

# Phytochemical Screening of Ethanol Extract Qust Al Hindi roots (*Saussurea lappa*)

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**ABSTRACT:** Qust al hindi is a plant from the Asteraceae family which has various therapeutic effects in ancient medicinal systems. This plant is used in traditional medicine in Arab countries as a stimulant, carminative, sedative and astringent. The part of Qust al hindi plant that is most often used for medicinal purposes is the dried root of the plant. This study aims to determine the content of secondary metabolites contained in the root extract of the plant Qust al Hindi. The extraction process was carried out by the soxhletation method using 96% ethanol at 70°C, and followed by phytochemical screening. The results of the phytochemical screening of the ethanol extract of the Qust al Hindi roots positively contained alkaloids, flavonoids and terpenoids.

**KEYWORDS:** Phytochemical screening; Qust al hindi roots; *Saussurea lappa*.

## 1. INTRODUCTION

Qust al hindi is a plant that grows a lot in the Himalayan region. Qust al hindi is often used in several traditional medical systems such as in Persian and Indian medicine. Primarily used medicinally is the dried root of qust al hindi. The root of the Qust al hindi plant is used in ancient medicine as a treatment for asthma, coughs, and chronic skin diseases such as rheumatism and cholera. In addition, Qust al Hindi is also used for the treatment of colds, flatulence, pruritus, gout, epilepsy, headaches, allergies and leukoderma (Ebadi et al., 2018; Zahara et al., 2014). Qust al hindi is also well known in Islamic medicine as stated in the Hadith spoken by the Prophet Muhammad SAW which is mentioned in the hadith of History Al-Bukhari number 5260 book of medicine chapter assa'uth with qusthul hindi and qusthul bahri (Islamic, 2022).

Qust al hindi is one of the medicinal plants that has been distributed globally and has been much discussed lately. Qust al hindi plant preparations have been widely circulated in Indonesia which are claimed to be able to fight and treat Covid-19 infection. Previously, research has been carried out on the activity of Qust al hindi as anti-inflammatory, antioxidant, antimicrobial and anticancer (Wei et al., 2014).

Qust al hindi is famous because it has many active compounds that can be used for treatment. This plant contains various chemical compounds such as alkaloids, glycosides, coumarins, flavonoids, phenols, quinones, steroids, tannins and terpenoids (Sukmawati et al., 2022). Based on a phytochemical study, the roots of qust al hindi contain monoterpenes, sesquiterpenoids, lignans, flavonoids, glycosides, steroids, triterpenes, etc. Qust al hindi root is rich in sesquiterpene lactones which are sesquiterpenoids. Apart from that, qust al-hindi root also contains an essential oil which can be extracted by hydro-distillation from dried and crushed qust al-hindi root. Qust al hindi root essential oil has a higher percentage of sesquiterpenoids (79.80%) compared to monoterpenoids (13.25%). The main compounds in the essential oil of Qust al Hindi root are dehydrocostus lactones and costunolide. In addition, this plant from India also contains aldehydes, alcohols and ketones from hydro-distillation results (Rathore et al., 2021).

## 2. EXPERIMENTAL SECTION

### 2.1. Sample Collection and Processing

This research was conducted experimentally in the Pharmaceutical Chemistry Laboratory of the Indonesian Muslim University. The sample used in this study was Qust al Hindi roots (*Saussurea lappa*) plant. The study was conducted by testing the inhibitory activity of the ethanol extract of the Qust al Hindi roots against the xanthine oxidase enzyme using a microplate reader at a wavelength of 570 nm. The Qust al Hindi roots are cleaned and dried in the wind. Grind the dried roots until you get a sample in powder form. As much as 50 g of Qust al Hindi root powder is put into a cellulose thimble, then 300 mL of 96% ethanol is put into a Soxhlet flask. Soxhletation was carried out at 70 °C for 3 hours for 30 minutes. Then it was thickened over a water bath at 70 °C.

### 2.2. Phytochemical Screening

A phytochemical screening test was carried out to determine the content of chemical compounds, as can be seen in **Table 1** below.

**Table 1.** Phytochemical Screening on the ethanol extract of the Qust al hindi roots (*Saussurea lappa*)

Compound	Reagents	Results	Conclusion
Alkaloids	Mayer	Formation of a white to yellowish precipitate (Simaremare, 2014)	Alkaloid positive
	Wagner	Formation of a reddish brown precipitate (Putri & Lubis, 2020)	Alkaloid positive
Flavonoids	Mg metal + HCl	The color of the solution changes to reddish (Sabandar et al., 2020)	Flavonoid positive
Saponins	Hot water	Formation of a layer of foam at the top of the solution (Sabandar et al., 2020)	Saponin positive
terpenoids	Anhydrous acetic acid + concentrated sulfuric acid	Formation of a brownish or violet ring (Bhemama, 2020)	Terpenoid positive

### 3. RESULTS AND DISCUSSION

The sample used in this test was the ethanol extract of the Qust al hindi roots (*Saussurea lappa*) plant. The extraction method used in this study was the soxhletation method using 96% ethanol. 96% ethanol solvent is used because at this concentration the solvent penetrates more easily into the cell walls of the sample compared to ethanol solvent with a lower concentration, so it can produce a concentrated extract (Wendersteyt et al., 2021). The soxhletation method was chosen because it is an extraction method that is suitable for materials that are heat resistant, has a shorter extraction time, and requires a smaller amount of solvent (Pratama et al., 2017). After obtaining the viscous extract, this research was continued by calculating the % yield. Calculation of % yield is needed to find out the amount of extract obtained from the extraction process. The calculation of % yield is related to the chemical content of a sample, where the greater the amount of yield obtained, the more chemical content contained in the sample (Hasnaeni et al., 2019). In this study, the extract weight was 3.87 g with a percent reduction of 7.74%.

The next stage was followed by screening for the phytochemicals of the ethanol extract of the Qust al hindi roots (*Saussurea lappa*). Phytochemical screening is a method carried out to get an idea of the class of compounds contained in the sample under study which is carried out by looking at the color testing reaction using color reagents (Simaremare 2014). The results of the phytochemical screening test on the ethanol extract of the Qust al Hindi roots showed that the extract contained alkaloids, flavonoids and terpenoids. Results of phytochemical screening of the ethanol extract of the Qust al hindi roots (*Saussurea lappa*) can be seen in **Table 2** as follows.

**Table 2.** Data on the results of phytochemical screening of the ethanol extract of the Qust Al Hindi roots (*Saussurea lappa*)

Compound	Reagents	Observation result	References
Alkaloids	Mayer	A yellowish precipitate formed	Formation of a white to yellowish precipitate (Simaremare, 2014)
	Wagner	A brown precipitate formed	Formation of a reddish brown precipitate (Putri & Lubis, 2020)
Flavonoids	Mg metal + HCl	There was a change in the color of the solution to red	The color change of the solution to red (Sabandar et al., 2020)
Saponins	Hot water	No foam layer is formed	Formation of a layer of foam at the top of the solution (Sabandar et al., 2020)
terpenoids	Anhydrous acetic acid + concentrated sulfuric acid	A brown ring is formed	Formation of a brownish or violet ring (Bhemama, 2020)

Identification of alkaloids was carried out using Mayer's and Wagner's reagents. The ethanol extract of the Qust al hindi roots contains alkaloid compounds which are characterized by the formation of a yellowish precipitate on Mayer's reagent and brown precipitate on Wagner's reagent. The yellowish-white precipitate that occurs in Mayer's reagent because alkaloid compounds have free nitrogen atoms that bind to  $K^+$  ions form a colloidal potassium precipitate. The yellow-brown precipitate in Wagner's reagent is colloidal potassium,  $K^+$  metal ions will form coordinate covalent bonds with nitrogen in the alkaloids to form potassium-alkaloid complexes which precipitate (Pardede et al., 2013).

Identification of flavonoids in the ethanol extract of the Qust al hindi roots was carried out by adding magnesium (Mg) and hydrochloric acid (HCl). Flavonoids are polar compounds that will dissolve in solvents with the same polarity, one of which is ethanol. In general, flavonoid compounds are found in almost every plant (Fawwaz et al., 2023). The flavonoid compound group has many -OH groups with high electronegativity differences so that they are easily extracted in ethanol solvents (Ikalinus et al., 2015). The ethanol extract of the Qust al hindi roots contains flavonoid compounds which are characterized by a change in the color of the solution to red. This is because the flavonoid compounds undergo a reduction reaction caused by hydrochloric acid and magnesium, where the Mg and HCl powders react to form  $H_2$  bubbles, resulting in a reduction reaction in the benzopyrone nucleus. This reaction causes a color change to red (Bhemama, 2020).

Identification of saponins was carried out by adding hot water and shaking for 10 seconds. Screening for compounds that can foam when shaken in water. This foam occurs due to the presence of polar and nonpolar groups in saponins that form micelles, when the micelles are formed the polar groups will face outward and the nonpolar groups

will face outward, this is what looks like foam (Padmasari et al. 2013). The ethanol extract of the Qust al hindi roots does not contain saponin compounds because the ethanol extract of the Qust al hindi roots does not have the ability to form foam.

Terpenoid identification was carried out using anhydrous acetic acid and concentrated sulfuric acid. The ethanol extract of the Qust al hindi roots contains terpenoids which are characterized by the formation of a brownish ring. These terpenoid compounds can be extracted with ethanol because they have the same polarity. Ethanol and terpenoid solvents have -OH groups which means they are both polar. There was an esterification reaction due to the dripping of concentrated sulfuric acid through the tube wall, causing acetic anhydride to react. The C atom on the anhydride forms a carbocation. The carbocation then reacts with the O atom in the -OH group present in the terpenoid compound (Dewi et al., 2021).

#### 4. CONCLUSION

Based on the research that has been done, it can be concluded that the ethanol extract of the Qust al hindi roots (*Saussurea lappa*) contains alkaloids, flavonoids and terpenoids.

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**Ethical Approvals:** Not applicable

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