Chemical Content investigation and Anatomy Characters of some Asteraceae family wild plants grown in western of Iraq

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Abstract
Asteraceae family (Compositae)is one of the large plant families, widely spread, and this study targeted a small part of it, the results showed that the species were rich in these compounds. A spectrophotometric study was also carried out with the Uv device to measure the highest lambda max for each plant, and a difference appeared in the values of the curves, which indicates the diversity of chemical compounds in their extracts. The study included also the distinctive anatomical characteristics and quantitative characteristics of the stems and roots, and included the dimensions of the epidermal layer, the cortex, the vascular cylinder and its components, the pith rays, and the pith through the cross-sections of four Species belonging to the family Leontodon laciniatus, Lactuca serriole Chrysophthalmum montanum, Onopordum canum, wild. These sections gave a clear and new anatomical fingerprint for each type of phenotypic and genetic fingerprints previously used to isolate taxonomic plant species. The sections were photographed microscopically. A general chemical detection of secondary metabolites of the crude ethanolic extract was performed for each of the four plants separately. Alkaloids, tannins, and glycosides
Keywords: Anatomy, Phytochemical, *Asteraceae*, western, Iraq.

1. introduction

Asteraceae family is one of the largest and largest families of vascular plants at all, and the majority of members of this family are either in the form of trees, shrubs or herbs (Harman & Swlankana, 2011), and Asteraceae is one of the richest plant families in the world with about 1,600-1,700 genera and 24,000 species, and it is also widespread, reaching every environment and continent except Antarctica (Funk *et al*, 2005), this family is one of the largest plant families in Iraq, and it is one of the dominant plants, as it includes 101 genera and 350 species (Guest, 1966), and

The plants of the Asteraceae family are mostly characterized as evergreen shrubs, sub-shrub plants, annual or biennial herbs, and the plant contains latex milk or is free of them, and resinous materials and essential oils may be present, or the plant is free of these materials (Robinson,1981), Many of its genera possess pharmacological activity as a result of containing important chemical compounds, *et al* such as phenols and polyphenols (Ojo *et al*, 2022; Harouak *et al*, 2022, for bacteria (Khalaf *et al*, 2019), infections (Attanzio *et al*, 2019), and for cancers as well (Muniyandi *et al*, 2019), and are used as insecticides (Harouna, 2016). The phenolic compounds and flavonoids that are extracted from the flowers of the species of this family have anti-bacterial activity and are also important in treating ulcers that occur in the mouth and treat vitamin C deficiency or what is known as scurvy and also help in the treatment of skin eczema (Garzon *et al,* 2022). Anatomical traits have a taxonomic supportive role for phenotypic traits in general, and many traits have been employed to isolate species into groups despite their belonging to different families, and due to the fact that the plant genera belonging to Compositae family is characterized by being rich in active compounds (Rudall, 2007), the amount of alkaloids. They change according to the stages of plant growth and also change between night and day (Dewick, 2002). Often one plant contains several alkaloids that are similar to each other in terms of general chemical composition, but there are some specific alkaloids that are only found in one plant, such as cocaine in coca and quinine (Katarzyna *et al*, 2019), and alkaloids are found in plant cells in the form of salts of organic acids, often such as acetic acid, malic acid, citric acid, tartaric acid, etc, or in the form of mineral acids rarely, such as sulfur salts (morphine sulfate in the poppy plant or combined with sugars, glucoalkaloid.(Oyetunde, 2021).

The glycosides present in plants are in the form of a beta bond between the sugar molecule and the complement molecule of the glycoside (Sinda *et al*, 2022), and the glycosides can be broken down by enzymes or acids into two parts the first is a sugary part, such as glucose, ramineose, and others, and the second part is glycone, which includes organic compounds such as alcohols, esters, aldehydes and ketones. Tannins are found in plants in the form of a mixture of phenolic compounds that are difficult to separate or obtain in a pure state because they are amorphous. The absorption spectrum of radiation in the visible and ultraviolet field is a useful method for the initial diagnosis of organic compounds and to obtain preliminary results. It can also help in weighing one of the possibilities (Boffo *et al*, 2022), the absence of absorption in the field 270-280 nm is

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conclusive evidence for the absence of a benzene ring in the model under analysis, Also, the absence of absorption from 210 nm to the visible range is conclusive evidence of the absence of alternating binary bonds, and the absence of absorption up to 180 nm, this is evidence of the absence of a binary bond in the compound (Minteguga *et al*, 2019).

The study aimed to study the quantitative anatomical characteristics of the stem and roots and take important measurements of their different layers, a qualitative and quantitative study of some active chemical compounds and a spectroscopic study of the highest peak of the alcoholic extract of the leaves.

2. Materials and methods

Plants collection: Plants were collected during flowering from separate areas in western Iraq, from March to mid-August 2020, and were classified in the herbarium of the Natural History Museum / University of Baghdad, after cleaning the plants, they were spread and spread in a place with good ventilation and far from direct light, taking into account the continuous stirring, and after making sure of the drying of the plants, they were preserved (Mohammed *et al*, 2020).

Chemical study

Tannins extract: The tannins were extracted by adding 75ml of distilled water to (0.5)g of powdered plant leaves (model) in a boiling water bath for (30) minutes, then centrifuging the solution using a centrifuge at (2000) rpm for a period of (2000) rpm.20) minutes after which the saliva was taken and placed in a volumetric flask with a capacity of (100) ml, then the volume was completed to the mark with distilled water. The extracted solution was added (20) ml of copper (or lead) acetate 4% with continuous shaking for one hour, then filtered the solution and placed the precipitate in an earthenware bowl, it was dried in the oven, and the precipitate was burned at 550 °C for two hours (Palici et al, 2005).

Glycoside extract: The glycosides were extracted, and their percentage was estimated by adding 100 ml of (80%) ethanol to 10g of plant powder, leaving the solution for (24) hours, then filtering to obtain the ethanolic extract, then the solution was concentrated by a rotary evaporator at a temperature of 50°C to obtain the concentrated extract, then 50 ml of diethelether and 5 ml of lead acetate solution were added to it. After the remaining components have evaporated (Harouak et al, 2022).

Alkaloids Extract: Add 10 g of plant leaf powder to 100 ml of 80% ethanol. Filter the concentrated solution using a rotary evaporator. The product or residue is dissolved in 50 ml of 5% HCl, then 50 ml of acetate is added.Ethyl, the aqueous layer was separated and ammonia solution was added to it to make it basic (PH=9), then 50 ml of methylene chloride (CH2CL2) was added to the extract three times and the lower layer was taken each time by evaporation using the rotary evaporator to obtain the alkaloids (Harouak et al, 2022).

Spectral study: The leaves of the plants of the studied species were taken and then left to dry naturally, then ground and extracted by a Saxsulate extraction device using ethanol alcohol and dried after that, where a preliminary powder of a plant extract of different species was obtained (Wasfi and Qasir, 1982). The Spectrophotometer UV/Vis spectrophotometer (Spectral Laboratory at the College of Education for Girls / University of Baghdad) of type 6405 UV/Vis and manufactured by Jenway was used, which was used to determine the effective groups in the organic compound, as the highest wavelength was measured, which corresponds to the highest absorbance of the extract prepared using ethanol alcohol, Then it was placed in quartz cells for the device, and the range was from (200-800) nanometers, which is a visible and ultraviolet region (UV-Visible, and the wavelengths were drawn (Balalakshitha et al, 2021).

Anatomical study: The transverse sections were prepared from samples of roots and stems from specific and uniform areas during field trips, which were preserved in Formaline acetic acid alcohol (FAA) solution prepared by adding 5 ml formalin, 5 ml glacial acetic acid and 95 ml ethyl alcohol 70%. For a period of 24 hours, the fixed slides were prepared using the (Johanson, 1940). The samples were examined by a Novel type compound microscope, while the microscopy was done using a digital camera.

3. Result and discuss

Table (1): Phytochemical study of Arial part of species extract.(%)

Species	Tannins	Glycoside	Alkaloid	λmax (nanometers)
Leontodon laciniatus	0.74	0.23	5.87	501
Lactuca serriole	0.43	0.44	9.16	555
Chrysophthalmum montanum	0.44	0.88	3.56	300
Onopordum canum	0.35	0.54	8.70	490

The results in Table (3) indicate that all wild plants contain good amounts of active compounds, as the species Leontodon laciniatus was distinguished by containing the highest percentage of tannins, which amounted to 0.74%, while species was distinguished by the highest percentage of glycosides, which amounted to 0.88%, in the type Chrysophthalmum montanum. The alkaloids had the highest percentage in the species Lactuca serriole and reached 9.16. The medicinal importance of the plant is due to the new contents of the active substances, which are attributed to its medicinal efficacy and its physiological effect on other organisms (Yousef et al, 2022; Trivedi, 2006). Its plants with active substances and its classification among the most important medicinal plant families (Herman & Swelankowo,

2011).

The subject of spectral chemistry or spectra chemistry was adopted as one of the proposed methods to support the classification process, and it is a useful method in determining the chemical content of plants and thus can be used in classifying plants along with other classification methods (Davies, 2007). The value of wavelengths λmax was measured, which is the wavelength that

The wavelength is as high as possible, and by drawing curves that show the relationship between the change in the intensity of absorption, with the change in the wavelength of the rays passing in the alcoholic extract solution for the leaves of each type of plant studied, and through the results obtained as shown in the table (3) fig (3,4,5,6). It was observed that there is a certain value of the constant λmax of the alcoholic extract of the leaves of a particular plant of the studied plants differs from the rest of the values, knowing that this value is one of the important physical constants that distinguish organic compounds from each other, and is useful in distinguishing also between plants and can be invested in the classification process.

There was a clear difference in the values of λmax, as it was the highest of 555 nanometers in Lactuca serriole and the lowest in Chrysophthalmum montanum and it was 300 nanometers

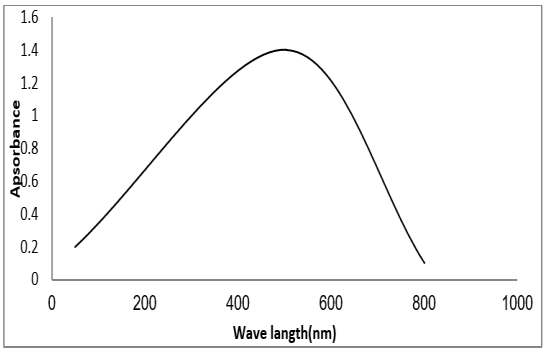

Figure 1: Absorption spectrum and λmax of Lactuca serriole

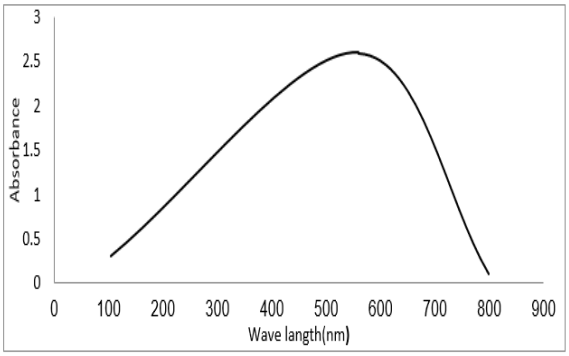

Figure 2: Absorption *spectrum and λmax of Lactuca serriole*

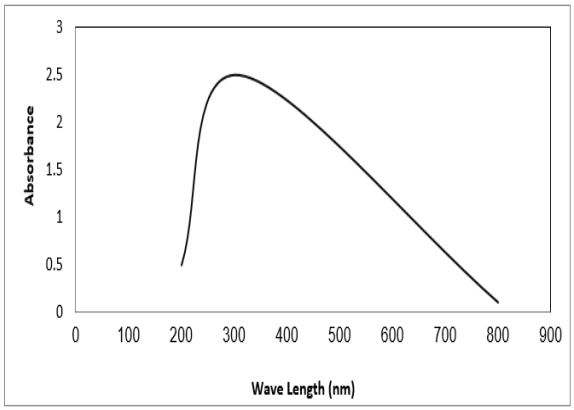

Figure 3: Absorption spectrum and λmax of Chrysophthalmum montanum

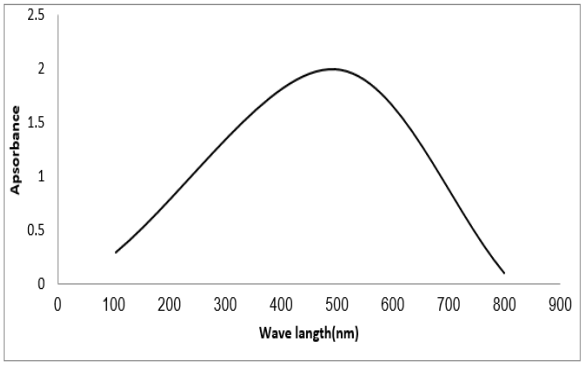

Figure 4: Absorption spectrum and λmax of Onopordum canum

That the active or chemical content of the plant determines its interactions, its biological effectiveness, and the forms of appearance of these substances by interactions. Also, most spectroscopic studies concerning the plant depended on the qualitative detection of a specific substance such as oils or tannins in the plant and comparing it with another plant and knowing the difference by measuring its highest absorption (Minteguiaga *et al*, 2019; Balalakshith *et al*, 2022), in which he compared the absorption of different oils from plants extracted from olives, sunflowers and palms, and knowing the different wavelengths of each oil and comparing it, but in the taxonomic field, no one touched on the exploitation of this spectroscopic study In the differentiation and separation of plant species, according to our research in this regard (Boffo, 2022). The difference in λmax is an indicator of the quality and concentration of the important active substance in the plant species, and it is one of the fixed values that are important in classifying plant species and determining their medicinal benefits or harms, especially wild ones

Table (2): The quantitative characteristics of stems measured in Micrometers.

Species	Cutical thickness	Epidermis thickness	Cortex thickness	Cortex layers	Xylem arms	Xylem thickness	Phloem thickness	Pith thickness
Leontodon laciniatus	6	14	66	3	Ring	35	40	440
Lactuca serriole	4	9	40	8	Semiring	74	33	501
Chrysophthalmum montanum	5	11	30	6	Ring	185	43	911
Onopordum canum	8	15	41	7	83	180	100	1399

The studied species are all dicotyledons, and most of them suffered from secondary growth; Therefore, he described the vascular tissue of secondary wood and phloem, as well as describing the primary vascular tissue. A discrepancy was observed between the stems of the species under study in terms of colour, branching, indumentum and dimensions (stem length and diameter). The value of its classification in isolating and characterizing these orders. These variations, as shown in Table (1) and Fig.(1), included its cross-section, the thickness of the dermis, the epidermis, and the cortex, the number of cortex layers, including the collenchyma and parenchymal tissue together, the thickness of the elements of the vascular cylinder, the vascular bundles and the wood Cortex and thickness of the core area Pith, the epidermal layer in the transverse section showed a clear contrast in its thickness, the shape of its cells and the cuticle layer that covers it. The dermis appears in the transverse section in a flat, thin shape without protrusions.

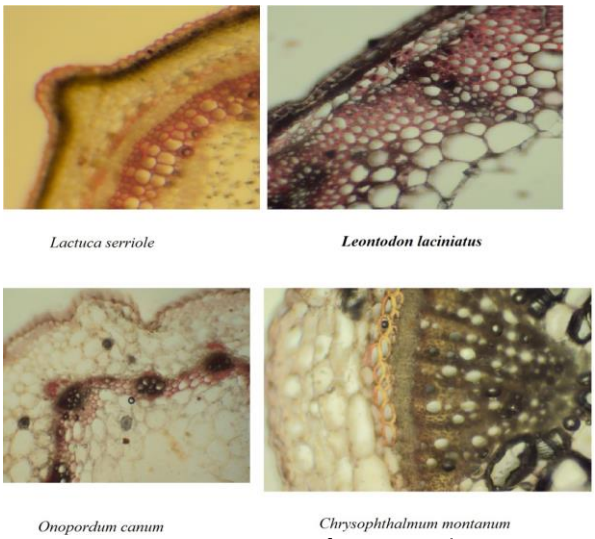

Figure 1: Across- section of stems, with Transport system elongation 40x.

The cortex represents the layer following the epidermis, which in turn varied in terms of thickness, number of rows of cells, and their types according to the different species studied. *Lactuca serriole* the cortex appeared with four to eight rows and consisted of thin-walled parenchymal tissue with large circular or irregular shaped cells, in which it is noted that there are some small interstitial spaces, and the size of the cortex cells increases towards the vascular cylinder. Rows in *Chrysophthalmum montanum* with oval cells that increase in size towards the starchy sheath that is located above the vascular cylinder and the cells composing this sheath contain starch grains, and the average thickness of the shell is 30 micrometers. *Onopordum canum*, there were two plant of cells in the cortex, which amounted to seven rows. In the area of the protrusions appeared thick-walled and lamellar collenchyma cells in the form of cell clusters separated from each other by chlorenchyma cells that give support to the stem, and in the area between the prominences, cells appeared Thin, small, oval or elongated in shape representing the barnaclea of the crust, which was two to three rows, the thickness of the crust reached 41 micrometers The bundles showed a difference in the presence of phloem outside and inside the bundle; To give an open or bicollateral bundle, the back of the segment suffers from secondary growth, so the vascular cylinder appears continuous and connected with the cells between the bundles. Cortex cells appeared elongated oval in the type *Onopordum canum*, which formed a continuous ring surrounding the cylinder, while the cambium appeared with narrow and undistinguished cells; Because of the secondary growth of the plant, while the xylem appeared to occupy a large area of the cylinder, where the transporting elements were well-formed, arranged radially, with oval transport units converging with each other towards the core. Fig. (1).

Table (3): The quantitative characteristics of Roots, measured in Micrometers

Species	Epidermis thickness	Cortex thickness	xylem thickness	Phloem thickness
Leontodon laciniatus	33	125	60	522
Lactuca serriole	30	48	38	500
Chrysophthalmum montanum	32	370	23	600
Onopordum canum	13	300	29	530

The roots of all the studied species were distinguished by being tap roots, the expansion of the cortex area, and the vascular tissues including wood were concentrated in most of their species. Despite the fact that the shape of the transverse section of the root is generally circular, where all the roots were cylindrical, and the sections were taken for all species from the middle of the root, and the epidermal layer appeared with one row of rectangular to circular elongated cells, the thickness of which differed among the studied species

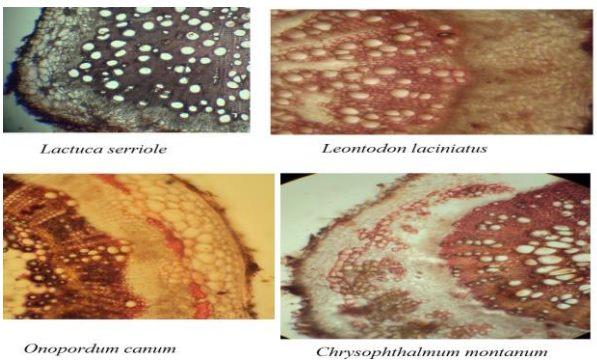

Figure1: Across- section of roots, with Transport system elongation 40x.

In *Leontodon laciniatus*, the cells of the cortex were of different shapes between oval, irregular, thin-walled, and appeared more flat on the side near the vascular cylinder. The thickness of the cortex reached 125 micrometers. The phloem appeared as a continuous ring composed of several layers of parenchymal cells representing the parenchyma of the phloem that vary in size; To become smaller inward and more regular towards the medulla, then cambium cells appear oblong wavy, alternating with square xylem rays, followed by the most conspicuous region in which the secondary xylem fills the largest area, and the back of the medulla, which forms the center of the narrow root in which the transmitting units were wide rows and diagonal

In *Lactuca serriole*, the rows of the cortex close to the epidermis were rectangular to ovate, and these cells became smaller, square in shape, and regular in order as we went inward, or they might alternate with the rays of the phloem to form rows of square-shaped compact cells. The milky ducts were found in the middle The cortex is surrounded by four to three oval cells observed in the unpigmented sections, and the phloem has small square to oval cells arranged in several rows, followed by the cambium cells, square and regularly arranged, which are smaller in size and arranged with a number of rows, followed by the vascular elements carrying xylem with xylem cells Small radial arrangement, which fills the entire center of the root, and the xylem is of a diffuse porous type, as it is not The center (medullary) region is observed in this species, as shown in. In *Chrysophthalmum montanum*, the cortex cells appeared large and filled with oval granules representing the starch that fills most of the cells of the cortex, followed by irregular shaped cells arranged from two to three rows and exchanged with the phloem parenchyma. As for the cambium, it appeared narrow with small square cells, and the xylem formed the center of the root if the cells appeared in it in a radial radial arrangement. In *Onopordum canum*, the cells in the cortex layer were arranged in two regions: the first was close to the epidermis, in which the cells appeared rectangular to square in shape, followed by cells of elongated oval shapes, representing the second region, and the average thickness of the cortex was 300 micrometers.

As for the vascular tissue of the species, it started with the phloem, which overlapped with the cortex, as the cells appeared elongated to irregular in shape, followed by a narrow area of the cambium with small square cells, from which cells extended to reach the xylem, which was characterized by large transporting units and oval in shape with a smaller diameter towards the center.

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