

INVESTIGATION OF COMMON CONSTITUENTS OF FERULAGO ABBREVIATA C.C. (TOWN)



Fenk Bakir Maaruf ^a, Firdus Nuri Ahmed ^b, and
Enas Sabah Hassan ^c

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ABSTRACT

Background

Ferulago abbreviata C.C. (town) is one of 35 genus *Ferulago* (family of Apiaceae). The other species of this plant are used for different medical purposes in different countries because they have many components. *Ferulago abbreviata* grows and develops between June and August at the top of mountains.

Objectives

To identify the common constituents of alcoholic extract of *Ferulago abbreviata*.

Materials and Methods

After collecting and preparing the plant extract, different reagents and HPLC techniques are used to identify the constituents of this plant.

Results

Many ingredients were identified, such as (phenolic acid, flavonoid, tannin, and glycoside); besides them also there is a percentage of components that were found in the volatile oil of the plant, similar to other studies. *Ferulago abbreviata* has many constituents, and some of them are found at a high percentage while others are found in a lower percentage compared to other species.

Conclusion

Ferulago abbreviata C.C. (town) has many components that can be applied in medicine.

Keywords: *Ferulago abbreviata*, Phenolic compound, Flavonoid, Sulaimani.

^a Department of Biochemistry, College of Medicine, University of Sulaimani, Kurdistan Region, Iraq.
Correspondence: fenk.maarouf@univsul.edu.iq

^b Ministry of Health, University of Sulaimani, Kurdistan Region, Iraq.

^c College of Pharmacy, University of Sulaimani, Kurdistan Region, Iraq.

INTRODUCTION

In most developing countries, herbal medicine has an essential role in the health system sector for managing different types of diseases due to; efficacy and safety of herbal medicine, acceptance by the community, lower cost of herbal medicine, the movement toward self-medication⁽¹⁾. The *Ferulago* genus has 35 species from the family of Apiaceae. Many studies have been conducted in different countries on *Ferulago*⁽²⁾. *Ferulago abbreviata* C.C. Towns. (APIACEAE; Kurdish name: Chnur) grows and develops between June and August at the top of mountains, rocky places, Cliffside eroded sandy soil, its stems are 1-1.5 m tall with strong sulcate, its leaves are 2-pinnately compounds, canaliculated with club-shaped hairs.

MATERIAL AND METHODS

Preparation of Plant Extract

Ferulago abbreviata C.C. (Towns) were used and collected in June from PIRAMAGROUN (Zewe) mountain north East of the Kurdistan region (Iraq). It was identified by Kurdistan Botanical Foundation (K.B.F.) in Sulaimani/Iraq, Figure 1.

The areal part of the plant was dried under the shade, then crushed into powder and small particles with a blender. The hydro-alcoholic extract was obtained by maceration. After filtration, the extracted material was placed in a vacuumed rotary evaporator at 37 °C, then after lyophilizing, the dried powder was stored at -20 °C until used, Figure 2.

Ferulago abbreviata C.C. Towns. (Apiaceae; K: Chnur):

Morphology:

- this plant is grow and develop between June and August at the top of mountain, rocky place, cliff side eroded sandy soil.
- It stems 1-1.5 m tall, leaves 2-pinnately compound all but final division very elongated, club-shaped hairs




Figure 1. Photo of *Ferulago abbreviata* C.C. (Towns) in PIRAMAGROUN Mountain.

Preparation of Plant Extract.

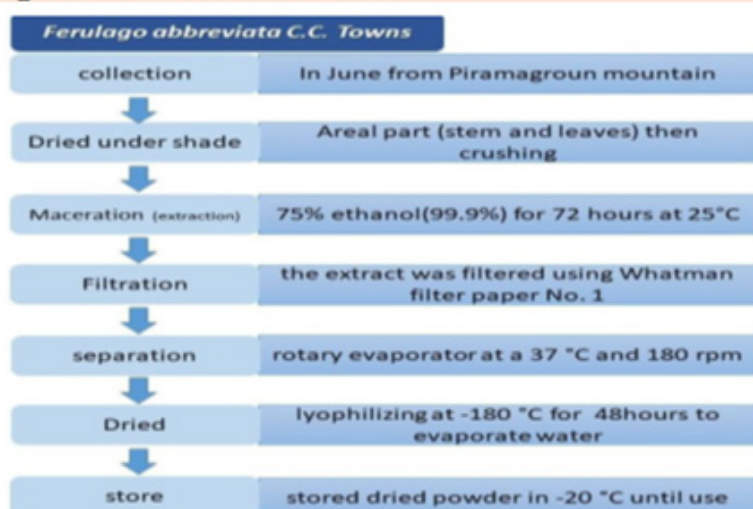


Figure 2. Preparation of the plant extract.

Determination of total Phenolic contents

For quantification of Phenolic compounds, Folin-Ciocalteu's test was used, 100 μ L of the extract was mixed with 500 μ L of the Folin-Ciocalteu's reagent then we added 1.5 ml of 20% sodium carbonate, then distilled water was added achieving a final volume of 10 mL, after two hours, the phenolic content was measured at the absorbance of 765nm, calibration curve made with Gallic acid (Sigma-Aldrich, Germany) was used ⁽³⁾.

Determination of Total flavonoid content

One ml of methanol was mixed with 50 μ L extract, then blended with 4 mL of distilled water and incubated for 5 minutes. Then we added 0.3 mL of 10% Aluminum chloride solution and 0.3 mL of (5% sodium nitrite) solution. Six minutes later, we added 2 ml of 1 mol/L NaOH solution, and distilled water was added to achieve a final volume of 10mL, which was then left for 15 minutes and measured at an absorbance of 510 nm. A calibration curve was used to calculate the amount of flavonoid content, and the result was expressed as mg Rutin equivalent per g dry weight ⁽⁴⁾.

Determination of total Tannins content

Two grams of the extract was mixed with hydro alcohol (80%) and heated in a water bath. After filtration, ferric chloride was added to it, the presence of tannins represented by the appearance of a dark-green solution. Next, one ml of the extract was mixed with 2 ml of NaCl (2%) and then filtrated with 5 ml of gelatin solution (1%). Again, the precipitate indicates the presence of tannin, which was then measured at 540 nm ⁽⁵⁾.

Determination of total alkaloid content

Dragendroff's method was used to identify alkaloids. A

part of the extract was dissolved in dilute HCl, then two drops of Dragendroff's solution were added alkaloid appeared as a crystalline precipitate ⁽⁶⁾.

Determination of total glycosides

A part of the extract was mixed with 10 mL Baljet's reagent then diluted with 20 mL of water. Shimadzu UV/VIS spectrophotometer model 1600A was used (measured at 495 nm). Different concentrations (12.5-100 mg/L) of securidaside were used for the standard curve preparation. Securidaside was isolated from sample extract, and it is used as a unit (Securidaside per gm) for the assessment of glycoside ⁽⁷⁾.

HPLC condition for analysis phenolic and Flavonoid compounds

Samples were analyzed by high-performance liquid chromatography HPLC model (SYKAM) Germany. Pump model: S 2100 Quaternary Gradient Pump, Autosampler model: S 5200, Detector: U.V. (S 2340), and Column Oven model: S 4115. The mobile phase was = (Methanol: D.W: acetic acid) (85: 13: 2), the column is C18-ODS (25 cm * 4.6 mm) and detector UV – 360 nm at flow rate 1ml/min.

RESULTS

The main constituents of the *Ferulago abbreviate* Phenolic compound in the form of Gallic acid (88.6mg/gm) and Flavonoid Content as Rutin (42.7 mg/gm) of dried extract. The concentration of the Hydro-alcoholic extract of the aerial part of *Ferulago abbreviate* is shown in Table1.

Table 1. The component of aerial part of *Ferulago abbreviata* C.C. (town).

Constitutes	Concentration
Total Phenolic Content (TPC)	88.6 mg Gallic/gm
Total Flavonoid Content (TFC)	42.7 mg Rutin / gm
Total Alkaloid	2.8 %
Total Glycoside	1.8 %

Table 2. The Phenolic acid contents of *Ferulago abbreviata* C.C. (Town) obtained by HPLC analysis.

Name	Concentration
Gallic acid	35.6 ppm
Quercetin	22.5 ppm
Keampferol	17.4 ppm
Vanillic acid	8.4 ppm
Catechine	7.5 ppm

Table 3. The Volatile oil content of *Ferulago abbreviata* C.C. (Town) obtained by HPLC analysis.

No	Concentration %
a-pinen	2.12
Cineole	12.82
Camphor	1.25
Linalool	3.59
Limonene	0.41
Myrcene	0.75
Sabinen	0.89

DISCUSSION

To the researcher's knowledge, after extensive searching the web, no previous study has been conducted neither in the region nor globally on this species of *Ferulago*. Therefore, this is the first study conducted on *Ferulago abbreviata* C.C. (town) in Kurdistan Region, Iraq. In the present study, hydro-alcoholic extraction from the aerial part of *Ferulago abbreviata* C.C. (town) from Piramagroun Mountain (Kurdistan), were analyzed to find its main constituents. Gas chromatography (G.C.) and high-performance liquid chromatography (HPLC) has been used to conduct the analysis.

The powder part from *Ferulago* had a yield of 7.9% (w/w) with green-brown colour. The components of hydro-alcoholic extraction of the plant are shown in Tables 1, 2. In addition, the percentages of the component of *Ferulago* are shown, which represented 22% of the whole aerial parts from hydro-alcoholic extraction. The presence of a-pinen, Camphor, Myrcene, and Limonene was confirmed, which is similar to the finding of Hashem et al.⁽²⁾ in which other

species (*Ferulago angulata* (Schlecht.) Boiss.) of the same family of *Ferulago* were studied. However, the amount of ingredient from *Ferulago abbreviata* was less than that of *Ferulago angulate*, while the amount of Linalool concentration was more than the finding of Hashem.

Regarding Cineole and Sabinen, which are other components of *Ferulago abbreviate*, they cannot be found in *Ferulago angulate*. However, the amount of a-pinen, Camphor, sabinene, Linalool, and Limonene are higher in *Ferulago angulate*. The amount of Myrcene is less than the *Ferulago angulata* from the finding of Hosseini, Naser, et al.⁽⁸⁾.

In conclusion, many constituents can be found in the *Ferulago abbreviata* C.C. (Town), which can have beneficial effects in a wide area of studies, especially in the field of Herbal medicine.

The authors disclose that they have no conflict of interest.

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