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A Review On Herbal Plants For Treatment Of Lips Disorders

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Abstract

Lip issues can cause uneasiness and tasteful worries, provoking people to look for viable medicines. This survey article dives into the capability of regular cures, explicitly Indian Sarsaparilla and Turmeric as elective ways to deal with overseeing lip issues. These customary fixings hold guarantee because of their calming, antimicrobial, and cancer prevention agent properties. By looking at their authentic utilization and late logical exploration, this article expects to reveal insight into their possible advantages and give experiences into their application in current lip issue medicines.

Key words: Anatomy of lips, lips disordes, herbal plant for treatment of lips disorders – Indian sarsaparilla, turmeric, beetroot.

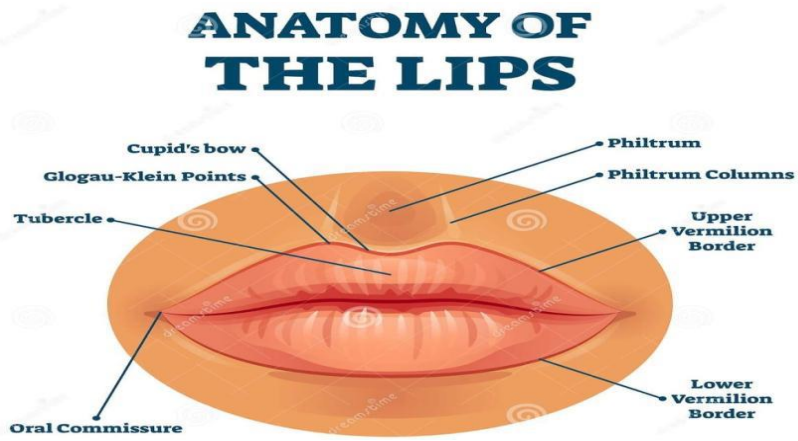
Introduction

Lips are piece of the human body that is exceptionally slender despite the fact that it comprises of 3-4 layers of the skin. Lips are defenseless where lips when contrasted with face skin turmoil, for example, aggravation and expanding of lips can rapidly happen. Irritation happens at the point when the side of lips become excruciating, broke and bothered while expanding happens when certain individuals might have a hypersensitive to specific food sources like fish and causing the lips to become enlarging. Plus, an innate condition likewise can prompt lip expanding Consequently, lips should be saturated utilizing any lip item like lip balm.[1]

Anatomy of lips:

Lips act as getting a handle on, sucking, and talking organs. That Comprises of skin, shallow belt, and roundabout muscle and the muscles (Areolar tissue and mucous layer) created around it film .The edges of the lips are covered with dry red Going on with and containing mucous layers and skin Various vascular papillae and vessels Of The inward mucosa reflects from a higher place, structure two at the lower lip of the gums, and the midline Upper and lower folds.[3,4] The areolar tissue or submucosa contains the coronary courses A vein that totally encompasses the buccal opening free edge of the lip. Coronary vessels are the upper ones and the mediocre coronary vein, which emerges from the face. Of The upper coronary supply routes are bigger than the lower coronary corridors and are anastomosed shoot a bit, with his friends from the opposite side Course to septal vein. pressure of this Courses at times control nosebleeds.[4] Of The prevalent labial vein or coronary

vein is The ring is the muscle of the upper lip, alongside the coronary corridors channels into conduits and facial veins simply under the wings Nose of the vein that depletes the lower lip Coronal joins the face somewhat beneath the upper lip; in any case, the principal branch from the lower lip is as a rule into the submental vein and from that point to the face, or frequently Foremost carotid artery.[2,3,4] The nerve that provisions the lower lip is mind that emerges from the bones through the heart It takes care of the mucous film with pores and enormous branches. Integument and belt of the lips and jaw. A few Lymphatic vessels on the lips go to the organs simply over the lips Body of the hyoid bone while others change to sub maxillary organ. Labial organs are situated in the submucosa The layer of lips around the mouth. you will be disposed of bodily fluid. A bodily fluid holding growth is the channels of these organs are closed.[4]



Lip disorders:

Swelling:
An unfavorably susceptible response can make your lips expand. Responses can be made by specific food varieties or touchiness food sources Refreshments, drugs, lipsticks, airborne aggravations. in the event that the reason can be distinguished and eliminated. Lips typically come back excessively normal. Nonetheless, much of the time, the reason for expanding remains. secret. A condition called genetic angioedema might foster It prompts repeat of expanding. Non-hereditary infection Erythema multiforme, sun related burn, cold and dryness, and so on. Or on the other hand the lips might enlarge due to trauma [5].

Sun Damage: Lips are especially vulnerable to sun related burn Lower lip, hard and dry. Red spots or white film Signal harm that improves the probability of later one's disease. This sort of harm can be relieved by covering Apply a lip ointment that contains sunscreen or cover your lips with a defensive layer A wide-overflowed cap safeguards you from the unsafe beams of the sun [5].

Inflammation: In the event that your lips are aggravated (cheilitis), sore corners of the mouth, crabbiness, redness, Broke and textured. Cheilitis can be brought about by an inadequacy Dietary vitamin B2. In certain individuals, enlarging and little rankles show up not long after applying lip emollient. There can be redness, scaling or dryness, and a tingle. The unfavorably susceptible response can spread to the face and neck and typically endures as long as you keep on utilizing the lip salve. Keep away from lip salves that contain menthol, camphor, phenol or any kind of liquor. These fixings might give a prompt cooling sensation yet can disturb the skin. Now and again they even eliminate the external layers of skin leaving your lips unprotected and defenseless to natural dangers [5].

Discoloration: Caramel with spots and unpredictable shape Regions (melanotic spots) are tracked down around the lips and are normal. It can require years. These imprints are not any justification. issue. Different little, dispersed tanish dark spots might be available is a side effect of a hereditary problem called Peutz-Jeghers Stomach polyp condition inside organs. Kawasaki sickness, an illness of obscure reason. It for the most part happens in kids younger than 8. May cause dry, broke and blushed lips mucous layer of the mouth. Lip staining can happen because of a parasitic contamination, iron lack frailty, sun openness, or an unfavorably susceptible response. Medicines for lip staining fluctuate contingent upon the reason. Individuals who notice new or uncommon spots all the rage might need to contact their primary care physician. Utilizing lip beauty care products like lipsticks, gleam and emollients might do more awful than great. Lipsticks might contain a few synthetics that you might be oversensitive to. These synthetics might be answerable for causing hyperpigmentation all the rage [5].

Cold Sore: A raised region or a sore with hard edges on the lip might be a type of skin malignant growth. Different injuries might create as side effects of other ailments, like oral herpes simplex infection disease or syphilis. Still others, for example, keratoacanthoma, have no known reason [6].

Scratches: Sore knocks or hard edges of the lips It very well might be a sort of skin disease. Different wounds may happen Side effects of different infections like B. Herpes Labialis Simplex infection contamination syphilis.Others, Keratoacanthoma, no known cause.[13] On the off chance that you have a shallow paper cut or shaving scratch, touching on lip salve will assist with easing torment by hindering air from open nerves. In the event that wax-based, the lip ointment will likewise assist with easing back dying. Lip ointments containing fixings like phenol, menthol and salicylic corrosive really make your lips drier. So you apply more, and it turns into horrendous.cycle." A portion of these item additionally cause a shivering inclination when you apply them This either causes disturbance on eliminates external layers of the skin, similar to an exfolian.

Herbal plants used in treatment of Lips Inflammation:
1. INDIAN SARSAPARILLA

Synonym: Hemidesmus indicus, Sariva, Anantmoola, Madhuri

Biological source: Root of Hemidesmus indicus

Family: *Asclepiadaceae*
Hemidesmus indicus R. Br. (Asclepiadaceae), regularly known as Indian Sarsaparilla, is typical weed foundall over India. It is broadly utilized in Indian customary medication also, has been widely researched for its pharmacological impacts. It has a wide assortment of ethno-therapeutic utilizes, the most significant of which is likely the treatment of looseness of the bowels and the runs, yet it is likewise utilized for different contaminations, skin infection, menorrhagia, post pregnancy recuperation, stomach ulcer and gastric

afflictions, fever, migraine, agony and irritation, sore mouth, venereal infection counting gonorrhea and syphilis, weakness, and as a blood purifier, cooling tonic and hunger energizer, and to advance wellbeing and essentialness, kill snake nibble and scorpion sting [7,8]

Geographical Distribution:

Hemidesmus indicus R. Br. (H. indicus) from family Asclepiadaceae is a notable drug fixing with numerous restorative applications in Ayurvedic arrangement of medication. H. indicus is started from India where it is still basically found developing fiercely. H. indicus is a prostrate or semi-erect bush found all through India from upper Gangetic fields, eastwards to Assam, all through Focal, Western and Southern India upto a rise of 600 m. Filling in Malaysia, Indonesia, Pakistan, Bangladesh and Sri Lanka is additionally known. [9,10,11]. The different vernacular names known are Anantamula, Ananthamoola, Asclepias pseudosarsa, Country Sarasaparilla, Durivel, East Indian Sarsaparilla, Timeless root, Misleading Sarsaparilla, Fragrant one, Gadisugandhi, Gopakanya, Hemidesmus pubescens, Hemidismus Indica-Radix Kapuri, Karibandha, Magrabu, Muttavapulagamu, Naga-jihva, Naruninti, Nunnari, Cloister root, Onontomulo, Periploca indica, Sariva, Smilax aspera, Sogade, Sugandhi-pala, Sugandi root, Upalasari, White Sariva [12]. Plant depiction

Phytochemistry:

Hemidesmus indicus R.Br. exists in two variations, to be specific var. indicus and var. pubescens. The constituents are comparable, despite the fact that var. pubescens has been found to have a higher substance of b-sitosterol and tannins while var. indicus had a higher substance of phenols and free amino acids [13]. The steam refining item (yield, 0.25 %) contained 2-hydroxy 4-methoxy benzoic corrosive (HMBA,91%) as the significant constituent, with 40minor constituents [14]. A quantitative assessment of the unrefined compound constituents in the fluid concentrate of H. indicus root yielded the accompanying: tannins 3.06%, saponins 12.55%, flavonoids 1.12%, alkaloids 1.23%, terpenoids 0.79%, coumarins 0.91% and phenols 1.1% [15,16] suggested that lupeol octacosanoate could be utilized as a marker compound for the quality control of H. indicus; the typical measure of lupeol octacosanoate present in the root powder was viewed as 36.5 mg/gm. H. indicus roots contain a wide assortment of organically dynamic compounds, including progression of novel coumarino-lignans called hemidesmins [17,18], furthermore, steroidal glycosides known as hemidesmosides A-C (Zhao et al., in press), which are remembered to add to the helpful movement.

Pharmacological activity:

Anti-inflammatory effect:

It is found that ethyl acetic acid derivation concentrates of H. indicus root shows much mitigating impact in intense and subacute irritation. Oral organization of H. indicus root separates shown a portion subordinate antinociceptive movement in all models and it hindered both neurogenic and fiery torments. Near examinations on mitigating movement of H. indicus are likewise finished in carrageenan-prompted rodent paw oedema. The ethanolic concentrates of roots showed critical mitigating movement at a portion of 350 mg/kg p.o. when contrasted with control [19].

Wound healing activity :

Wound recuperating movement Leaves of H. indicus have checked injury recuperating movement and play a promising job in the therapy of wounds particularly persistent injuries and in diabetic and malignant growth patients.The alcoholic concentrate of H. indicus figured out as 5% and 10% balm increment the pace of wound withdrawal and time of epithelisation [20].

Antiulcer activity:

The antiulcer action of H. indicus. It acts by mucoprotective activity and specifically hindering prostaglandins. Indeed, even standard medications, as omeperazole, rantidine have less mucoprotective action than H. indicus have[21].

2. Turmeric

Synonym: Curcuma, Haldi, Haridra, Indian saffron

Family: *Zingiberaceae*

Biological source: dried rhizome of curcuma longa linn.
Curcuma longa, regularly known as Turmeric, is a rhizomatous herbaceous enduring plant having a place with the Zingiberaceae family [22].It started in India and is generally developed in China, Sri Lanka, also, East Africa and other tropical nations. It is known as Jianghuangor then again Huangjiang in China. It is utilized in Chinese Conventional Medication (TCM) for the treatment, anticipation and the executives of different sicknesses such as disease, hacks, diabetes, Joint pain, the runs, aggravation, psoria-sister, hepatobiliary sicknesses, skin problems, gastric ulcers and peptic ulcers [22,23]. It advances blood course, eliminates stagnation, alleviates gloom, and fills in as a characteristic seasoning specialist that emphatically influences food's tone, taste and nature [22].

Geographical distribution:

Curcuma longa (Turmeric) is native to Indian and broadly distributed in the accompanying nations: Andaman Is., Assam, Borneo, Bangladesh, Belize, China *South*-Focal, China Southeast, Cambodia, Caroline Is., Cook Is., Costa Rica, Cuba, Comoros, Congo, Nigeria, Dominican Republic, East Himalaya, Easter Is., Fiji, Gilbert Is., GuineaBissau, Bay of Guinea Is., Haiti, Hawaii, Ivory Coast, Jawa, Leeward Is., Philippines, Pitcairn Is., Puerto Rico, Queensland, Réunion, Samoa, Society Is., Sri Lanka, Sumatera, Solomon Is., Taiwan, Thailand, Tibet, Tonga, Trinidad-Tobago, Tuamotu, Tubuai Is., Vietnam and Windward Is.

Phytochemistry:

The utilization of Turmeric in traditional medication is upheld by the presence of more than 300 biolegitimately dynamic parts, for example, polyphenols, sesquiterpenes, diterpenes, triterpenoids, sterols, and alkaloids (Fig. 1). The commonplace yellow shade of Turmeric is expected to curcuminoids, a class of phenolic intensifies present in turmeric [23]. Curcuminoids make up 2-9% of Turmeric, contingent upon its starting point and soil fruitfulness levels in the district where it was developed [24]. The four principal curcuminoids are curcumin(desmethoxycurcumin (17%), bis desmethoxycurcumin (3%) and cyclocurcumin (a minor constituent) [25,26]. Curcumin (a functioning phytochemical in Turmeric) has shown guarantee in actually lessening lipid levels in patients with type-2 diabetes mellitus and metabolic disorder. Additionally, it is supposed to be cardioprotective on the grounds that it can decrease C-receptive protein levels [27]

Pharmalogical actions:

Anti-inflammatory effect
Curcumin has been displayed to hinder various atoms associated with aggravation including phospholipase, lipooxygenase, COX-2, leukotrienes, thromboxane, prostaglandins, nitric oxide, collagenase, elastase, hyaluronidase, MCP-1, interferon-inducible protein, growth rot factor, and interleukin-12 [28]. Studies has demonstrated bisdemethylcurcumin (BDC) is more strong as a calming specialist as demonstrated by concealment of TNFinduced NF-κB initiation, more intense as an against proliferative specialist, and more strong in prompting responsive oxygen species(ROS). Hispolon analogs, which needs one fragrant unit in connection to curcumin, additionally displayed upgraded mitigating and against proliferative exercises [29]. The advantageous impact of curcumin(antiprovocative compound) in sepsis gives off an impression of being

interceded by the upregulation of PPAR-γ, prompting the concealment of expert incendiary cytokine, TNF-α articulation and delivery [30].

3.Beet root

Synonyms: Beet, Sugar beet, Red beet, Beta vulgaris rubra
Family: Amaranthaceae

Biological source : it consists of fresh root of beta vulgaris
Beetroot is part of the Amaranthaceae family, and was first developed by the Romans. The two its leaves and the enormous round foundation of the plant are consumable and ordinarily eaten. Be that as it may, beetroot is likewise referred to for its utilization as color or as a restorative plant. Fame for the plant comes in floods, as a greater amount of its wholesome benefits are perceived. Ubiquity for beetroot is on the ascent once more, maybe due to its adaptability as a fixing, which can be eaten crude, cooked, cured and bubbled, also, on the grounds that it is generally simple to develop [31]. Betalains present in the cell vacuoles of beetroot is the purposes for of its red variety. [32].These betalains are generally utilized as food colorants in numerous ventures. Likewise betalains have numerous positive organic exercises, including cell reinforcement, calming, hepatoprotective, hostile to malignant growth properties. The expanded focus (more than 20-crease) of absolute phenolic corresponding compounds, which might have synergistic impacts with betalains in the furry root separates is the explanation of high cancer prevention agent movement. The presence of 4-hydroxybenzoic corrosive, caffeic corrosive, catechin hydrate, and epicatechin in the beetroot were detected[33]. The betalains found in beetroot strip separate were vulgaxanthin I, vulgaxanthin II, indicaxanthin, betanin, prebetanin, isobetanin furthermore,neobetanin.Likewise cyclodopaglucoside, N-formylcyclodopaglucoside, glucoside of dihydroxyindolcarboxylic corrosive, betalamic corrosive, L-tryptophan, p-coumaric corrosive, ferulic corrosive and limited quantities of hydroxycinnamic acids, for example, gallic, syringic, furthermore, caffeic acids and flavonoids have been distinguished were detected[34]. As there is no broad report is found on thepharmacological exercises of the Beetroot on Isoproterenol inducedcardiac renovating in rodent model . The sane of this study was consequently intended to assess the mitigating and free extremist scavengingactivities of the Beetroot powder.

Geographical distribution:

The plants of the Beta family are ventured to have begun in North Africa and spread through the Drug iterranean Ocean course, involving the beaches of Europe, Asia and the Americas [35].Red beetroot (Beta vulgarisssp. vulgaris L.) is a herbaceous biennial (blooming in the second year of development) or then again, once in a while, lasting plant up to 120 cm (up to 200 cm in second year) in level, however developed structures are for the most part biennial. The foundations of the developed structures are dull red, white, or yellow, and respectably to emphatically enlarged what's more, plump or brown, sinewy, here and there enlarged and woody in the wild subspecies. [36,37,38]

Nutrition Facts :

Calories	Amount
Calories	43
Water	88%
protein	1.6 g
Carbs	9.6g
Sugar	6.8g
Fiber	2.8g
Fat	0.2g

Saturated	0.03g
Monounsaturated	0.03g
Polyunsaturated	0.06g
Omrga -3	0.01g
Omega-6	0.06g

Chemical constituents:

beet roots are the most famous for human utilization, both cooked and crude as salad or juice [39]. Beta vulgaris L. (beetroot) contains high measures of organically dynamic substances 17 counting betalains and inorganic nitrate. The absolute betalain content is found torange somewhere in the range of 0.8 and 1.3 g/L new squeeze (around 60% betacyanins and 40% betaxanthins) that represented 70-100 percent of the absolute phenolics content. Other phenolics are hydroxycinnamic acids, which represented up to 2.6% of aggregate phenolics. Sugar piece is around 7.7%, comprising of 95% sucrose [40]. Beetroots (Beta vulgaris) are wealthy in other important dynamic mixtures for example, carotenoids, glycine betaine [41]. saponins, betacyanines [42,43], folates, betanin, polyphenols and flavonoids.

Pharmalogical action:

Anti-inflammatory effect:

Betalains and beetroot separates have arisen as intense calming specialists. In some measure a piece of their mitigating impacts is by all accounts interceded by meddling with supportive of provocative flagging fountains. The generally significant of these is the Atomic Variable Kappa B (NF-κB) overflow, as it straightforwardly initiates and translates most quality focuses on that direct and intensify the provocative reaction (i.e., cytokines, chemokines, apoptotic and phagocytic cells) [44]. Thus, NF-κB action assumes a focal part in the fiery cycles that manifest in ongoing illness. In a new report [45], NF-κB DNA-restricting movement was portion conditionally weakened in nephrotoxic rodents directed a beetroot separate for 28 days (250 mg or then again 500 mg·kg·bm−1). Besides, kidney homogenates from the beetroot treated rodents had lower groupings of resistant cells (TNF-α, IL-6 and MPO) and diminished indications of oxidative harm (MDA), which could be straightforwardly connected with the dulling of the NF-κB pathway. These impacts are probably going to be interceded, in part, by the betalains present in beetroot; ongoing proof shows that betanin treatment (25 and 100 mg·kg·bm−1 for 5 days) fundamentally represses NF-κB DNAbinding movement in rodents actuated with intense renal harm [46]. Betalains have likewise been displayed to extraordinarily supress cyclooxygenase-2 (COX-2) articulation in vitro, which is a significant forerunner [47,48] atom for supportive of fiery arachidonic corrosive metabolites known as prostaglandins. Past investigation discovered that betanin (IC50 esteem 100 μg·mL−1) restrained 20 cyclooxygenase-2 (COX-2) catalyst action by 97%, first represented this. It is fascinating to take note of that albeit a somewhat higher grouping of betanin was required, its COX-2 inhibitory impacts were tantamount or more noteworthy than a few phenolic compounds (cyanidin-3-O-glucoside, lycopene, chlorophyll, b-carotene, furthermore, bixin) and mitigating drugs (Ibuprofen, Vioxx and Celebrex). This raises the likelihood that betanin rich beetroot supplements, in adequate portions, could display mitigating impacts to match engineered drugs.

Conclusion:

Turmeric, beetroot, and Indian sarasaparila have all had promising results in the treatment of lip problems. Their therapeutic qualities and natural constituents provide a number of advantages, including anti-inflammatory, antioxidant, and antibacterial activities. To determine their effectiveness and safety for certain lip problems, however, more investigation and clinical trials are required. Before adopting these home remedies as your main course of therapy, it is best to speak with a healthcare provider.

References:

1. Kadu, M., Vishwasrao, S., & Singh, S. (2015). Review on natural lip balm. International Journal of Research in Cosmetic Science, 5(1), 1–7. (2014 August).
2. Chaudhari, N. P., Chaudhari, N. U., Chaudhari, H. A., Premchandani, L. A., Dhankani, A. R., & Pawar, S. P. (2018). A Review on Herbal Lipstick from Different Natural Colouring Pigment. Indian Journal of Drugs, 6 (3), 174–179.
3. http://elementsofmorphology.nih.gov/anatomy-oral.shtml (assessed on 8 January 2015).
4. M.S. Balsam, E. Sagarin, Cosmetics science and technology, Second ed. Wiley Interscience Publication, NY, USA, 2008; 3: 209-512.
5. Lip Disorders Lip and Tongue Disorders Merck Manual Home Edition.mht
6. Lip Disorders Lip and Tongue Disorders Merck Manual Home Edition.mh http://www.merckmanuals.com/home/mouth_and_dental_disorders/lip_and_tongue - disordes/lip_disorders.html (assessed on 30 November 2014).
7. Das S, Dash SK, Padhy SN. 2003a. Ethnomedicinal information from the tribals of Orissa state review. *J Human Ecology* 14: 165–227**.**
8. Austin A. 2008. A review on Indian Sarsaparilla, *Hemidesmus indicus* (L.) R. Br. *J Biol Sci* 8: 112.
9. Sasidharan, N. (2004). Biodiversity Documentation for Kerala. Flowering Plants. Kerala Forest Research Institute, Peechi, Kerala, India.
10. Siddique, N.A., Bari, M.A., Naderuzzaman, N., Khatun, M.H., Rahman. (2004). Collection of indigenous knowledge and identification of endangered medicinal plants by questionnaire survey in Barind Tract of Bangladesh. Journal of Biological Science, 4: 72-80.
11. Nayar, T.S., Beegam, A.R., Mohanan, N. and Rajkumar, G. (2006). Flowering Plants of Kerala: A Handbook of Tropical Botanic Garden and Research Institute, Thiruvanathapuram, Kerala, India.
12. Satheesh, G., Tushar, K.V., Unnikrishnan, K.P., Hashim, K.M., Indira, B. (2006). Hemidesmus indicus (L.) R. Br. A Review. Journal of Plant Sciences, 3: 146-156.
13. Austin, A. (2008). A Review on Indian Sarsaparilla, Hemidesmus indicus (L.) R. Br. Journal of Biological Sciences, 8: 1-12.
14. Nagarajan, S., Rao, L.J.M. and Gurudutt, K.N. (2001). Chemical composition of the volatiles of Hemidesmus indicus R. Br. Flavour and Fragrance Journal, 16(3): 212-214.
15. Ananthi, R., Chandra, N., Santhiya, S.T. and Ramesh, A. (2010b). Genotoxic and antigenotoxic effects of Hemidesmus indicus R. Br. root extract in cultured lymphocytes. Journal of Ethnopharmacology, 127(2): 558-560.
16. Darekar, R.S., Khetre, A.B., Sinha, P.K., Jeswani, R.M. and Damle, M.C. (2008). Quantitation of lupeol octacosanoate in Hemidesmus indicus R. Br. root powder by HPTLC. Rasayan Journal of Chemistry. 1(3): 526-531.
17. Mandal, S., Das, P.C., Joshi, P.C. and Chatterjee, A. (1991). Hemidesminine - a new coumarinolignoid from Hemidesmus indicus R. Br. Indian Journal of Chemistry, Section B: Organic Chemistry Including Medicinal Chemistry, 30B (7): 712-713.
18. Das, P. C., Joshi, P. C., Mandal, S., Das, A., Chatterjee, A. and Banerji, A. (1992). New coumarino-lignoids from Hemidesmus indicus R. Br. Indian Journal of Chemistry, Section B: Organic Chemistry Including Medicinal Chemistry, 31B (6): 342-
19. Dutta M. K., Sen T.K. and Sikdar S. (1982). Some preliminary observations on the anti-inflammatory properties of *Hemidesmus indicus* in rat. Indian J. Pharmacol., 14: 78.
20. Moideen M.M., Varghese R., Kumar E. K. and Dhanapal C.K. (2011). Wound Healing Activity of Ethanolic Extract of Hemidesmus Indicus (Linn) R. Br Leaves In Rats. RJPBCS. 2(3): pp. 643.
21. Austin A. (2008). A Review on Indian Sarsaparilla Hemidesmus indicus (L.) R.Br. Journal of Biology science. 8(1): 1-12.
22. B.T. Tung, D.T. Nham, N.T. Hai, D.K. Thu, Curcuma longa, the polyphenolic cur-cumin compound and pharmacological effects on liver, Diet. Intervent. Liver Dis. (2019) 125–134.
23. A.E.L.M. El-Kenawy, S.M.A. Hassan, A.M.M. Mohamed, H.M.A. Mohammed, Tumeric or Curcuma longa Linn, in: S.M. Nabavi, A.S. Silva (Eds.), Nonvitamin and Nonmineral Nutritional Supplements, Academic Press, 2019, pp. 447–453.
24. B. Kocaadam, N. Şanlier, Curcumin, an active component of Turmeric (Curcuma longa), and its effects on health, Crit. Rev. Food Sci. Nutr. 57 (2017) 2889–2895.
25. T. Arablou, R. Kolahdouz-Mohammadi, Curcumin and endometriosis: review on potential roles and molecular mechanisms, Biomed. Pharmacother. 97 (2018) 91–97.

26. A. Bhat, A.M. Mahalakshmi, B. Ray, S. Tuladhar, T.A. Hediyal, E. Manthiannem, J. Padamati, R. Chandra, S.B. Chidambaram, M.K. Sakharkar, Benefits of curcumin in brain disorders, Biofactors 45 (2019) 666–689.
27. M. Dei Cas, R. Ghidoni, Dietary curcumin: correlation between bioavailability and health potential, Nutrients 11 (2019) 2147.
28. A.R. Vaughn, A. Branum, R.K. Sivamani, Effects of Turmeric (Curcuma longa) on skin health: a systematic review of the clinical evidence, Phytother. Res. 30 (2016) 1243–1264.
29. ChainaniN (2003) Safety and Anti-Inflammatory Activity of Curcumin: A Component of Turmeric (Curcuma longa). J Altern Complement Med 9: 161- 168
30. Ravindran J (2010) Bisdemethylcurcumin and structurally related Hispolon analogues of curcumin exhibit enhanced pro-oxidant, anti-proliferative and antiinflammatory activities in vitro. Biochem Pharmacol 79: 1658-1666.
31. Jacob A, Wu R, Zhou M, Wang P (2007) Mechanism of the Anti- inflammatory effect of Curcumin: PPAR-γ Activation, PPAR Research.
32. NIZIOŁ-ŁUKASZEWSKA, Z. & GAWĘDA, M. 2016. Influence of cultivar on the content of selected minerals in red beet roots (Beta vulgaris L.). *Folia Horticulturae,* 28**,** 143-150.
33. SLATNAR, A., STAMPAR, F., VEBERIC, R. & JAKOPIC, J. 2015. HPLC-MSn Identification of Betalain Profile of Different Beetroot (Beta vulgaris L. ssp. vulgaris) Parts and Cultivars. *Journal of Food Science,* 80**,** C1952-C1958
34. GEORGIEV, V. G., WEBER, J., KNESCHKE, E.-M., DENEV, P. N., BLEY, T & PAVLOV, A. I. 2010. Antioxidant Activity and Phenolic Content of 10 Betalain Extracts from Intact Plants and Hairy Root Cultures of the Red Beetroot Beta vulgaris cv. Detroit Dark Red. *Plant Foods for Human Nutrition,* 65**,** 105-111.
35. KUJALA, T., LOPONEN, J. & PIHLAJA, K. 2001. Betalains and Phenolics in Red Beetroot (Beta vulgaris) Peel Extracts: Extraction and Characterisation. *Zeitschrift für Naturforschung C*
36. Neel Warne B, Halagur SB (2013) Red beet: An overview. In: B Neelwarne, Red Beet Biotechnology - Food and Pharmaceutical applications. Springer Science+Business Media, New York, 1-43.
37. Kale RG, Sawate AR, Kshirsagar RB, Patil BM, Mane RP (2018) Studies on evaluation of physical and chemical composition of beetroot (Beta vulgaris L.). International Journal of Chemical Studies 6: 2977-2979.
38. Chhikara N, Kushwaha K, Sharma P, Gat Y, Panghal A (2019) Bioactive compounds of beetroot and utilization in food processing industry: A critical review. Food Chemistry 272: 192-200.
39. SINGH, B. & HATHAN, B. S. 2014. Chemical composition, functional properties and processing of Beetroot-a review. *International Journal of Scientific & Engineering Research,* 5**,** 679.
40. WRUSS, J., WALDENBERGER, G., HUEMER, S., UYGUN, P., LANZERSTORFER, P., MÜLLER, U., HÖGLINGER, O. & WEGHUBER, J. 2015. Compositional characteristics of commercial beetroot products and beetroot juice prepared from seven beetroot varieties grown in Upper Austria. *Journal of Food Composition and Analysis,* 42**,** 46-55.
41. NEMZER, B., PIETRZKOWSKI, Z., SPÓRNA, A., STALICA, P., THRESHER, W., MICHAŁOWSKI, T. & WYBRANIEC, S. 2011. Betalainic and nutritional profiles of pigment-enriched red beet root (Beta vulgaris L.) dried extracts. *Food chemistry,* 127**,** 42-53.
42. KUJALA, T. S., LOPONEN, J. M., KLIKA, K. D. & PIHLAJA, K. 2000.Phenolics and betacyanins in red beetroot (Beta v ulgaris) root: Distribution and effect of cold storage on the content of total phenolics and three individual compounds. *Journal of Agricultural and Food Chemistry,* 48**,** 5338-5342.
43. WYBRANIEC, S. 2005. Formation of decarboxylated betacyanins in heated purified betacyanin fractions from red beet root (Beta vulgaris L.) monitored by LC-MS/MS. *Journal of agricultural and food chemistry,* 53**,** 3483-3487.
44. EL GAMAL, A. A., ALSAID, M. S., RAISH, M., AL-SOHAIBANI, M., ALMASSARANI, S. M., AHMAD, A., HEFNAWY, M., AL-YAHYA, M., BASOUDAN, O. A. & RAFATULLAH, S. 2014. Beetroot (Beta vulgaris L.) extract ameliorates gentamicin-induced nephrotoxicity associated oxidative stress, inflammation, and apoptosis in rodent model. *Mediators of inflammation,* 2014.
45. TAN, D., WANG, Y., BAI, B., YANG, X. & HAN, J. 2015. Betanin attenuate oxidative stress and inflammatory reaction in kidney of paraquat-treated rat. *Food and Chemical Toxicology,* 78**,** 141-146.
46. VIDAL, P. J., LÓPEZ-NICOLÁS, J. M., GANDÍA-HERRERO, F. GARCÍACARMONA, F. 2014. Inactivation of lipoxygenase and cyclooxygenase by natural betalains and semi-synthetic analogues. *Food chemistry,* 154**,** 246-254.

47. REDDY, M. K., ALEXANDER-LINDO, R. L. & NAIR, M. G. 2005. Relative inhibition of lipid peroxidation, cyclooxygenase enzymes, and human tumor cell proliferation by natural food colors. *Journal of Agricultural and Food Chemistry,* 53**,** 9268-9273.
48. JIRATANAN, T. & LIU, R. H. 2004. Antioxidant activity of processed table beets (Beta vulgaris var, conditiva) and green beans (Phaseolus vulgaris L.). *Journal of Agricultural and Food Chemistry,* 52**,** 2659-2670.
49. TROIANO, R. P., BRIEFEL, R. R., CARROLL, M. D. & BIALOSTOSKY, K. 2000. Energy and fat intakes of children and adolescents in the United States: data from the National Health and Nutrition Examination Surveys. *The American journal of clinical nutrition,* 72**,** 1343s-1353s.
50. SKUJALA, T., LOPONEN, J. & PIHLAJA, K. 2001. Betalains and Phenolics in Red Beetroot (Beta vulgaris) Peel Extracts: Extraction and Characterisation. *Zeitschrift für Naturforschung C.*