Pharmacogn Rev. 2019;13(26):71-76
A multifaceted peer reviewed journal in the field of Pharmacognosy and Natural Products
www.phcogrev.com | www.phcog.net

Ethnobotany and Pharmacognosy of Qust/ Kut (*Saussurea lappa*, C. B. Clarke) with Special Reference of Unani Medicine

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ABSTRACT

Saussurea lappa, CB Clarke is the root of a perennial herb commonly grew in cold and humid areas such as North Asia- Kashmir, neighboring Himalaya regions, Garhwal etc. It has been used in the treatment of various disease ailments and conditions in Unani medicine with the name of 'Qust/ Kut'. In Unani medicine, qust had been used as a drug of choice in diseases such as bronchial asthma (spasmolytic), liver diseases (as liver tonic, anti-inflammatory and analgesics), nervine and brain disorders (as tonic), painful conditions (as analgesics), weakness, low body immunity (as immune enhancer), etc. This paper uniquely presents the morphological features, temperament, chemical constituents, pharmacological actions, usage in diseases, dose, adverse effects with the reference of not only the ethnobotanical data and pharmacological studies but also with the reference of Unani literature in detail. Pharmacological actions and uses of qust in Unani medicine are searched in the light of available pharmacological, cell line and clinical studies to identify those action and uses which are left to be tested and substantiated.

Key words: Qust, Saussurea, Costus, *Saussurea lappa*, Kut, Unani medicine, Ayush.

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DOI : 10.5530/phrev.2019.2.7

Article Available online
http://www.phcogrev.com/v13/i26

INTRODUCTION

Qust/ Kut is a perennial herb of family Asteraceae with botanical name of *Saussurea lappa*, CB Clarke.[1,2] Dried root of qust are well known and widely used Unani medicine for the treatment of liver diseases, neurological diseases, cough, bronchial asthma, ascites, joint diseases, intestinal worms, dysentery, skin diseases, various pains etc. In Unani medicine, dried roots of qust are used in the form of powder or decoction alone or as a part of compound formulations.[3-12] Its chemical constituents such as costunolide, dehydrocostus lactones, cyanaropicrin etc. have been isolated and substantiated their potentials as bioactive molecules.[13,14] In the international market, both dried roots and root oil are important medicinal drug for trade. Being an endemic species to the Himalaya, the distribution of this species is fairly restricted to tremendously narrow geographical. Qust is considered an critically endangered species and is enlisted in Appendix I of convention of international trade in endangered species of wild flora and fauna.[15]

Taxonomical classification.[1,2]

Kingdom	Plantae
Sub-kingdom	Tracheobionta – Vascular plants
Super-division	Spermatophyta – Seed plants
Division	Magnoliophyta – Flowering plants
Class	Magnoliopsida – Dicotyledons
Subclass	Asteridae
Order	Asterales
Family	Asteraceae[1,7,8,15-17,19,20] Compositae[2,3,9,10,13,14,17,20-23]
Genus	Saussurea D.C. – saw-wort
Species	*Saussurea lappa*, C. B. Clarke

Common names [Table 1]

Morphological features

Temperament (*Mizaj*): The theory of temperament is proposed by father of medicine "Buqrat (Hippocrates)" which outlined that each substance in the world carries a particular temperament of its own. The theory is also applicable to drugs of herbal, mineral and animal origin. The theory conceptualized that each drug possesses four qualities in different proportions, i.e. *hararat* (heat), *buroodat* (cold), *yaboosat* (dryness) and *rutoobat* (moisture). The interaction between these qualities in different proportion leads to development of an overall temperament (*Mizaj-e-advia*) which defines the constitution and action of the drug. Since every drug contain different active ingredients, temperament of these active ingredient dominates the other constituents [hence, named *murrakab-ul quwa (mixture of properties)*]. Thus, the temperament of the active ingredients becomes the basic of the overall temperament of the drug, creating variability of temperament in each drug. In Unani medicine, temperament of the drugs carries an important aspect while choosing drug for treatment of a particular diseases.

There is variability in temperament of qust, proposed by different scholars**:** (Hot 1^0 Dry 1^0)[13] or (Hot 3^0 Dry 2^0)[25] or (Hot 3^0 Dry 3^0)[10,11,12,24,26,27]

Distribution/Habitat: North Asia- Kashmir and neighboring Himalaya region 2500-3000 m; and also in Garhwal of Uttar Pradesh.[2,8,10,13,14,18,20,23,28]

Part used: The dried roots constitute the drug Qust/ Saussurea which is official in India[2,8,9,13,17,18,29] and essential oil are used primarily.[2]

Cite this article: Ansari S. Ethnobotany and Pharmacognosy of Qust/ Kut (*Saussurea lappa*, C. B. Clarke) with Special Reference of Unani Medicine. Pharmacog Rev. 2019;13(26):71-6.

Table 1: Common names of *Saussurea lappa*.

Language	Common names	References
English	Costus, kuth, costus root	[2, 3, 7-14,17,18,23]
Arabic	*Kust, qust, kustabaheri*	[2, 9,12-14]
Persian	*Kust, qust, koshnaha, kuttalkh*	[2,9,13,14]
Urdu/ Unani	*Qust, kut, kust*	[8,9,14,21,24]
Ayurveda	*Kustha*	[21]
German	*Practige kostwurz*	[13,14]
French	*Costus elegant*	[13]
Hindi and Bengali	*Kutha, Kut, kur, pachak, kudo, kot, pokharmul*	[2,9,12-14,17,18,21,23, 25]
Sanskrit	*Amaya, pikala, apya, kasmirja, utpalam, kushta, kashtam, puskara, kashmirja, kaubera*	[9,13,14,17,18,21]
Gujarati	*Upaleta, kur, kath*	[2,9,13,17,23]
Kannada	*Koshta, changal*	[2,9,13,17,18,21]
Malayalam	*Sepuddy, kottam*	[2,9,13,17,18,21]
Marwari	*Kushta*	[2,9,17]
Tamil	*Kostum, putchuk, goshtam, kosbtham, kottam*	[2,9,13,17,18,21]
Telugu	*Changala, kustam, koshtu*	[2,9,13,17,18,21]
Kashmiri	*Kuth, chob-e-qut, post-khai, patalapadmini, pakchan*	[2,9,13,17,18,21]
Assamese	*Kud, kur*	[9,21]
Marathi	*Upleta, kushtha*	[9,13,21]
Oriya	*Kudha*	[9,21]
Trade	Kuth, costus	[2,17]

Description: An erect robust perennial herb 1 to 2 m. tall.[11,25,26] Qust require a cool and humid climate of the kind found at altitudes above 2600-3200 m. Roots are harvested during September-October when they achieve maximum growth and comes to flower when they are about five years old.[2,14] [Figure 1]

Root*- Naked eye*: Stout, often up to 60 cm long, possessing a penetrating aromatic odor. Bitter in taste. Dried roots are Greyish to dull brown in color, thick, light, stout and fusiform to cylindrical 7-15 cm long and 1.5 cm thick with collapsed center. Occasionally they are ridged and possesses a short and horny fracture.[2,9,10,11,14,21,25] Odor strong, characteristically aromatic and taste slightly bitter.[9,21,25] [Figure 2]

***Microscopic*:** Transverse section of thin root shows thin periderm, followed by broad zone of phloem and still broader xylem traversed by wide medullary rays; cork. Secondary phloem consists of mostly stroage parenchyma, small groups of sieve tubes and companion cells and often phloem fibres, bast fibres thick-walled, lignified, upto 350 m in length, with many simple pits associated with fibre, tracheids and parenchyma; resin canals found throughout as large cavities; in older roots, wood parenchyma collapses and takes a spongy appearance in the center of root; inulin present in storage parenchyma.[2,9,21]

Powder: Form of the drug (root) is deep brown or rust colored and contains not more than 2 % foreign organic matter. Under microscope irregular bits of yellow, brown or orange-red fragments of resins and oils associated with thin-walled parenchymatous cells, broken bits of xylem vessels with scalariform, reticulate thickening and horizontal end walls.[2,9,21]

Stem*:* Stout, fibrous, 1.2-2 m. ***Leaves***: Radical with long lobately winged stalk, upto *c.* 1 m. long. ***Flower***: Dark blue purple or almost black, in axillary and terminal clusters; flower head, stalk less 2.5-3.8 cm. ***Achenes:*** *c.* 3 mm, long, curved and compressed.[3,7-10,14,17,18,20,21,23]

Figure 1: Morphology of *Saussurea lappa*, CB Clarke.

Figure 2: *Saussurea lappa* roots.

Chemical constituents

Root

Root contains resinoids (5%) - bitter 2 liquid resin and a solid resin, essential oil (1.5%) and alkaloids (0.05%) - saussurine (in alcoholic extract), kushtin ($C_{20}H_{26}O_3$) as active principle.[13,14] it also contain inulin (18%); Salt of valeric acidA fixed oil; an astringent principle; minor constituent's annins and sugars.

Essential oil is obtained from the roots (costus oil) through various methods which yields 0.8-5.8 % essential oil. Through steam distillation of which yields 1-2 % of essential oil which possesses a natural aroma. The solvent extraction of the roots with petroleum ether (b.p, 40-60^0) at low temperature, the yield of the oil being 6%.[2,7-11,13,17,19,21,23]

Kuth root oil contains mainly high boiling sesquiterpenes and sesquiterpene alcohols. The following constituents have been reported: Costunolide ($C_{15}H_{20}O_2$), primary sesquiterpene lactone, dehydrocostus lactone (DL), dihydro-dehydrocostus lactone, camphene, costol, β-sitosterol, stigmasterol, betulin, aplotaxene, β- selinine, β-elemene, α and β-ionones, a bicyclic sesquiterpenic acid, phellanderine, C_{13}-ketone and certain unidentified constituent's including hydrocarbons, ketones and alcohols. Oil is a pale yellow to brownish, very viscous liquid. It has a peculiar soft but tenacious odor reminiscent of orris root with a distinctly animal or sebaceous undertone. It is valued in high class perfumery and cosmetic and is expensive.[2, 7,11,13,17,19,21,23]

Leaves: Alkaloid saussurine and taraxasterolalong with resin, traces of bitter substances, small amount of tannins, inulin, potassium nitrate, sugar, fixed oil but not essential oil.[2,7-11]

Dose: 2-3 g[9,10] or 0.2-1 g[21] or 3 g[24] or 7 g.[5]

Table 2: Pharmacological actions of *Saussurea lappa*.

Action of drug	Unani references	Ethno-botanical references
Hepatoprotective (*Muqawwi-e-Jigar*)	[12,27]	[13,14]
Anti-inflammatory (*Muhallil-e-Warm*)	[9,10]	[14]
Immuno-modulator (*Tabiyat ki Tehrik*)	[25]	
General tonic (*Muqawwi/ Muqawwi-e-A'za Raisa*)	[8,10,11,24,29]	[3,7,13,14,17,18,30]
Antidote (*Tiryaq*)	[12,25]	[30]
Analgesic (*Musakkin-e-Alam*)	[9,10-12]	[8,14]
Diuretic (*Mudirr-e-Bawl*) (Oil)	[9,10-12,29]	[2,13,14,18,19]
Digestive tonic (*Muqawwi-e-Me'da*)	[8,10,11,27]	[7,14,17,18,28]
Carminative/ Anti-flatulant (*Kasir-e-Riyah*)	[8-11,27,29]	[2,3,7,13,14,17,18,23]
Nervine and brain tonic (*Muqawwi-e-Dimagh wa Asab*)	[9-11,25,24]	[13,14]
Alterative (*Moaddil*)		[13,14,18]
Detergent (*Jali*)	[9-11]	
Rubefacient (Muhammir/ Jazib-e-Khoon)	[10,11,24-26]	
Desiccant (*Mujaffif*)	[9-11]	[14]
Anti-septic and disinfectant (*Dafi'-e-Ta'affun*) (oil)		[2,13,14,18,23]
Vasodilation (oil)		[2]
Emmenegogue (*Mudirr-e-Haez*)	[9-12, 25]	[14]
Abortificient (fumes)	[25]	
Expectorant (*Munaffis-e-Balgham*) (oil)/ Bronchodilator	[9-11]	[2,13,14,18,23]
Decreases gut peristalsis		[2,13,14,19]
Insecticidal / Anti-parasitic (Root)		[2,13,17,23]
Hypotensive		[2,19]
Spasmolytic/ Antispasmodic		[2,13,17,19,23]
Kidney Tonic/ Nephroprotective	[12]	[14]
Cardiac stimulant		[13,18,19,23]
Tonic for genital organ		[13,30]
Anthelminthic (*Qatil-e-Didan Shikam*)	[9,10,27]	[3,13,14]
Aphrodisiac (*Muqawwi-e-Bah*)	[10,11,24,25]	[13,14]
Astringent (*Qabiz*)		[13,30]
Sedative (*Munawwim*)		[13]

Table 3: Therapeutic uses of *Saussurea lappa*.

Uses	Unani References	Ethno botanical References
Hepatitis (Warm-e-Jigar)	[3,5,6,25]	
Jaundice (*Yarqaan*)	[6]	[13]
Splenomegaly (*Warm-e-Tihal*)	[9-11]	
Ascites (*Istiska*)	[10,11]	
Cough	[7-11,29]	[2,3,13-14,17,18]
Bronchial asthma (*Zeeq-un-Nafas*)	[7-12,29]	[2,3,13,14,17, 18,21,23]
Chronic bronchitis		[2,14,18]
Paralysis/ Facial palsy (*Falij/ laqwa*)	[9-11,25,29]	[13]
Tremors (*Rasha*)	[9-11]	
Arthritis (*Waja-ul-Mafasil*)	[9-11,24]	[14]
Gout (*Niqras*)	[9-11,18]	
Sciatica (*Irq-un*-Nasa)	[11,25]	
Intestinal worms (*Didan-e-Ama*)	[9-11,25,26,29]	[14]
Amenorrhea/ Dysmenorrhea	[9-11,25]	[18,19]
Fever/ chronic fever	[10,11,24-26]	[13,14,18,30]
Polyuria (*Kasrat-e-Bawl*)	[26]	
Menorrhagia (*Kasrat-e-Haez*)	[26]	
Quartan malaria		[13,14,30]
Cephalgia	[24]	[13,14]
Leprosy		[13,14,18,21,30]
Leucoderma and erysipelas		[14,18]
Dysentery		[3,18,30]
Hiccough		[13,14,17,18,30]
Dyspepsia (*Su-e-Hazm*)		[13,18,30]
Dropsy		[13]
Chronic rheumatism	[7,8,24,29]	[13,14,17,30]
Epilepsy and hysteria	[29]	[14,18,29]
Skin diseases Ring worm, itching, scabies	[7,8,10,29]	[13,14,17,29]
Lateral or chest pain	[11,10,25,26]	[13,14,17,18,30]
Alopecia	[11,25,29]	
Melasma and dark pigmentation	[10,11,24,25,26]	
Chronic ulcer		[18,30]
Cosmetic and perfumery	[25]	[3,13,14,18]
Aching tooth (odontalgia)		[13,18,30]
Greying, impaired growth of hair	[10]	[13,30]
Cholera	[8,29]	[3,7,13,18]
Scorpio bite/ snake bite	[25]	[13,14,29]
Piles, headache, scanty urination		[29]
Prophylactic		[13]

Table 4: Experimental studies on *Saussurea lappa*.

Action	Form	Model used	After treatment	References
Antiviral (anti-HBV)	Costunolide and Dihyd-o costus	Human hepatoma Hep 3B cells	Strong suppressive effect on the expression of HBsAg and HBV DNA.	Chen *et al*. 1995.[31]
		HepA2 cells	Suppressive effect on mRNA of HBsAg	
Hepatoprotective	Aqueous extract	D-Gal N and LPS-induced hepatitis in mice	Significantly restricted the progression of hepatic damage ($p < 0.05$).	Yaeesh *et al*. 2010.[32]
Immuno-modulator	Hydroalcoholic extract	Swiss albino mice	Increase in leukocyte count, spleen weight, phagocytic index and antibody secreting cells. Humoral and cell mediated response.	Pandey *et al*. 2012.[33]
Anti-inflammatory	Methanolic extract	LPS activated mouse	Inhibit NO production and inflammatory mediators.	Matsuda *et al*. 2003.[34]
	Cynaropicrin	Murine macrophage		Cho *et al*. 2000.[35]
Anti-oxidant	Butenolic fraction	Folin-Ciocalteu's colorimetric	Inhibited DPHH radical.	Chang *et al*. 2012.[36]
Anti-cancer/ anti-tumor	Lappadilactone	Human cancer cell	Cytotoxicity against HepG2, OVCAR-3 and HeLa cell lines.	Sun *et al*. 2003.[20,37]
	Costulonide	Umbilical vein cells	Anti-angiogenic effect in endothelial cells.	Jeong *et al*. 2002.[38]
Anti-ulcer	Acetone extract and Costunolide	Mice	Inhibitory effect on the formation of gastric ulcer.	Yamahara *et al*. 1985.[20,39]
Anthelminthic	Decoction	Against nematode	Reductions in the faecal eggs per gram (EPG).	Akhtar *et al*. 1991.[40]
Anti-convulsant	Petroleum Extract	Mice	Inhibited picrotoxin-induced convulsions and maximal electroshock test.	Butola *et al*. 2010.[41]
Gastro-protective effect	Methanolic extarctr	Rats	Acidified ethanol induced gastric mucosal lesions in a dose dependent manner.	Kumar *et al*. 1989.[42]
Anti-angiogenesis effect	Costulonide	Mouse corneal cell	Repressed vascular endothelia growth factor. Inhibited neo-vascularization of cornea	Jeong *et al*. 2002.[43]
Hypoglycemic	Extract	Human	Effective in obese diabetes	Upadyay *et al*. 1996.[44]
Spasmolytic	Extract	Guinea pig	Relax the contraction induced by carbachol, reduced ca++ions	Hsu *et al*. 2009.[45]
Anti-diarrheal	Methanolic extract	Wistar rats	Inhibition of diarrhea	Hemamalini *et al*. 2011.[46]
Hypolipidemic	Aqueous extract	Rabbits	Reduction in serum triglyceride and cholesterol.	Upadyay *et al*. 1996.[44]
Anti-microbial	Extract	*in vitro*	Inhibits H. Pylori	Ohta *et al*. 2010; Papamichael *et al*. 2009; Li Y *et al*. 2010; Li YH *et al*. 2010.[47-50]
			Inhibits resistant Streptococcus mutant.	Yu *et al*. 2011.[51]
			Inhibits shigella.	Hasson *et al*. 2013.[52]

Table 5: Adverse effects of *Saussurea lappa*.

Adverse Effect	Form	Unani references	Ethno-botanical references
Irritation and feeling of discomfort in abdomen	Extract orally in large doses (10-20 cc)		[13]
Drowsy			[13]
Irritation in urethra and aphrodisiac effect	During excretion of essential oil		[13]
Headache giddiness	Higher doses of extract		[13]
Depression of cerebral centers	Inhalation of fumes of powdered drug	[7]	[2,13]
Allergic Dermatitis			[53]

Corrective (*Muslih*): As per Unani scholars, due to its hot temperament, qust can cause certain side effects in individual of hot temperament or in certain disease conditions. Hence, Unani scholars also mentioned those drugs (correctives) to counterfeit those side effects. The correctives for qust are *gulqand aftabi* and *anisoon (Pimpinella anisum)*.[11,24,27]

Alternative (*Badal*): During ancient times, unavailability of a particular drug (drug of choice) contributes to usage of a drug (alternatives) which has almost similar temperament and actions likewise to the drug of choice. As per Unani scholars, alternatives for qust are *aqarqarha* (*Anacyclus pyrethrum*)[11,12,25] and *daroonj* (*Doronicum hookeri*).[24]

Harmful to (Muzir): Through logic, philosophy and clinical experiences, Unani scholars mentioned that qust has harmful effects on Urinary bladder and lungs (especially if a person suffer from diseases of these organs).[11,24,27]

Formulations in Unani Medicine: Qust is a part of following compound formulations of Unani medicine: *Jawarish-e-Jalinoos, Dawa-ul-Kurkum, Majoon-e-Dabidul Ward, Majoon-e-Juntiyana, Majoon-e-Khadar, Tiryaq-e-Samaniya, Zimad-e-Khanazeer, Sabadaritoos, Anqaruya-e-Kabir* etc.[9,10,11]

Pharmacological actions (Af'al-o-Khawas) in Unani medicine and ethno-medicine [Table 2]

Therapeutic uses in Unani medicine [Table 3]

Experimental studies/ Pharmacological evidence [Table 4]

Adverse effects [Table 5]

CONCLUSION

More than 300 variety of Saussurea are available throughout the globe. Qust (*Saussurea lappa*, CB clarke) is one of the root to be used as medicinal important in Unani medicine. Many medicinal active compounds have been isolated from the qust. Sesquiterpene lactones of which dehydrocostus lactone and costulonide are the major active constituents responsible for most of the pharmacological activities.

Qust has been used in Unani medicine in the form of decoction or powder or oil, alone or in combination with other drugs. It has been used successfully by Unani physician in the treatment of hepatitis, jaundice, splenomegaly, cough, asthma, chronic bronchitis, paralysis, tremors, epilepsy, hysteria, arthritis, chronic rheumatism, sciatica, gout, intestinal worms, amenorrhea, fevers, malaria, leukoderma, erysipelas, ring worm, chronic itching, scabies, dysentery, dyspepsia, cholera, melasma, alopecia, chronic ulcer, hair fall and scorpio/ snake bite. Qust oil has also been used in perfumery and cosmetics and also for prophylactic use.

Qust and its active compounds have substantiated their potential antiviral, hepatoprotective, anti-inflammatory, immunomodulator, anti-microbial, antiulcer, gastroprotective, anticancer, anti-oxidant, anthelminthic, hypolipidemic, hypoglycemic, anti-angiogenesis, anti-diarrheal, spasmolytic and anticonvulsant activities in various *in vitro*, *in vivo* and clinical studies. Various critical reviews analyzed pharmacological benefits of qust but insufficient to produce and correlate diverse benefits available in Unani literature with current studies. Its neurotronic, antifungal, vasodilator, nephroprotective, cardiac stimulant, hair vitalizer/ tonic, joint repairment, skin rejuvenating effects have not been studied which requires investigation. Some of the adverse effect of qust have also been reported by Unani scholars which are developed when the concentrated extract of the root is taken in higher dosage for long term. The adverse effects are depression of cerebral centers, gastrointestinal disturbances, headache, giddiness, irritation of urethra and allergic dermatitis upon local use.

Due to presence of active compounds and their widespread usage especially in international societies also, high demand puts the herb into endanger and extinction. Thus, scientifically governed proper steps should be taken for its harvesting, conservation and limited utilization under biotechnology expertise.

ACKNOWLEDGEMENT

Authors are thankful to librarians and library assistant of School of Unani Medical Education and Research, Jamia Hamdard, New Delhi.

CONFLICT OF INTEREST

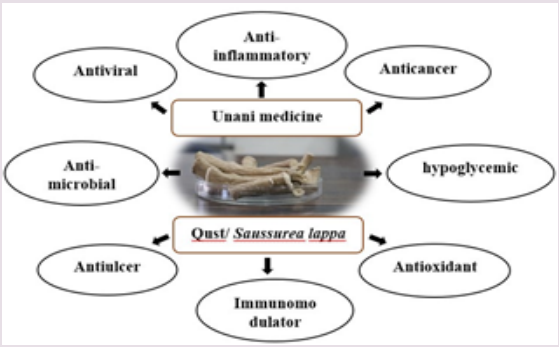
The authors declare no conflict of interest.

REFERENCES

1. USD A Plants: Classification: *Saussurea* DC. [Monograph online] [Cited 2015 May 27]. Available from: http://plants.usda.gov/java/ClassificationServlet.
2. The Wealth of India. *Saussurea* DC. India: Publication and Information Directorate. CSIR. 1972;9:240-3.
3. Ibne S. Al-Qanoon Fit-Tibb [Kantoori GH, Trans]. New Delhi: Aijaz Publishing. 2010;3(1):854-62, 869-78.
4. Jurjani AH. Zakheera khwarzim shahi, [Khan HH, Trans]. Lucknow: Munshi Nawal Kishore Publishing. Year???2(7):368-82.
5. Khan H. Ikseere Azam [H. Kabiruddin, Trans]. New Delhi: Aijaz Publishing. 2010;489, 505-15.
6. Razi AB. Kitabul-Hawi [Urdu translation]. New Delhi: Central council for research in Unani Medicine. 2000;7:47-50, 52-73, 119-45.
7. Medicinal plants in the folklores of Kashmir Himalayas. New Delhi: Central council for research in Unani Medicine. 2001;194.
8. Medicinal plants in the folklores of Northern India. New Delhi: Central council for research in Unani Medicine. 2006;2:245-66.
9. The Unani Pharmacopea of India: Qust. New Delhi: Central council for research in Unani medicine. 2007;1:74-6. Part 1st
10. Lubhaya R. Goswami Byan-ul-Advia. New Delhi: Goswami Kutub Khana Gali Kasim Jaan. 1975;2:66-8, 124-6.
11. Kabiruddin. Makhzan-ul-Mufradat Maaroof Khwas-ul-Adviyah. New Delhi: Aijaz Publishing House. 1930;80.
12. Razi Z. Kitabul Abdal. 3rd ed. New Delhi: Central council for research in Unani Medicine. 2000;43.
13. Indian Materia Medica. 3rd ed. India: Popular Prakashan Pvt. Ltd. 2013;141-2, 1108-113.
14. Kirtikar KR, Basu BD. Indian Medicinal Plants. 2nd ed. India: International book distributors. 1988;2:1420-23, 1398-1400.
15. Pandey MM, Rastogi S, Rawat AKS. *Saussurea costus*: Botanical, chemical and pharmacological review of an ayurvedic medicinal plant. Journal of Ethnopharmacology. 2007;110(3):379-90.
16. NMCD (Natural Medicine Comprehensive Database): Costus. 2015. [Monograph online] [Cited 2015 May 27]. Available from: http://naturaldatabase.therapeuticresearch.com/nd/Search.aspx?pt=100andid=855andAspxAutoDetectCookieSupport=1.

17. Ramchandran K. The Useful Plants of India. India: Publication and Information Directorate. CSIR. 1986.
18. Sala AV. Indian Medicinal Plants. India: Orient Longman. 1997;5:80.
19. Rastogi RP, Malhotra BN. Compendium of Medicinal Plants. New Delhi: Publication and Information Directorate. CSIR. 1990;1:345-64.
20. Zahara K, Tabassum S, Sabir S, Arshad M, Qureshi R, Amjad MS, *et al*. A review of therapeutic potential of *Saussurea lappa*: An endangered plant from Himalaya. Asian Pac J Trop Med. 2014;7(1):S60-9.
21. The Ayurvedic pharmacopeia of India: *Saussurea lappa*. New Delhi: Central council for research in Ayurvedic sciences. 2016;1:103-4. [Cited 2015 July 12] Available from: http://www.ayurveda.hu/api/API-Vol-1.pdf.
22. Chopra RN, Chopra IC, Varma BS. Supplement to glossary of Indian medicinal plants. New Delhi: Publication and Information Directorate. CSIR. 1986;90-8.
23. Shah CS, Qadry JS. A Textbook of Pharmacognosy. India: Navjiwan Press.1971;246-9.
24. Mufradat-e-Nasri. Available from: Central Library, Jamia Hamdard. Year???;76.
25. Ibne S. Al-Qanoon Fit-tibb [Kantoori GH Trans]. New Delhi: Aijaz Publishing House. 2010;268-439ss. Part 5.
26. Ibne RAWM. Kitabul Kuliyaat [Urdu Trans]. New Delhi: Central council for research in Unani Medicine. 1987; 267-89.
27. Abd-ul-Aziz M. Mufradat-e-Azizi. Lucknow: Sahitya Mandir Press. 1948;28-36.
28. Kaul MK. Medicinal Plants of Kashmir and Ladakh. New Delhi: Indus Publishing Co. 1997;144.
29. Hussain SF, Kram M. Adviyat mai Kaam Aane wale Paude [Nagar SA Trans]. Lahore: Aldosaiaa Board. 1990;10-22.
30. Kumar N, Kumar A. Durlabh hoti chamatkaric aushadhi-Kuth. Sachitra Ayurveda. 1989;1:25-9.
31. Chen HC, Chou CK, Lee SD, Wang JC, Yeh SF. Active compounds from *Saussurea lappa* Clarks thatsuppress hepatitis B virus surface antigen gene expression in human hepatoma cells. Antiviral Res. 1995;27(1-2):99-109.
32. Yaeesh S, Jamal Q, Shah AJ, Gilani AH. Antihepatotoxic activity of *Saussurea lappa* extract on D-galctosamine and lipopolysaccharide induced hepatitis in mice. Phytother Res. 2010;24(2):S229-32.
33. Pandey RS. *Saussurea lappa* extract modulates cell mediated and humoral immune response in mice. Der Pharmacia Lettre. 2012;4(6):1868-73.
34. Matsuda H, Toguchida I, Ninomiya K, Kageura T, Morikawa T, Yashikawa M. Effects of serquiterpene and amino acid-serquiterpene conjugates form the roots of *Saussurea lappa* on inducible nitric oxide synthase and heat shock protein in lipopolysaccharide-activated macrophages. Bioorganic and Medicinal Chemistry. 2003;11(5):709-15.
35. Cho JY, Baik KU, Jung JH, Park MH. *In vitro* anti-inflammatory effects of cynaropicrin, a sesquiterpene lactone, from *Saussurea lappa*. Eur J Pharmacol. 2000;398(3):399-407.
36. Chang KM, Choi SI, Kim GH. Anti-oxidant Activity of *Saussurea lappa* C.B. Clarke Roots. Prev Nutr Food Sci. 2012;17(4):306-9.
37. Sun CM, Syu WJ, Don MJ, Lu JJ, Lee GH. Cytotoxic sesquiterpene lactones from the root of *Saussurea lappa*. Journal of Natural Product. 2003;66(9):1175-80.
38. Jeong SJ, Itokawa T, Shibuya M, Kuwano M, Ono M, Higuchi R, *et al*. Costunolide, a serquiterpene lactone from *Saussurea lappa* inhibits the VEGER KDR/FLK-1 signaling pathway. Cancer Letter. 2002;187(1-2):291-303.
39. Yamahara J, Kobayashi M, Miki K, Kozuka M, Sawada T, Fujimura H. Cholagogic and antiulcer effect of *Saussurea radix* and its components. Chemical and Pharmaceutical Bulletin. 1985;33(3):1285-8.
40. Akhtar MS, Riffat S. Field trail of *Saussurea lappa* roots against nematodes and *Nigella sativa* seeds against cestodes in children. Journal of Pakistan Medical Association. 1991;41(8):185-7.
41. Butola JS, Samant SS. *Saussurea* species in Indian Himalayan Region: diversity, distribution and indigenous uses. Int J Plant Biol. 2010;1(1):43-51.
42. Kumar N, Kumar A. Durlabh hoti chamatkaric aushadhi-Kuth. Sachitra Ayurveda. 1989;1:25-s9.
43. Jeong SJ, Itokawa T, Shibuya M, Kuwano M, Ono M, Higuchi R, *et al*. Costunolide, a sesquiterpene lactone from *Saussurea lappa*, inhibits the VEGFR KDR/Flk-1 signaling pathway. Cancer Lett. 2002;187(1-2):129-33.
44. Upadhyay OP, Singh RH, Dutta SK. Studies on antidiabetic medicinal plants used in Indian folklore. Aryavaidyan. 1996;9:159-67.
45. Hsu YL, Wu LY, Kuo PL. Dehydrocostuslactone, a medicinal plant derived sesquiterpene lactone induces apoptosis coupled to endoplasmic reticulum stress in liver cancer cells. J Pharmacol Exp Ther. 2009;329(2):809-19.
46. Hemamalini K, Vasireddy U, Nagarjun GA, Harinath K, Vamshi G, Vishnu E, *et al*. Anti-diarrhoeal activity of leaf extracts *Anogessius accuminata*. Int J Pharm Res Dev. 2011;3(6):55-7.
47. Ohta M. *Helicobacter pylori* infection and autoimmune disease such as immune thrombocytopenic purpura. Kansenshogaku Zasshi. 2010;84(1):1-8.
48. Papamichael KX, Papaioannou G, Karga H, Roussos A, Mantzaris GJ. *Helicobacter pylori* infection and endocrine disorders: is there a link?. World J Gastroenterol. 2009;15(22):2701-7.
49. Li Y, Xu C, Zhang Q, Liu JY, Tan RX. *In vitro* anti-Helicobacter pylori action of 30 Chinese herbal medicines used to treat ulcer diseases. J Ethnopharmacol. 2005;98(3):329-33.
50. Li YH, Gong T, Yang QM, Miao ZL, Cheng GQ, Huo QP. *In vivo* study of the inhibition of R plasmid transfer by conjugation in rats taking extracts of *Radix aucklandiae* and *Polygonatum cyrtonema*. Zhongguo Ji Sheng Chong Bing Fang Zhi Za Zhi. 2010;5(2):108-10.
51. Yu HH, Lee JS, Lee KH, Kim KY, You YO. *Saussurea lappa* inhibits the growth, acid production, adhesion and waterinsoluble glucan synthesis of *Streptococcus mutans*. J Ethnopharmacol. 2007;111(2):413-7.
52. Hasson SSA, Al-Balushi MS, Alharthy K, Al-Busaidi JZ, Aldaihani MS, Othman MS, *et al*. Evaluation of anti-resistant activity of Auklandia (*Saussurea lappa*) root against some human pathogens. Asian Pac J Trop Biomed. 2013;3(7):557-62.
53. Cheminat A, Stampf JL, Benezra C, Farrall MJ, Frechet JM. Allergic contact dermatitis to costus: removal of haptens with polymers. Acta Dermato-Venereologica. 1981;61(6):525-9.

GRAPHICAL ABSTRACT



SUMMARY

Root of qust/ *Saussurea lappa* has been used in Unani medicine for medicinal purposes for centuries. Its various pharmacological actions such as antiviral, hepatoprotective, anti-inflammatory, immunomodulator, anti-microbial, antiulcer, gastroprotective, anticancer, anti-oxidant, anthelminthic, hypolipidemic, hypoglycemic, anti-angiogenesis, antidiarrheal, spasmolytic and anticonvulsant activity have been substantiated in various experimental studies. However, the neurotronic, antifungal, vasodilator, nephroprotective, cardiac stimulant, hair vitalizer/ tonic, joint repairment, and skin rejuvenating effects have left to be studied and require experimentation.

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Cite this article: Ansari S. Ethnobotany and Pharmacognosy of Qust/ Kut (*Saussurea lappa*, C. B. Clarke) with Special Reference of Unani Medicine. Pharmacog Rev. 2019;13(26):71-6.