	5-6
Vein Islets Number	10-11
Stomata Number	5-6
Stomatal Index	25
Palisade Ratio	2.1

a. **Section Cutting:** Taraxacum Officinale leaves were selected and soaked overnight in tertiary butyl alcohol. The following day, the pieces were transferred to ethanol for 2 hours before being processed for microtome. Under a microscope, the sections were examined.

b. **Powder analysis:** The raw materials were powdered, and the powder was passed through sieve no. 60 and examined for microscopic characteristics. The drug powder was boiled with chloral hydrate to remove the colouring matters before being mounted on glass slides with glycerine, covered with a cover slip. and viewed under a microscope. The powder was also stained with safranin, fast green, phloroglucinol, and hydrochloric acid before being examined under a microscope. Iodine water was then used to find the starch.

3. Physicochemical parameters

The standard method was used to determine the various physio-chemical values of seed, such as ash values, moisture content, foaming index, swelling index, and fluorescence analysis. The Phytochemical evaluation of the drug was carried out in accordance with the method described in the table 2. Previously dried powdered seeds were extracted in a Soxhlet apparatus with petroleum ether, chloroform, methanol, methanol: water, and water, in that order, in a Soxhlet apparatus. [8,9]. The extracts were vacuum evaporated to dryness. These extracts were used to analyse various phytoconstituents such as alkaloids, carbohydrate, phenolic, flavonoids, proteins, amino acids, saponins, steroids, mucilage, and resins, among others. [10,11] as shown in the table no 2.

Table 2: Physicochemical parameters of *Taraxacum Officinale*

Sr. No.	Determination	Percentage (w/w)
1	Moisture Content	1.65
2	Foreign Matter	1.9
3	Total Ash Value	8
4	Acid- Insoluble Ash Value	0.81
5	Alcohol soluble extractive value	12
6	Water soluble extractive value	35

RESULT AND DISCUSSION

Macroscopical evaluation:

Roots: Cross section of the stem showed typical dicot anatomy differentiated into a single epidermal layer followed by few rows of collenchyma cells, thin-walled parenchyma cells followed by closed and collateral vascular bundles having prephloemic sheaths and a central pith. Light and scanning electron microscopy of the powdered drug revealed a variety of tissues and cells fragments having different measurements.

Leaves: The leaves are 5–49cm long and 1–10 cm wide, and are long, narrow shape, with the bases gradually narrowing to the petiole. The lobed tips are point in opposite directions and toward the crown.

Microscopical Evaluation:

Figure 1: Whole Plant of *Taraxacum Officinale*

Figure 2: *Taracum Officinale* Flower

Figure 3: *Taraxacum Officinale* Roots

Figure 4: *Taraxacum Officinale* Leaf

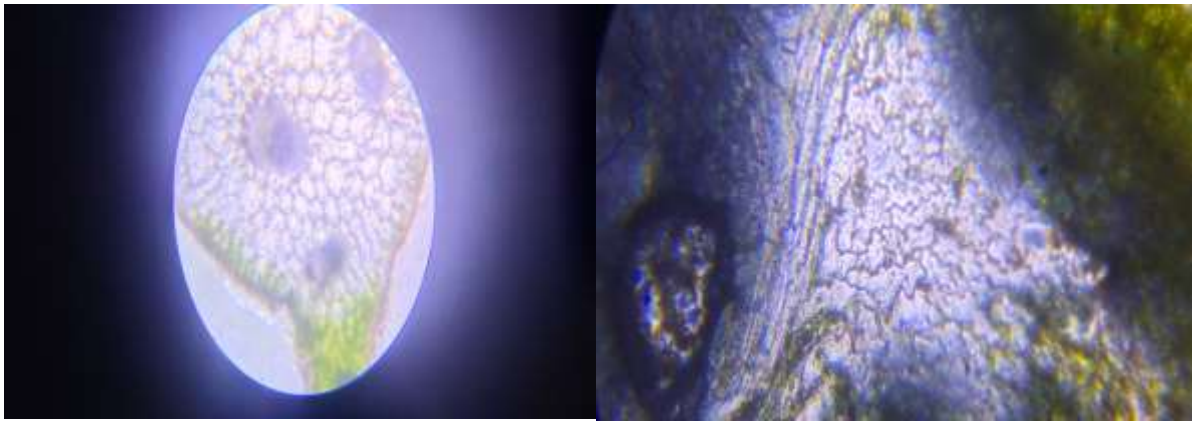

Figure 5: Transverse Section of *Taraxacum Officinale* Leaves

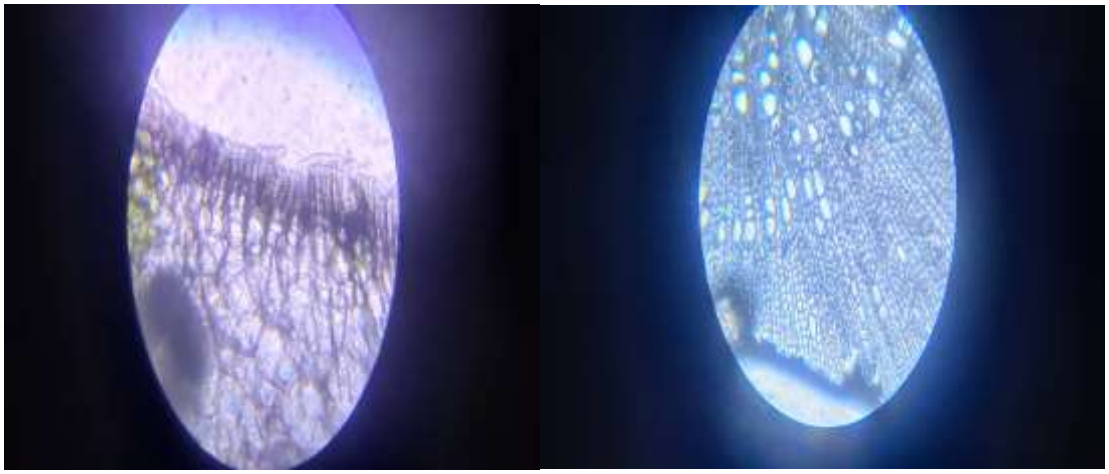

Figure 5: Transverse Section of Taraxacum Officinale Roots

Quantitative microscopy: Leaf constants Leaf constants study such as stomata index, stomata number, vein islets, vein termination were carried out.

Fluorescence analysis: The powder of seeds was subjected to fluorescence analysis as per the standard procedure (11) and shown in Table 3

Table 3: Fluorescence analysis of Taraxacum Officinale

Sr. No.	Reagent	Day Light	254 nm	366 nm
1.	Drug powder as such	Yellow	Cream Yellow	Dark Yellow
2.	Drug powder + conc. H2SO4	Dark Yellow	Light Green	Brownish dark
3.	Drug powder+ 1m H2SO4	Brown	Brown	Blackish Brown
4.	Drug powder + conc. HCL	Dark Yellow	Dark Yellow	Dark Brown
5.	Drug powder + 1m HCL	Brownish Yellow	Brownish Yellow	Dark Brown
6	Drug powder + conc. HNO3	Dark Yellow	Dark Yellow	Black
7.	Drug powder + conc. HNO3+ 25% NH3	Yellowish Brown	Yellowish Brown	Black
8.	Drug powder + sodium hydroxide	Yellow	Greenish Yellow	Brown
9.	Drug powder + sodium hydroxide+ dist. water	Yellow	Yellow	Light Brown
10.	Drug powder + 5% iodine	Yellowish Brown	Dark Brown	Black
11.	Drug powder + 5% FeCL3	Yellowish Brown	Brown	Black
12.	Drug powder + petroleum ether	Light Yellow	Yellow	Yellow

CONCLUSION:

This analysis demonstrates that *Taraxacum officinale's* various therapeutic properties are frequently mentioned in the scientific literature. Hepatoprotective, anticolitis, immunoprotective, antiviral, antifungal, antibacterial, antiarthritic, antidiabetic, antiobesity, antioxidant, and anticancer effects are among these properties. The scientific literature most frequently mentions and anticancer activities as *Taraxacum officinale's* medicinal properties. This plant holds promise for both the treatment and prevention of medical conditions. Scientific literature extensively documents *Taraxacum officinale's* protective effects against hepatotoxicity, oxidative stress, and cancer cell proliferation. For the previously described medicinal properties to be confirmed and for this plant to be used as a potential future health remedy, more research is required.

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