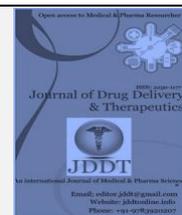


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Review Article

Kasni (*Cichorium intybus*): A Unani Hepatoprotective Drug

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ABSTRACT

Kasni (*Cichorium intybus* Linn.) is a powerful hepatoprotective and nephroprotective drug which has been extensively used in Unani System of Medicine. It is commonly known as chicory in English language. It is an erect perennial herb of the dandelion family Asteraceae. There are two types of *Kasni* depending on colour of the flowers which are usually bright blue and white or pink rarely. Chicory consists of a dietary fibre called as Inulin which is very useful in treating diabetes and constipation. As per Unani classical literature, it has been extensively used as *Mufatteh Sudud* (Deobstruent), *Musaffi Dam* (Blood Purifier), *Muqawwi Kabid* (Hepatic Tonic), *Muqaiwwi Meda* (Tonic for Stomach), *Waram e Meda* (Gastritis), *Amraz e Kabid* (Liver Disorders), *Ghisyan* (Nausea and Vomiting), *Amraze Kulliya* (Kidney Diseases), etc. The root of *Kasni* possesses various properties such as Aperient, Cholagogue, Deobstruent, Diuretic, Emmenagogue, Febrifuge, Resolvent. Its leaves' decoction is used as lithotriptic and also useful in elimination of internal mucus. This paper gives an overview of types, phytochemical studies, pharmacological actions and therapeutic uses of *Kasni* as per Unani classical literature and current scientific studies.

Keywords: *Kasni*, *Cichorium intybus* Linn., Unani System of Medicine, Hepatoprotective, Unani drug.

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INTRODUCTION

Kasni (*Cichorium intybus* L) is an erect perennial herb of the dandelion family Asteraceae. It is known as Hindubar, Indyba in Arabic, Chicory in English, Kichora, Kikori in Greek, Kasani in Gujrati, Kasni in Hindi, Kasani in Persian, Kasani in urdu¹. It is an important Unani drug which has been extensively used for the treatment of various diseases of hepatobiliary system and renal system. There are some scientific studies which has been validated that *Kasni* or chicory has some constituents like caffeic acid derivatives, fructooligosaccharides, flavonoids, inulin, and polyphenol¹. It also contains a bitter glycoside named cichorine². Leaves of the plant contain salts namely, sulphates & phosphates of sodium, magnesium, potassium and potassium nitrate. It has been reported that fresh *Kasni* typically contains 68% inulin, 14% sucrose, 5% cellulose, 6% protein, 4% ash, and 3% other compounds, while dried *Kasni* contains approximately 98% inulin and 2% other compounds. The plants of *Kasni* are found on roadsides, railroads and waste grounds. It is widely distributed in Asia and Europe³. All parts of the plant *Kasni* especially root and

leaves are used as diuretic, laxative, antibilious, antipyretic, blood purification and strengthen of the stomach. It is also used as an appetizer as well as in the treatment of hepatic failure, jaundice, intermittent fever and mild states of chronic skin diseases⁴.

TAXONOMIAL DESCRIPTION⁵

Kingdom: Plantae,

Division: Magnoliophyta,

Class: Magnoliopsida,

Family: Asteraceae,

Genus: *Cichorium*,

Species: *Cichorium intybus* L.

BOTANICAL DESCRIPTION

The leaves of *Kasni* are broadly oblong, oblanceolate or lanceolate, crowded at the base, forming a rosette arranged spirally on the stem. The upper leaves are cordate and

amplexicaul; and the lower leaves are long and pinnate. The stems are angled or grooved, with spreading branches, bright blue flowers, short pappus and very long, spreading-toddled ligules. The roots of *Kasni* are brownish yellow outside and white inside, with thin bark. It is well developed and the central part is mature which contains a portion of xylem including numerous vessels. They are fleshy, tapering, stem 1-3 long angled and grooved, branches rigid spreading, leaf nerves, beneath, hispid leaves along lanceolate, upper cordate amplexical. Head 1-1/2" diameter, peduncles thickened in the middle, involucre bracts herbaceous, ligules bright blue, rarely white or pink. The fruits are dry, indehiscent, 3 mm long, 2 mm broad and crowned with a ring of 0.5 mm long pappus which is usually white but sometimes half white and half straw coloured. The seed inside the fruits are 2.5 mm long & ovoid, with a pointed apex, brownish tip and while plano-convex cotyledons^{6,7}.

UNANI DESCRIPTION OF *KASNI*⁸⁻¹⁰

According to Unani physician Hakim Njam ul Ghani, *Kasni* is a common plant which grows wild and also cultivated. Its cultivated variety is known as *Bustani*, *Hindba e Shami-o-Hashmi-o-Balaqhi* and wild variety is known as *Dashti*, *Hindba e Baqal*.

Bustani is of two varieties:

- One variety where leaves are long & broad similar as *Kahu* leaves and slightly bitter in taste; flowers are bigger and colour resembles with colour of lajward. This variety is also known as *Hindba e Shami o Hashmi o Balaqhi*.
- In other variety, leaves and flowers are smaller than first variety, flowers are bluish / purple and taste is very bitter. This variety is also known as *Hindba e Baqhal*. The medicinal properties of the plant are mainly found on the layers of leaves, therefore it is advised not to wash the leaves.

Temperament

The *Mizaj* (Temperament) of *Kasni* is cold in the last phase of the first degree. Its dry part is dry in first degree and moist part is moist in the last phase of first degree. The cultivated variety is relatively more cold and moist while the wild *Kasni* which is also known as *Tarakhshaq* is less moist⁸.

Actions and Therapeutic Uses of *Kasni*

Mufatteh Sudud (Deobstruent), *Musaffi Dam* (Blood Purifier), *Muqawwi Kabid* (Hepatic Tonic), *Muqaiwwi Meda* (Tonic for Stomach), , *Muskkin e Atash* (thirst reliever), *Mushil* (Laxative), *Qabiz* (Astringent), *Habis e Dam* (Styptic), *Muddir-e-Baul* (Diuretic) and *Musakkin* (Analgesic) . *Kasni* is used in the treatment of *Waram e Meda* (Gastritis) *Sual* (Cough), *Khafqan* (Palpitation), *Sudda Har* (Headache), *Khunaq* (Diphtheria), *Amraz e Kabid* (Liver Disorders), *Istisqa* (Ascites), *Ghisyana* (Nausea and Vomiting), *Amraze Kulliya* (Kidney Diseases), , *Ishal* (Diarrhoea) and *Muzmin Humma* (Chronic fevers)⁸⁻¹².

SCIENTIFIC STUDIES

Phytochemical Studies

A study on seeds of *Kasni* was carried out for its phytoconstituents. It was found that seeds contain carbohydrates, glycosides, flavonoids, saponins, fats, and gums¹³.

Analysis of the fresh roots of *C. intybus* gave the following values: Moisture- 77. Fat: 0.6gm, Cellulose, Inulin and fiber-

9.0gm, Gummy matter- 7.5gm, Glucose- 1.1gm, Bitter extractives- 4.0gm, Ash- 0.8%. The roots contain the sesquiterpenes lactones like sonchusides A and C, and, cytokinin, crepidiaside B, cichoriolide A, cichoriosides B and C, ribosylzeatin a nucleotidsugar, lactucopicrin, uridine-5'-diphosphoglucose and chlorogenic, neochlorogenic, 8-deoxylactucin, isochlorogenic, lactucin, caffeic and chicoric acids. The carbohydrates present in the roots include a series of glucofructosans between sucrose and inulin besides glucose, fructose, pentose, dextrose, taraxarcine and levulose. The inulin is converted into inulide and finally into fructose due to the presence of an enzyme inulocoagulase during the storage¹⁴.

In the study on analysis of phytochemicals in the leaves of chicory it was found that the leaves contain coumarins, esculetin, cichoriin and sesquiterpene lactones, and recently a new coumarin glucoside ester Cichoriin-6'-*p*-hydroxyphenyl acetate, was isolated from chicory leaves along with cichoriin¹⁵.

In the another study, it was found that the plant of *Kasni* contains Chicoric acid which was found to stimulate insulin release from INS-1 E insulin-secreting cell lines and rats islet of Langerhans as well as glucose uptake¹⁶. Following compounds namely, Lactucin, Sonchuside A, Cichoriolide, Chlorogenic acid, 3,5-Dicaffeoylquinic acid, 4,5Dicaffeoylquinic acid, Crepidiaside A, Cichoralexin, Malic acid, Caffeic acid, 3-Caffeoylquinic acid, 5-Caffeoylquinic acid, 4-Caffeoylquinic acid, Dicaffeoyltartaric acid, (chicoric acid), Cyanidin, Glucoside etc. were isolated and identified from the plant of chicory¹⁷.

PHARMACOLOGICAL STUDIES

Antiulcer and Antioxidant Activity

Saxena et al., (2011) studied the antiulcer and antioxidant activity of *Cichorium intybus* L. roots which have been extensively used in the treatment for gallstones, gastroenteritis, sinus problems, diabetes and constipation. Antiulcer effect of hydro alcoholic extract of roots of *Cichorium intybus* L.(HACI) was assessed in rats by the oral administration of ethanol 99.5% (dose 1ml/200gm b.w.) and pylorus ligation method. The result of study showed that the antioxidant properties of HACI may contribute to gastro protective activity probably due to its free radical scavenging activity. It was suggested that HACI root extract possess antiulcer activity¹⁸.

Phytochemical and Antibacterial Activity

Nandagopal et al., (2007) carried out a study on phytochemicals and antibacterial activity of Chicory (*Cichorium intybus* L.). The whole plant contains a number of medicinally important compounds such as inulin, esculin, volatile compounds (monoterpenes and sesquiterpenes), coumarins, flavonoids and vitamins. The hexane and ethyl acetate root extracts of chicory showed a more pronounced inhibition than chloroform, petroleum ether and water extracts. Root extracts showed more inhibitory action on *Bacillus subtilis*, *Staphylococcus aureus* and *Salmonella typhi* than *Micrococcus luteus* and *Escherichia coli*. The results of the study showed the antibacterial activity of Chicory¹⁹.

Antidiabetic Activity

Hardeep and Pandey (2013) conducted a study to investigate the antidiabetic activity of Chicory roots methanolic extract (MEC) in streptozotocin (STZ) induced diabetic rats. MEC of root was subjected to preliminary qualitative phytochemical investigations by using standard procedures. Phytochemical analysis of MEC of roots revealed

the presence of inulin, sucrose, cellulose, protein, carbohydrates, lipids, alkaloids, glycosides and tannins compounds. In acute toxicity study, no toxic symptoms were observed for MEC up to dose 2000 mg/kg. Urine analysis on 1st day showed the presence of glucose and traces of ketone in the entire group except normal control group. However, on 21st day glucose and ketone traces were absent in MEC and glibenclamide-treated groups while they were present in diabetic control. After analysing the data, it was concluded that the methanolic extract of the root of the plant has antidiabetic activity and it is also involved in correction of altered biological parameters²⁰.

Pushparaj et. Al., (2007) studied to investigate the hypoglycemic and hypolipidemic properties of an ethanolic extract of *Cichorium intybus* in male Sprague-Dawley rats. The results of the study suggested that the reduction in the hepatic Glc-6-Pase activity could decrease hepatic glucose production, which in turn results in lower concentration of blood glucose in CIE-treated diabetic rats. It was also suggested that *Cichorium intybus* could ameliorate diabetic state²¹.

Ghamarian et. al., (2012) carried out a study to evaluate and compare the effects of aqueous extract of the seeds of chicory, *Cichorium intybus* L., on glucose tolerance test (GTT) and blood biochemical indices of experimentally-induced hyperglycemic rats. Late stage and early stage of Type 2 diabetes mellitus (T2DM) were induced in rats by streptozotocin (STZ) and a combination of STZ and niacinamide (NIA/STZ), respectively. Normalization of blood parameters, namely alanine aminotransferase, triacylglycerol, total cholesterol, and glycosylated hemoglobin, was seen in these animals. It was showed that chicory treatment led to the increase in insulin levels pointing toward the insulin-sensitizing action of chicory in early-stage diabetic rats²².

Tousch et. al., (2008) have described Chicoric acid (CRA) and chlorogenic acid (CGA) as potential antidiabetic agents by increasing glucose uptake in muscle cells. The results showed that CRA and CGA increased glucose uptake in L6 muscular cells, an effect only observed in the presence of stimulating concentrations of insulin. Both compounds were also able to stimulate insulin secretion from an insulin-secreting cell line and islets of Langerhans. It was proved that they are anti-diabetic agents which exhibit both insulin-sensitizing and insulin-secreting properties²³.

Hepatoprotective Effect:

Ahmed et al., (2008) conducted a study on Antihepatotoxic activity of cichotyboside which is a sesquiterpene glycoside isolated from the seeds of *Cichorium intybus*. It was found that cichotyboside exhibited a significant anti-hepatotoxic activity against CCl₄ induced toxicity in Wistar rats, wherein it reduced the elevated levels of liver enzymes such as serum glutamate oxaloacetate transaminase. It was concluded that seeds of *Cichorium intybus* possesses antihepatotoxic activity²⁴.

Gilani and Janbaz (1994) carried out a study to investigate the hepatoprotective activity of aqueous-methanolic extract of *Cichorium intybus* seeds against acetaminophen and carbon tetrachloride-induced hepatic damage in mice. It was observed that both the death rate and the serum levels of alkaline phosphatase, glutamyl oxaloacetate transaminase, and glutamyl pyruvate transaminase were decreased. Moreover, it prevented carbon tetrachloride (CCl₄)-induced prolongation in pentobarbital sleeping time confirming hepatoprotectivity and validates the folkloric uses of this plant in liver damage²⁵.

Sadeghi et. al., (2008) carried out a study to evaluate the hepatoprotective activity of hydroalcoholic extract of *C. intybus* using a carbon tetrachloride (CCl₄) -induced liver injury in rats. It was found that level of serum markers such as aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase, total bilirubin were significantly increased in CCl₄ treated rats. Simultaneously, *C. intybus* extract significantly suppressed mainly the increase in plasma activities of AST, ALT, ALP and TB concentration, which are considered as markers of liver functional state. The results of this study confirmed the hepatoprotective effect of the hydroalcoholic extract of *C. intybus*²⁶.

Gastroprotective Effect:

Gürbüz et al., (2002) carried out in vivo gastroprotective effects of *Cichorium intybus* which has been used in Turkish folklore including against ethanol-induced lesions. The aqueous decoction of *C. intybus* roots was orally administered to Sprague-Dawley rats, 15 minutes before the induction of ulcerogenesis by ethanol. More than 95% inhibition of ulcerogenesis was found in the test group. It was observed that the relevant extracts of all the plants given orally showed significant stomach protection²⁷.

Anti-Inflammatory Activity

Cavin et. al., (2005) carried out a study to investigate the potential anti-inflammatory activities of chicory. In this study, the inhibition of TNF- α mediated cyclooxygenase (COX) induction by chicory root extracts was investigated in the human colon carcinoma (HT 29) cell line. Ethyl acetate chicory root extract produced a marked inhibition of prostaglandin E(2) (PGE(2)) production in human colon carcinoma HT 29 cells treated with the pro-inflammatory agent TNF-alpha. The inhibition of TNF-alpha-dependent induction of COX-2 expression was mediated by an inhibition of NF-kappaB activation. It was found that the chicory root possesses anti-inflammatory activity²⁸.

Analgesic Activity

Wesołowska et. al., (2006) conducted a study to investigate analgesic action of lactucin, lactucopicrin, and 11 β , 13-dihydro-lactucin found in *C. intybus* in mice by using the hot plate and tail-flick tests. It was found that all the three compounds exerted an analgesic effect in the hot plate test, with lactucopicrin being the most potent compound. In the tail-flick test, the antinociceptive effects of all the tested compounds (30 mg/kg dose) were comparable to that of ibuprofen (60 mg/kg dose). It was observed that lactucin and lactucopicrin have some sedative action (which may contribute to the analgesic effect in part) as evident from the decreased spontaneous locomotor activity in mice²⁹.

Antioxidant Activity

Gazzani et. al., (2000) carried out a study to evaluate the *in-vitro* antioxidant activity and *in-vivo* protective activity of *Cichorium intybus* against rat liver cell microsome lipid peroxidation²⁹. Another study was conducted by Mehmood et. al., (2012) to investigate the antioxidant, antimicrobial and phytochemical analysis of *Cichorium intybus* seeds extract and various organic fractions. The results of the study showed that chicory contained both biological antioxidant and prooxidant compounds. After an antioxidant, antimicrobial & phytochemical analysis of *Cichorium intybus* seeds extract and various organic fractions, it was concluded that methanolic extract & ethyl acetate fraction of seeds exhibited good antioxidant activity³¹.

Cardioprotective Activity

Nayeemunnisa and Rani (2003) conducted a study to evaluate the cardioprotective effects of *Cichorium intybus* in ageing myocardium of albino rat. The cardioprotective effects of the aqueous extracts of the leaves of *Cichorium intybus* have been examined in the ageing myocardium of albino rats. The effects of chicory extract on malondialdehyde level on taurine, glutathione and catalase activity of the heart have been studied. The results showed that the *C. intybus* was found to ameliorate the age-induced injury and offered protection to the heart from oxidative damage, suggestive of age³².

CONCLUSION

Kasni (*Cichorium intybus*) has been extensively used for a long period in Unani System of Medicine. It is an excellent tonic for the liver & digestive tract and also useful in the cleansing of urinary tract. It is used as a Hepatoprotective and Nephroprotective for a long time. There are two types of *Kasni*: wild and cultivated. The wild *Kasni* is better than the cultivated variety for stomach diseases. *Kasni* is said to be suitable for all kinds of temperaments of the liver, and the drug is particularly suitable for hot-tempered livers. As per Unani classical literature, *Kasni* has been extensively used as *Mufatteh Sudud* (Deobstruent), *Musaffi Dam* (Blood Purifier), *Muqawwi Kabid* (Hepatic Tonic), *Muqaiwwi Meda* (Tonic for Stomach), *Waram e Meda* (Gastritis) and *Mushil* (Mild Laxative) in the treatment of *Amraz e Kabid* (Liver Disorders), *Ghisyan* (Nausea and Vomiting), and *Amraze Kulliya* (Kidney Diseases). Many therapeutic uses of *Kasni* have also been proved by the recent scientific pharmacological studies viz. hypoglycemic, hypolipidemic, hepatoprotective, anti-inflammatory, analgesic, antioxidant, anti-allergic.

CONFLICT OF INTEREST

None

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