Balchar (NardostachysJatamansi DC): Pharmacological action and therapeutic uses in perspective of unani medicine: A review

ABSTRACT:

Nardostachysjatamansi DC, commonly known as '*Balchar'*, is a perennial herb that is a member of the Valerianaceae family known locally as "*Jatamansi*" or "*Sumbul-ut-teeb"* This species is native to the Himalayan Mountain range, can be found in China, India, Nepal, Bhutan, and Myanmar. It is grown up to an elevation ofbetween 3,000 and 5,000 meters. Nardostachysjatamansi roots are used in traditional Unani medicine to cure a wide range of illnesses, such as hepatitis, inflammation, and blockage.Nardostachys species, which includes Nardostachysjatamansi, contains a diverse array of phytoconstituents such as actinidine, angelicin, jatamansin, jatamansone, and jatamansinol. This plant has been the subject of numerous pharmacological properties, which have shown its antilithiatic, antidiabetic, anti-inflammatory, hepatoprotective, learning and memory-improving, cardioprotective, hypolipidemic, anti-convulsant, anti-depressant, anti-androgenic, and antibacterial qualities. This review aims to shed light on the therapeutic applications of Nardostachysjatamansi based on both traditional Unani literature and scientific studies conducted on different parts of the plant.

Keywords: Nardostachysjatamansi;Balchar;hepatoprotective; Sumbul-utteeb; Unani Medicine

1. INTRODUCTION

NardostachysJatamansi DC. is a tiny herbaceous species from the Valerianaceae family, also known as Indian nard, balchar, or spikenard[(1)].It is also traded by the name ‘jatamansi’in Nepal, Pakistan, and India. Bhulte, Bala-tagra, Bhutijatt, Jatalasi, Jatamashi, Kalichhad,Kukilipot, Mansi, Masi, Masijara, Pangbu, Poi, and Sumbulu are the other vernacular names used in these countries[(2).] The name ‘jatamansi’ is derived from the appearance of the rhizomes covered with rust-colored tufted fibrous remains of petioles which look like the twisted, unkempt locks of hair of a hermit. ‘Jata’ is a Sanskrit word meaning matted and uncombed lock of hair. It also means root [(2).] In some Islamic tales, the powdered root of N. jatamansi is associated with the forbidden fruit that Adam ate in heaven. In Medieval European cuisine, N. jatamansi is commonly used to season foods as part of a spice blend. Hippocrates used the herb to sweeten and spice wine drinks. The plant's rhizomes are used in Ayurvedic medicine for bitter tonics, stimulants, anti-epileptic, antispasmodics, and hysteria relief [(3)]. Nardostachysjatamansi have constituted an important part of the ‘havansamagri’ or powdered mixture of medicinal herbs/plants, used in religious pyres ofHindus in India. There is a belief that the burning of these herbs/plants have curative properties against many diseases.This perennial, hairy, rhizomatous medicinal herb thrives on steep, damp, rocky, and undisturbed grassy slopesbetween3000 and 5000m[(1).] The species is native to the Himalayan Mountain range, occurring in India (the states of Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh), Nepal, Bhutan, Myanmar, southwest China, Jammu and Kashmir [(4).] Itis listed in the top 20 most traded plants in India and is largely

exploited. Due to its wide range of uses in traditional medicine and excessive over-exploitation as well as small reproductive phase and low germination rate (10-20%), it is now on the verge of extinction. Recently, the International Union of Conservation of Nature (IUCN) Red list of threatened species has enlisted N. jatamansi as a critically endangered (CR) medicinal plant. There are four binomials that are treated synonymous to the species. These are N. chinensis Batalin, N. gracilisKitam. and N. grandiflora DC. and Patrinia jatamansiD.Don. However, Webberling (1975) considered the genus Nardostachys to be monospecific and noticed that variability of different characters is not discontinuous as many transitional forms occur, all falling in a continuous range of variability within N. jatamansi. Webberling (1975) thus recognized five forms, namely jatamansi-type, grandiflora-type, gracilis-type, longiflora-type and laxiflora-type.It has long history of use in ethnomedicine perfume, incense and modern medicine[1].In Unani literature, *Balchar*has been used for *Mudirr-i-Ḥayḍ*(Emmenagogue) to harmonize menstruation, the a *Muḥallil*(Resolvent) to disperse ailments, the *Mudirr-i-Bawl* (Diuretic) to cleanse, the *Kasr-i-Riyāḥ* (Carminative) to soothe, and the *Muqawwī-i-Qalb* (Cardiotonic) to invigorate the heart.Nardostachysjatamansi contains sesquiterpenes and coumarins as its major active constituents, the principal sesquiterpene is Jatamansone or Valeranone[5].The purpose of this paper is to highlight the therapeutic applications of Nardostachysjatamansi, drawing on descriptions in Unani literature and scientific studies undertaken on various portions of the plant.

2. MATERIALS AND METHODS

In the context of Unani medicine, a comprehensive literature review was undertaken by searching all accessible classical textbooks using key terms *Sumbul-ut-teeb, Jatamansi, Balchar, Billilotan.*Additionally, electronic databases such as Google Scholar, ResearchGate, and PubMed were searched for terms such as*Jatamansi, Balchar*. The search covered both ancient Unani terminology and botanical nomenclature. Data gathering and subsequent analysis involved thorough consideration of review articles and experimental investigations. This rigorous method sought to gather essential material from both traditional Unani sources and contemporary scientific research, resulting in a comprehensive analysis of Nardostachysjatamansi'stherapeutic applications and qualities in the context of unani medicine.

3. OBSERVATIONS

3.1 Geographical Distribution

The species is endemic to the Himalayan Mountain range, occurring in India (the states of Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh), Nepal, Bhutan, Myanmar and southwest China, Jammu &Kashmir[4]

3.2Botanical Description

The leaves are rosy, slightly pink or blue in dense cymes.

Colour: reddish brown tufted fibres crowned in dark greyish rhizomes.

Odour: Highly agreeable, aromatic.

Size: Rhizomes are 2.5 to 7.5 cm in length.

Shape: Elongated and cylindrical.

Rhizome: A transverse section of the rhizome shows a thin periderm, it can be more or less circular in outline. A large parenchymatous cortex contains starch and an endodermis containing globules of volatile oil. Within a ring of collateral vascular bundles lies large pith containing scattered groups of sclerenchymatous cells.

Cork: 2-5 layers of cells filled with oil granules.

Cortex: Cortex is broad, 7-11 layers

Cambium ring: Distinct and continuous

Leaves: Leaves develop from both rootstock and stem. Basal leaves in rosettes are 15-18 cm long and 2.5 cm wide, longitudinally veined; leaves on stem are about 7.5 cm long and 2.5 cm wide, sessile, base attenuate into petiole nearly equal to leaf blade in length, margin entire apex obtuse. Leaves are cauline, lower ones elliptic to obviate; upper ones sessile, on lanceolate to lanceolate, sometimes serrate.

Flowers:The inflorescence may have one or in rare cases 2-3 terminal capitates clusters. flowers are pale pink or blue.Its calyx is 5-lobed; fruit, usually ciliate. Corolla purple-red, campanulate, 4-9mm, 5 lobbed; lobes broadly ovate to oblong. Stamens are nearly equal to corolla in length and are generally 4 in numbers, filaments villous. Style nearly equal to stamens in length, stigma capitates. The flowers are arranged in clusters and have many small flowers. They are bilaterally symmetrical and usually bisexual[3]

Fruit: small sized about 4mm in length, covered with white hairs and crowned with dentate calyx teeth[5]

3.3Taxonomic classification

Botanical name: Nardostachysjatamansi DC

Kingdom: Planate

Division: Mangnoliophyta

Class: Mangnoliopsida

Order: Dipsacales

Family: Valerianaceae

Genus: Nardostachys

Species: Jatamansi[6]

3.4 Description in Unani Literature

Its origin spans from Gadwal to Sikkim in the Himalayas and can also be found in parts of Asia and Europe[8]. The plant does not bear fruit or flowers[9]. It grows to about the size of a finger, with a thickness slightly less than that of a finger, and features several rings that merge in one area. The root is somewhat hard and is used for coloring. There are two types:

one black and one red. It is fragrant and therefore used in perfumes. It is also used in*Ma'jūn*, with the black, fragrant, and soft variety being preferred. The roots are hard, the hairs remain intact, and with a little shaking, dust starts to fall off.[11]

In old Unani literature, it is recommended to use it when fresh, with a red-black color, a strong aroma, and short hair. Distasteful and old varieties are undesirable due to their unpleasant smell. High quality can be identified by the fragrance lingering in the mouth for a long time. From twenty-eight seers, seven and a half tolas of oil can be extracted.[11]

The plant grows up to half a meter in height, with rough leaves and branches. Various fibers in the rough parts begin emerging near the root, giving it a shape resembling the jata, or hair, of a sadhu. This distinctive appearance is why it is called jatamali. The leaves are approximately three centimetres long and two and a half centimetres wide. [10]

Fig: 1 Rhizome and plant of *balchar*

3.5 <u>Vernacular Names</u>

Arabic: Sumbul-ut-teeb

Bengali: Jatamansi

English: Muskroot, Indian Spikenard, Spikenard

Gujarati: Baalchad, Kalichad, Jatamsi

Hindi: Balchar, Balchir, Jatamansi

Kannada: Jatamanshi, Jatamansi

Kashmiri: Bhut-jaat, Bhutijatt, Kukilipot

Malayalam: Jatamanchi, Jetamanshi, Jatamamshi

Orrisa: Jatamansi

Punjabi: Billilotan, Balchar, Chharguddi

Persian: Sumbul-utteeb

Sanskrit: Mansi, jati, jatilaJatamansi, Janani Jatamansi, Sukshmapatri, Bhutajata,

Tamil: Jatamanji, Jatamanshi

Telegu: Jatamanji, Jatamanshi, Jatamsi

Urdu: Sumbul-ut-teeb, Balcha[6,7]

3.6 Wajah Tasmiyah (Nomenclature)

The plant grows up to half a meter in height, with rough leaves and branches. Various fibers emerge from the rough parts near the root, giving it a shape resembling the jata, or hair, of a sadhu, which is why it is called jatamali. The leaves are about three centimeters long and two and a half centimeters wide. [15]

3.7 Ajza-i- Musta'mala (Parts Used)

Root and Branch[10][15]

3.8 Mijaz (Temperament)

Hot and Dry 2nd[9,10,11,15]

Hot 1st and Dry 2nd [8,9,10,14]

Some physicians describe it as hot and dry at the third degree.[11]

3.9 MiqdarKhurak (Dose)

3.5 –4.5 or upto 7 gms[11]

3 – 5 gms[8,10,15]

3.10 Af'al (Actions)

Mudirr-i-Ḥayḍ (Emmanagogue) [8,9,11,15]

Muḥalil (Resolvent) [11,8,14]

Mudirr-i-Bawl (Diuretic) [11,9]

Kāsir-i-Riyāḥ (Carminative) [8,9]

Muqawwi-i-Qalb (Cardiotonic)[8,9]

Muqawwī-i-Dimāgh(Brain tonic) [8,11,10,14]

Muqawwī-i-Bāh (Aphrodisiac) [11,8,15]

Mutayyib-e-dahan (Makhzan, Iftikhar[8,15]

Muqawwisadriya (tonic to chest and lungs)[11,9,14]

Mufattiḥ-i-Sudad al-jigarwamida(deobstruent) [11,8,14,9]

Muqawwīmidawajigar (Stomachic and hepatotonic)[11,9,15,10]

Mufattit-i-Ḥaṣāt /(Lithotripic)[11]

Musākhiṇ (Calorific) [8,15]

Jālī(detergent) [8]

Mujaffif (Desiccant)[11,9]

MujaffifQūruh (Cicatrizant) [11,14]

MuqawwīChashm (eye tonic) [14,11]

Mushtahī (Appetiser)[11,9]

Dafia Qai'(Anti-Emetic)[11,9]

Mohsin-e-loun (brightens the complexion)[9,8]

MuqawwīShar(Hair tonic) [14,11]

Increases Retentive power[11,9]

Tiryāq(Antidote) [14]

3.11 Iste'malat (Therapeutic Actions)

1. *Balchar*is used as *farzaja* (vaginal suppository) for both *kasratetamth* (menorrhagia) and *ihtibas-i-tamth* (amenorrhoea) and is helpful in maintaining pregnancy [11]
2. Oral or local use of *Balchar*either single or in combination with other drugs is beneficial in *Warm-i-Raḥimwa- mathāna*[11].
3. *Aabzan* (sitzbath) with*Joshānda*(decoction) of *Balchar*is beneficial in warm-I raḥim (endometritis). [11,14]
4. Paste of *Balchar*when applied on forehead relieves headache [11]
5. Powder of *Balchar*with water when taken orally alleviates abdominal pain,helps in digestion of food,*asbiamraz,duwar, ghashi, zoaf-i- dimagh,muqawwi bah* when used with *sharab*[11]
6. *Joshānda*of*Balchar*and*afsanteen*resolves the inflammation of stomach and liver. [11,14]
7. Balcharis beneficial in *khafaqan*[14] and all types of yaraqan.[11,14]
8. *Dhooni* (Fumigation) of *Balchar* relieves thesudda (obstruction) of uterus [11]
9. Powdered sumbul- ut –teeb when rubbed over teeth relieves toothache and when applied on body acts as anti-diaphrotic[11]
10. Due to its properties like *jali* and *mohasin-i- lawn, balchar*is used as face pack in chloasma, freckles[8,9,11].
11. Sumbul- ut –teeb prevents loss of eyelashes when applied over eye lids [11,14]

12. Balchar with salt and vinegar is beneficial in ascites, used as a blood purifier [11]
13. Used locally/orally with alcohol in haemorrhoids,colouring and lengthening of hair. [11]
14. It helps in relieving vasomotor symptoms in postmenopausal women.

3.12 Madarrat (Toxicity, Side effects and Adverse effects)

OnKidneys[11,8,9,10,15]

3.13 Musleh (Corrective)

Kateera, Binsaloochan[11]

Rogan-i-gul [8,10,15]

Kateera, Isphagoland Tabasheer [9,10]

3.14 Badal (Substitute or Alternatives)

Saad koofi,Azkhar maki, Sajizhindi,postbikh-i-kaba(Capparis spinosa L.),sumbulroomi,Darchini (Cinnamomum zeylanicum) [8,9,10,11,15]

3.15 table 1 :Unani Compound Formulations

S.No.	***Unani compound Formulations***	**Part used**	**Dose and Method of use**	**Indications**
1	Unani formulation	Root	As per required for *Ābzan*	Beneficial in acute inflammation of bladder
2	Unani formulation	Root	*Ābzan*	Retention of urine
3	Arasto sager	Root	4.5 *Māsha*	Useful in ulceration of eyes, chalazion, abdominal pain, colitis, fevers.
4	*Iṭrīfalkaseer -ul-munfa*	Root	7-9 *Māsha*	Increaseseyesight
5	*Iṭrīfalmuqawwidimagh*	Root	1 *tola* empty stomach	Brain tonic, rhinitis, in respiratory diseases
6	*Anoshdārūloalawi*	Root	As per requirement*(Ma'jūn)*	Stomach, heart and brain tonics
7	*Iyarijlogaziya*	Root	14gm with warm water and honey	Headache, migraine, otalgia,vertigo, deafness
8	*Iyarijshabyaar*	Root	3.5gm with warm water or rose water	Removes melancholic and phlegmatic morbid matters.
9	*BāsalīqūnKabeer*	Root	As per required	Glaucoma, epiphora
10	*Bāsalīqūndegar*	Root	As per requirement*(Ma'jūn)*	Rhinorrhoea,diseases of head
11	*Jawārishanareen*	Root	3.5-7gm	Liver tonic, appetizer
12	*Jawārishjalinoos*	Root	9-13.5gm after meals	Halitosis, body tonic,anaphrodisiac
13	*JawārishJavaid*	Root	7 *Māsha*	Stomach tonic, increases memory, helpful in

				haemorrhoids,brightens face
14	*Jawārishjalali*	Root	4.5-9gm	Appetizer, increases libido
15	*Jawārishhabulaas*	Root	3.5gm	Cholera,anti-emetic
16	*Jawārishkhusravi*	Root	1 tab	Increaseslibido,memory,paralysis, bell's palsy,tremors,palpations
17	*Ḥabb-e-iyarij*	Root	3 tab twice a day	Chronic headache,epilepsy, eye diseases
18	*Ḥabb-e-hilteet*	Root	1 tab once a day	Increases libido, strengthens stomach
19	*Ḥabb-e-rajgati*	Root	1 tab after lunch	Appetizer, increases digestion
20	*Ḥabb-e-mullayin*	Root	7 tabtwice a day	Constipation,stomach ache
21	*Ḥabb-e-munshat*	Root	1 tab	Increases libido

3.16 Phytoconstituents

Nardostachysjatamansi contains sesquiterpenes and coumarins as its major active constituents.The principal sesquiterpene is Jatamansone or Valeranone.

Table 2 :Chemical Constituents Part of plant herb[(3)]

S.no	Part of plant herb	Chemical Constituents
1	Root	Angelicin, Jatamansic acid, Aendesmol, B-eudesmol
2	Rhizomes	Jatamansone,1-2% volatile oil, resin, sugar [(18)]starch,Dnardostachone[(12)]Seychellene, Seychelane, β-sitosterol
3	Oil of Roots	Oroselol, jatamansin (terpenic coumarins) [(21)]Jatamanisol, Angelicin [(22)]

PHARMACOLOGICAL STUDIES

1. **Hepato-protective activity:**
   After pre-treatment with 800 mg/kg, p.o. of the 50% ethanolic extract of N. jatamansi'srhizomes, rats treated with thioacetamide exhibited considerably lower levels of blood transaminases (aminotransferases) and alkaline phosphatase. The hepatoprotectiveeffect was shown by the normalisation of multiple blood enzymes elevated inresponse to liver injury induced by thioacetamide.[(16)]
2. **Improves Learning and memory**:
   Three doses (50, 100, and 200 mg/kg, p.o.) of an ethanolic extract of N. jatamansi were administered for 8 successive days to both young and aged mice. The 200 mg/kg dose of N. jatamansi ethanolic extract significantly improved learning and memory in the young mice and also reversed the amnesia induced by diazepam (1 mg/kg, ip.) and scopolamine (0.4 mg/kg, ip.). Furthermore, it also reversed aging-induced amnesia due to natural aging of mice. As scopolamine-induced amnesia was reversed, it is possible that the memory improvement may be because of facilitation of cholinergic transmission in the brain. Hence, N. jatamansi might prove to be a useful memory restorative agent in the treatment of dementia seen in elderly persons.[(22)]
3. **Cardio protective activity**:
   Elevation in serum marker enzymes (alanine amino transaminase, creatine phosphokinase, aspartate amino transaminase, and lactate dehydrogenase) indicated

myocardial damage in rats treated with doxorubicin at a dose of 15 mg/kg intraperitoneally. The antioxidant enzymes [superoxide dismutase, glutathione peroxidase, catalase, and glutathione-S-transferase] and lipid peroxidation levels were significantly altered in the animals. By using N. jatamansi extract as a pre-treatment, antioxidant enzyme activity was greatly reduced and lipid peroxides were brought back to levels that were almost normal.[17]

4. **Anti-convulsant activities**

   Ethanol extract of the roots of Nardostachysjatamansi was studied for its anticonvulsant activity.The results demonstrated a significant increase in the seizure threshold by Nardostachysjatamansi root extract against maximal electroshock seizure (MES) model as indicated by a decrease in the extension/flexion (E/F) ratio. However, the extract was ineffective against pentylenetetrazole (PTZ)-induced seizures. Further,pre-treatment of rats with phenytoin at a dose of 12.5, 25, 50 and 75 mg/kg in combination with 50 mg/kg of Nardostachysjatamansi root extract resulted in a significant increase in the protective index of phenytoin from 3.63 to 13.18. The dose response studies of phenytoin alone and in combination with Nardostachysjatamansi extract on the serum levels of phenytoin clearly demonstrated the synergistic action of both the drugs.[20]

5. **Hypolipidemic activity**:

   The rats treated with a single dose of doxorubicin at the dose of 15 mg/kg intra-peritoneal showed an increase in serum and cardiac lipids [cholesterol, triglycerides, free fatty acids and phospholipids] along with a significant rise in serum low density lipoproteins, very low-density lipoproteins and dropinhighdensity lipoproteins levels, resulting in alteration of serum and cardiac lipid metabolizing enzymes. Pre-treatment with an extract of N. jatamansi at the dose of 500 mg/kg orally for seven days to doxorubicin induced rats showed a significant prevention in the lipid status with the activities of the lipid metabolizing enzymes. Histopathological observations were also in correlation with the biochemical parameters.[23]

6. **Antidepressant activity:**

   The antidepressant activity of methanolic extract of N. Jatamansi by forced swim test, tail suspension test and locomotors activity in inbred male Swiss was determined. The efficacy of the extract at the dose of 200 and 400 mg/kg, p. o. was compared with the standard drug imipramine [10 mg/kg, p. o.] in normal and sleep deprived mice. N. jatamansi at the dose of 200 and 400 mg/kg, p. o produced significant [$P<0.001$] antidepressant like effect in normal and sleep deprived mice in both TST and FST and their efficacies were found to be comparable to imipramine at the dose of 10 mg/kg, p.o. It did not show any significant change in locomotor functions of mice as compared to normal control.However, it significantly [$P<0.01$] improves the locomotors activity in case of sleep deprivation which is comparable to normal control. This finding suggests that N. jatamansi has dose dependent antidepressant activity and can also be used in patients suffering from depression due to sleep disturbances.[20]

7. **Anti-diabetic activity**:

   The antidiabetic study was carried out to estimate the anti hyperglycemic potential of NardostachysJatamansi rhizome's hydro alcoholic extracts in alloxan induced diabetic rats over a period of two weeks. The hydroalcoholic extract HAE1 at a dose (500mg/kg) exhibited significant antihyperglycemic activity than extract HAE2 at a dose (500mg/kg) in diabetic rats. The hydroalcoholic extracts showed improvement in different parameters associated with diabetes, like body weight, lipid profile and biochemical parameters. Extracts also showed improvement in regeneration of β-cells of pancreas in diabetic rats. Histopathological studies strengthen the healing of pancreas by hydro alcoholic extracts

(HAE1& HAE2) of NardostachysJatamansi, as a probable mechanism of their ant diabetic activity.[25]

8. **Antimicrobial activity**:
   Antimicrobial activities of Nardostachysjatamansi ethanol extract were studied by disc diffusion technique, and then minimum inhibitory concentration (MIC) determination was done by serial dilution in Mueller Hinton broth. Ethanolic extract of Nardostachysjatamansi showed antimicrobial activities with MIC varied between 2.77-5.82 mg/mL in both MDR and ATCC bacteria. Ethanolic extract of Nardostachysjatamansi is an effective antimicrobial agent on MDR bacteria and may help save the lives of many critically ill patients.[24]

9. **Anti -Inflammatory and Anti-candidal activity**:

   Desoxo-Narchinol A, Narchinol B, Selinidin/ Jatamansin, Nardosinone and Valerenal were chosen as representative compounds of N. Jatamansi for the prediction of pharmacokinetic parameters, in-silico and bioactivity scores. All the compounds were showed results in line with Lipinski Rule of 5 and best acted as enzyme inhibitors with a score greater than 0.00. In light of the above result findings, N. jatamansi was found to possess anti-inflammatory and anticandidal activities.[28]

10. **Anti-Androgenic activity and its effect on PCOS**:

    N. jatamansi DC and T. terrestris L. extracts were positive on PCO-induced rat models. These plants normalized estrous cyclicity dose dependently, reduced steroid hormone levels, and improved the ovarian dynamics.[17]

11. **Activity in Refractory Functional Dyspepsia**:
    For thirty days, the participants were given 500 mg N. Jatamansi capsules three times a day, before meals. By self-reporting improvement in at least 50% of symptoms, early satiation and postprandial fullness were evaluated, and the Gastrointestinal Symptom Rating Scale (GSRS) was used to measure other FD symptoms both prior to and during treatment. Following the intervention, the study population's mean GSRS score level dropped noticeably. The main complaints of five patients, who all reported a 50% improvement, were early satiety and postprandial fullness. The results indicate that N. jatamansi may be useful for people with FD that is refractory.[27]

12. **Activity in inhibition of Benzoyl Peroxide- induced Cutaneous Oxidative stress, toxicity and Ear edema**:
    Prior to the administration of benzoyl peroxide (20 mg=animal per 0.2 ml acetone), jatamansi pre-treatment at dosages of 2.5 and 5 mg=kg body weight in acetone significantly inhibited benzoyl peroxide-induced cutaneous oxidative stress, toxicity, and ear edema in a dose-dependent manner. Significant reductions were seen in both xanthine oxidase and cutaneous microsomal membrane lipid peroxidation activities ($p < 0.05$). Furthermore, there was a considerable recovery ($p < 0.05$) of the decreased levels of glutathione and phase II metabolising enzymes. According to our research, N. jatamansi can potentially lessen ear edema, toxicity, and cutaneous oxidative stress brought on by benzoyl peroxide. It also appears to be an effective chemo-preventive agent in mouse skin.[26]

5 Conclusion:

According to Unani Medicine,jatamansi has numerous medicinal properties.Researchindicatesthat this plant has promise for antilithiatic, antidiabetic,anti-inflammatory,hepatoprotective,improves learning and memory,cardioprotective,hypolipidemicactivity,anti-convulsant, anti-depressant, anti-androgenic activity and antibacterial properties.The plant's therapeutic potential stem from bioactive compounds present in its numerous sections, including the root and rhizome. Compound formulations of jatamansiare used in Unani Medicine to treat genitourinary problems like nephrolithiasis and female reproductive system related problems.Additional research is needed to uncover the plant's unique features and possible therapeutic applications in various health conditions.

6Consent and ethical Approval:

It is not applicable

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