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Haldi: A review

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Abstract

Turmeric is a significant spice in India, which is gotten from rhizomes of plant *Curcuma longa*, from the Zingiberaceae (ginger) family. The spice is at times additionally called the 'Indian saffron' because of its splendid tone. It is generally utilized in the Indian subcontinent, for medical care as well as additionally for the safeguarding of food and as a yellow dye for clothes. Since Ayurveda (1900 bc) various restorative actions have been allocated to turmeric for a wide assortment of sicknesses and conditions, including those of the skin, pneumonic, and gastrointestinal systems, torments, wounds, hyper-extends, furthermore, liver issues. Parts of turmeric are named curcuminoids, which incorporate predominantly curcumin (deferulolyl methane), demethoxycurcumin and bisdemethoxycurcumin. Turmeric with its most active extracts curcumin and curcuminoids is by all accounts substantially more than simply a yellow colorant for Indian curries. Due to its extra-conventional sub-atomic structure it shows solid enemy of oxidative, just as mitigating properties. It is broadly utilized for giving tone and flavor to the food in the conventional Indian medication, turmeric powder is utilized to treat a wide assortment of illnesses.

Keywords: Turmeric, curcumin, antioxidant, rasa-panchak, folk medicine, hepatoprotective, anti- fertility

Introduction

Restorative herbs constantly have a conventional history of utilization, with significant role in maintaining the wellbeing and also have a role in social legacy. Turmeric (*Curcuma longa* L.) is a therapeutic herb extensively employed in Ayurveda, Unani and Siddha medicine and also as a folk medicine for different ailments [1, 2]. The class turmeric contains around 30 different species. The name *Curcuma* is gotten from the Arabic word "turmeric" which means yellow. It is also known as golden spice got from the rhizome of the plant [3]. In Sanskrit, turmeric has 55 unique names related with its strict and clinical use Turmeric is generally utilized the world for various purposes, including as a dietary zest, a dietary shade and in Indian it is consumed as a folk medication for the treatment of different ailments [4]. It is utilized in the material and drug enterprises and in Hindu culture for some ethnic believes. Current customary Indian medication utilizes it for biliary problems, anorexia, hack, diabetic injuries, hepatic issues, stiffness, and sinusitis. The old Hindu writings have depicted it as a sweet-smelling energizer and carminative [5, 6]. In Asian medications, it has been utilized for the treatment of skin break out, psoriasis, dermatitis, and diaper rash [7].

Taxonomy of turmeric [8]

Kingdom: Plantae
Subkingdom: Tracheobionta
Superdivision: Spermatophyta
Division: Magnoliophyta
Class: Lilliopsiada
Subclass: Zingiberidae
Order: Zingiberales
Family: Zingiberaceae
Genus: *Curcuma*



Fig 1: Turmeric

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Vernacular Names [9]

Sanskrit	Ameshta, bahula, bhadra, dhirgharaja, gandaplashika, gauri, gharshani, haridra, harita, hemaragi, haridvilasini, jwarantika, jayanti, kanchani, kaveri, krimighna, kshamada, Lakshmi, kshapa, mangalparada, nisha, mehagni, mangalya, pavitra, pitika, pinja, ranjani, shiva, shifa, shobhana, shyama, umavara, suvarana, vishagni, nishakhya, vauragi, varnadatri, varnini, yamini, yuvati, yoshitapriya, pita, patavalika, ratrimanika, varavarnini, souhagouhaya
English	Indian saffron, turmeric
Hindi	Haldi
Bengali	Halud, Pitras
Assamese	Kordoi/ rohdoi
Gujrati	Halad, Haldar
Marathi	Halad
Punjabi	Haldar, halja
Telugu	Haridra, pasupi, pampi
Tamil	Ameshta
Malayalam	Manjal, mannal, manjalkua
Kannada	Arishina
Oriya	Haldi
Sinhala	Kaha
French	Curcuma, saffron de India, sochet des Indes, souchet, souchet long, souchet odorant, teri merit
Indonesian	Kunyit
Malaya	Kunyit basah, wtkam, wang keong,
Burmese	Hansanwen, sanac, tarum
Cambodia	Banley, pauley, romeit
Cantonese	Wong kewng, yuet kau
German	Kurkuma, glbwurzel
Hamsa	Ganjamau
Hebrew	Kurkum
Italian	Kurkuma
Ilocano	Ciming, culiago
Java	Kumir, kuing, warangan, koeneng temen, kuniyt, kunir bentis
Konkani	Halad, ollod, ollodi
Malacca	Kuniyt
Malagasy	Tamo tamo
Modjakerto	Kumirbantis
Panpangan	Angari, culalo
Persian	Darzardi, zharachobabi, tardhubah
Portugese	Acafrao da India
Dualao	Quinambo
Chinese	Chiang husang, kianag husang, yuchin
Tagalog	Dialo
Visayan	Calanag, calavaga
Zambales	Lisangoy

Morphology

Turmeric is a sterile plant and which produce no seeds. The enduring herbaceous plant grows up to 3-5 ft. tall and has dull yellow blossoms. Profoundly stretched, yellow to orange, barrel shaped, sweet-smelling rhizomes are found. The leaves are substitute and organized in two columns. They are arranged into leaf sheath, petiole, and leaf blade. From the leaf sheaths, a bogus stem is framed. The height of petiole is 50 to 115 cm (20-45 in). The basic leaf cutting edges are generally 76 to 115 cm (30-45 in) long and seldom up to 230 cm (91 in). They have a width of 38 to 45 cm (15 to 18 in) and are oval to curved, narrowing at the tip. The underground

rhizomes or underlying foundations of the plant are utilized for therapeutic and preparation of food. The rhizome is an underground stem that is thick and beefy ringed with the bases of mature leaves. Rhizomes are bubbled and afterward dried and ground to make the particular brilliant yellow flavor, turmeric. At the highest point of the inflorescence, stem bracts are available on which no blossoms happen; these are white to green and now and then touched ruddy purple, and the upper closures are tightened. At the highest point of the inflorescence, stem bracts are available where no flowering occur these are white to green and now and then touched ruddy purple, and the upper closures are tightened^[10, 11].

List of various species of curcuma			
<i>C. aeruginosa</i>	<i>C. coriacea</i>	<i>C. meraukensis</i>	<i>C. rubricaulis</i>
<i>C. albicoma</i>	<i>C. decipiens</i>	<i>C. montana</i>	<i>C. rubrobacteata</i>
<i>C. albiflora</i>	<i>C. domestica</i>	<i>C. musacea</i>	<i>C. sessilis</i>
<i>C. alismatifolia</i>	<i>C. ecalcarata</i>	<i>C. mutabilis</i>	<i>C. sichuanensis</i>
<i>C. amada</i>	<i>C. ecomata</i>	<i>C. neilgherrensis</i>	<i>C. singularis</i>
<i>C. amarissima</i>	<i>C. elata</i>	<i>C. nilamburensis</i>	<i>C. soloensis</i>
<i>C. americana</i>	<i>C. erubescens</i>	<i>C. ochrorhiza</i>	<i>C. sparganifolia</i>
<i>C. angustifolia</i>	<i>C. euchroma</i>	<i>C. officinalis</i>	<i>C. speciosa</i>
<i>C. aromatica</i>	<i>C. exigua</i>	<i>C. oligantha</i>	<i>C. spicata</i>
<i>C. attenuata</i>	<i>C. ferruginea</i>	<i>C. ornata</i>	<i>C. stenochila</i>

<i>C. aurantiaca</i>	<i>C. flaviflora</i>	<i>C. pallida</i>	<i>C. strobilifera</i>
<i>C. australasica</i>	<i>C. glans</i>	<i>C. parviflora</i>	<i>C. sulcata</i>
<i>C. bakeriana</i>	<i>C. glaucophylla</i>	<i>C. parvula</i>	<i>C. sumatrana</i>
<i>C. bicolor</i>	<i>C. gracillima</i>	<i>C. peethapushpa</i>	<i>C. sylvatica</i>
<i>C. brog</i>	<i>C. grahamiana</i>	<i>C. petiolata</i>	<i>C. sylvestris</i>
<i>C. burtii</i>	<i>C. grandiflora</i>	<i>C. phaeocalis</i>	<i>C. thalakovieriensis</i>
<i>C. caesia</i>	<i>C. haritha</i>	<i>C. pierreana</i>	<i>C. thorelii</i>
<i>C. kannanensis</i>	<i>C. harmandii</i>	<i>C. plicata</i>	<i>C. trichosantha</i>
<i>C. caulina</i>	<i>C. heyneana</i>	<i>C. porphyrotaenia</i>	<i>C. vamaana</i>
<i>C. careyana</i>	<i>C. inodora</i>	<i>C. prakasha</i>	<i>C. vellanikkarensis</i>
<i>C. ceratotheca</i>	<i>C. latiflora</i>	<i>C. pseudomontana</i>	<i>C. viridiflora</i>
<i>C. chuanezhu</i>	<i>C. latifolia</i>	<i>C. purpurascens</i>	<i>C. wenchowensis</i>
<i>C. chuanhuangjiang</i>	<i>C. leucorhiza</i>	<i>C. purpurea</i>	<i>C. wenyujin</i>
<i>C. chuanjujin</i>	<i>C. leucorrhiza</i>	<i>C. raktakanta</i>	<i>C. xanthorrhiza</i>
<i>C. cochinchinensis</i>	<i>C. loerzingii</i>	<i>C. ranadei</i>	<i>C. yunnanensis</i>
<i>C. codonantha</i>	<i>C. longa</i>	<i>C. reclinata</i>	<i>C. zanthorrhiza</i>
<i>C. coerulea</i>	<i>C. longiflora</i>	<i>C. rhabdota</i>	<i>C. zedoaria</i>
<i>C. colorata</i>	<i>C. longispica</i>	<i>C. rhomba</i>	<i>C. zerumbet</i>
<i>C. comosa</i>	<i>C. lutea</i>	<i>C. roscoeana</i>	
<i>C. cordata</i>	<i>C. malabarica</i>	<i>C. rotunda</i>	
<i>C. cordifolia</i>	<i>C. mangga</i>	<i>C. rubescens</i>	

Distribution

It is usually found in Cambodia, China, India, Nepal, Indonesia, Madagascar, Malaysia, Philippines and Viet Nam, islands of the Caribbean, and South America. India is the major exporter of Turmeric around the world. The country consumes most (80 percent) of its turmeric production and it exports the surplus. Turmeric is grown in as many as 25 states of India with Andhra Pradesh, Tamil Nadu, Karnataka and Odisha being the leading producers. Other main producers of turmeric are Gujarat, West Bengal, Assam, Meghalaya and Maharashtra. India has almost 1.73 lakh hectares under turmeric development with a complete manufacturing of 8.55 lakh tones during the year. Andhra Pradesh, topped both in area and production during the year 2005-2006, with 69990 hectares (40.46%) and 518550 tons (60.60%) respectively. Tamil Nadu followed with acreage of 25970 hectares (15.01%) and production of 143358 tons (16.75%) [12, 13].

Cultivation

The turmeric plant needs temperatures somewhere in the range of 20 °C and 30 °C and yearly precipitation to flourish. Singular plants develop to a stature of 1 m, and have long, oval leaves. Turmeric is a tropical spice and is filled in the two jungles and subtropics. It will fill lushly in shade if not very thick, yet it produces bigger and better rhizomes in the open ground to the sun. Turmeric requires muggy atmosphere [14].

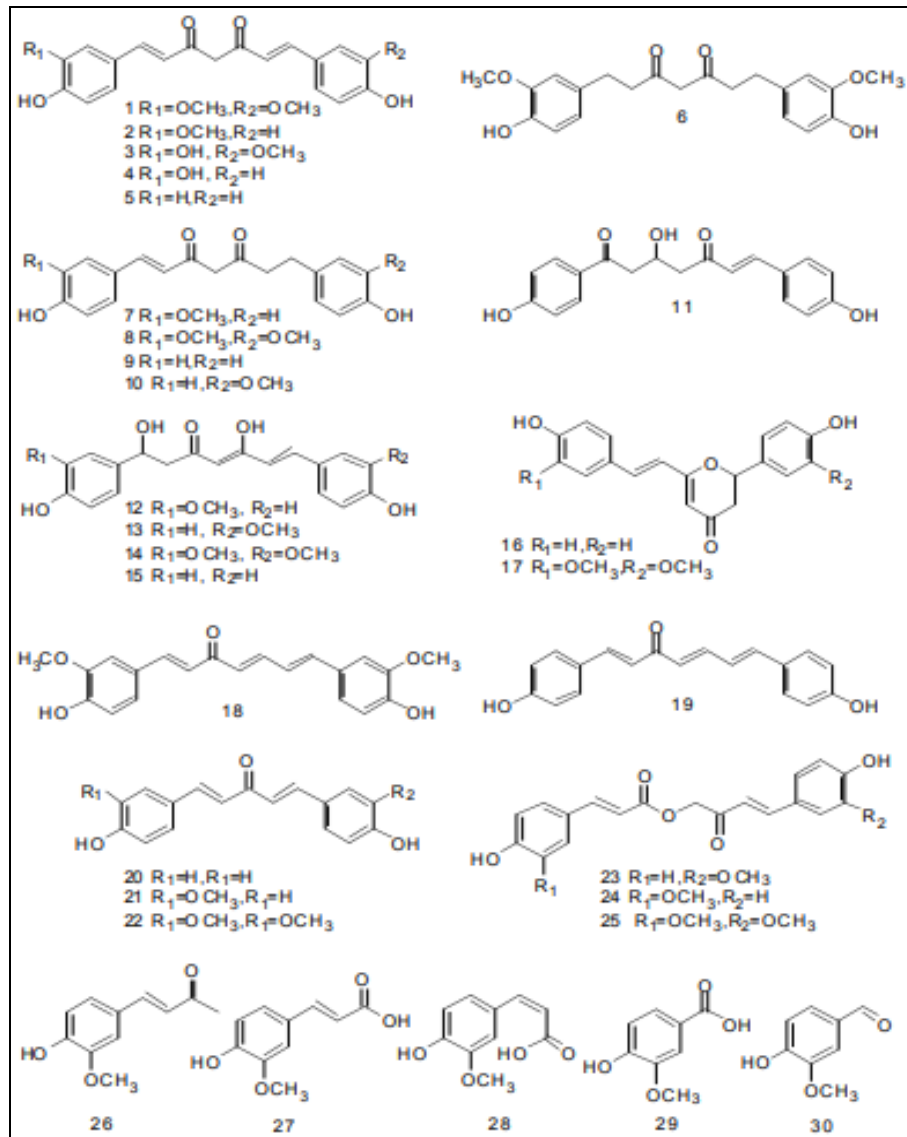
Phytochemical of haldi

Turmeric contains protein (6.3%), fat (5.1%), minerals (3.5%), starches (69.4%) and moisture (13.1%). Phenolic diketone, curcumin (diferuloylmethane) (3.4%) is answerable for the yellow tone, and involves curcumin I (94%), curcumin II (6%) and curcumin III (0.3%). Other phenolic diketones demethoxycurcumin and bis demethoxycurcumin have also been segregated from the rhizomes of *C. longa* [15]. Presence of tumerones (an and b), curdione, curzerenone, mono and di demethoxycurcumin have been accounted for in the rhizomes. The fundamental oil (5.8%) acquired by steam refining of rhizomes has α phellandrene (1%), sabinene (0.6%), cineol (1%), borneol (0.5%), zingiberene (25%) and sesquiterpenes (53%) [16]. Curcumin is the phytochemical that is currently perceived as being liable for the vast majority of the restorative impacts. It is assessed that 2-5% of turmeric is curcumin. Curcumin was first secluded from turmeric in 1815 and the structure was depicted in 1910 as diferuloylmethane. Most presently approached arrangements of curcumin contain around 77% diferuloylmethane, 18% demethoxycurcumin, and 5% bisdemethoxycurcumin. Curcumin is hydrophobic in nature and often dissolvable in dimethylsulfoxide, CH₃2CO, ethanol, and oils. It has some ingestion maxima around 420 nm. At the point of the acidic conditions, the shade of turmeric/curcumin abandons yellow to dark red, the structure in which it is utilized regularly for different strict functions [17].

Phytochemical of Haldi (<i>Curcuma longa</i>)	
1. Curcumin (curcumin I)	[18, 19]
2. Demethoxycurcumin (curcumin II)	[18, 19]
3. 1-(4-hydroxy-3-methoxyphenyl)-7-(3, 4-dihydroxyphenyl)-1, 6-heptadiene-3, 5-dione	[20]
4. 1-(4-hydroxyphenyl)-7-(3, 4-dihydroxyphenyl)-1, 6-heptadiene-3, 5-dione	[20]
5. bisdemethoxycurcumin (curcumin III)	[18]
6. tetrahydroxycurcumin	[18]
7. 5-hydroxyl-1-(4-hydroxy-3-methoxyphenyl)-7-(4-hydroxyphenyl)-4,6-heptadiene-3-one	[21]
8. 5-hydroxyl-1,7-bis(4-hydroxy-3-methoxyphenyl)-4,6-heptadiene-3-one	[21, 22]
9. 1,7-bis(4-hydroxyphenyl)-1-heptene-3,5-dione	[21]
10. 5-hydroxyl-7-(4-hydroxy-3-methoxyphenyl)-1-(4-hydroxyphenyl)-4,6-heptadiene-3-one	[21]
11. 3-hydroxy-1,7-bis(4-hydroxyphenyl)-6-heptene-1,5-dione	[20]
12. 1,5-dihydroxy-1-(4-hydroxy-3-methoxyphenyl)-7-(4-hydroxyphenyl)-4,6-heptadiene-3-one	[20]
13. 1,5-dihydroxy-1-(4-hydroxyphenyl)-7-(4-hydroxy-3-methoxyphenyl)-4,6-heptadiene-3-one	[20]
14. 1,5-dihydroxy-1,7-bis(4-hydroxy-3-methoxyphenyl)-4,6-heptadiene-3-one	[20]
15. 1,5-dihydroxy-1,7-bis(4-hydroxyphenyl)-4,6-heptadiene-3-one	[20]
16. 1,5-epoxy-3-carbonyl-1,7-bis(4-hydroxyphenyl)-4,6-heptadiene	[27]
17. cyclocurcumin	[23]

18. 1,7-bis(4-hydroxy-3-methoxyphenyl)-1,4,6-heptatrien-3-one	[22]
19. [1,7-bis(4-hydroxy-3-methoxyphenyl)-1,4,6-heptatrien-3-one	[24]
20. 1,5-bis(4-hydroxyphenyl)-penta-(1E,4E)-1,4-dien-3-one	[24]
21. 1-(4-hydroxy-3-methoxyphenyl)-5-(4-hydroxyphenyl)-1,4-pentadiene-3-one	[20]
22. 1,5-bis(4-hydroxy-3-methoxyphenyl)-penta-(1E,4E)-1,4-dien-3-one	[25]
23. 4''-(4'''-hydroxyphenyl)-2''-oxo-3''-butenyl-3-(4'-hydroxyphenyl-3'-methoxy)-propenoate	[26]
24. 4''-(4'''-hydroxyphenyl-3-methoxy)-2''-oxo-3''-butenyl-3-(4'-hydroxyphenyl)-propenoate	[26]
25. calebin-A	[18]
26. (E)-4-(4-hydroxy-3-methoxyphenyl)but-3-en-2-one	[25]
27. (E)-ferulic acid	[25]
28. (Z)-ferulic acid	[25]
29. vanillic acid	[25]
30. vanillin	[25]

Structure of mentioned phytochemicals [28]



Extract	Property
Turmeric powder	Wound healing [29]
Ethanol extract	Antiinflammatory Hypolipemic Antitumour Antiprotozoan [30, 31, 32]
Petroleum ether extract	Antiinflammatory Antifertility [33, 34]
Alcoholic extract	Antibacterial [35]
Crude ether extract	Antifungal
Chloroform extract	Antifungal [36]
Aqueous extract	Antifertility [37]
Volatile oil	Antiinflammatory Antibacterial Antifungal [38, 39]
Curcumin	Antibacterial, Antiprotozoan Antiviral Hypolipemic Hypoglycemic Anticoagulant Antioxidant Antitumour Anticarcinogenic [40, 41, 42, 43, 44, 45, 46, 47, 48, 49]
Ar-turmerone	Antivenom [50]
Methylcurcumin	Antiprotozoan [51]

Demethoxycurcumin	Antioxidant
Bisdemethoxycurcumin	Antioxidant ^[52]
Sodium curcumin	Antiinflammatory, antibacterial ^[53]

Ethnic view

There is a solid faith in Hinduism that God has granted spiritual capabilities to some preferred plants which are thusly utilized in ceremonies and concoctions just as to enhance the wellbeing of individuals ^[54]. The utilization of plant species in Hindu ceremonies means the significant connection among people and plants. Various plant parts such as leaves, stems, barks, flowers are introduced as offerings during the fulfillment of a few Hindu customs which is done in the most maintainable way ^[55, 56]. Evidently Haldi was utilized to worship the Sun during the sunlight based time of India, when Lord Ram Chandra strolled the Earth. It was referenced in the Artharveda of India. Buddhist priests have utilized turmeric as a color for their robes for 2000 years ^[57]. All of us is familiar with the promising event of GAYA HALUD (the turmeric festivity) upon the arrival of the marriage. Haldi is the attributed for favorable luck in Indians. This is likewise one of the significant articles needed for worshipping. In this way, Haldi is significant from social viewpoint ^[58]. In the ancient times the pre-aaryans utilized haldi in Sakthi worship ^[59]. Local tribes of Orissa are also associated with the utilization of Haldi in some cultural rituals and religious practices. Haldi is regarded as the symbol of purity in Hindu culture. It is utilizing in ceremonies from birth to death. Haldi has been used in anointing from ancient times times in many ceremonies. In Shital Sasthi the festival of lord Shiva and Parvati marriage, haldi paste is used. Turmeric paste plays an important role in Brahmins' Bratopanayana ceremony which is a sacred thread wearing ceremony. Dried rhizome paste is applied on the newly born baby's forehead to make him protected from evil sights and demons. Turmeric powder solution is used in the welcome ceremony of newly married couple. Haldi is also used in Sarpam thullal and in black magic. Women on their last day of menstrual period apply turmeric glue before a shower to make themselves pure. Haldi also has a role in Rakshabandhan ^[60].

Haldi in ayurveda

Turmeric, or *Curcuma longa*, is perhaps the most known, universally researched and usually utilized Ayurvedic flavors or spices. This miracle is utilized in cooking, as a dietary enhancement with various medical advantages, and even as an effective application for beautification. No tasty curry is finished without turmeric. There's not really a framework in the body that isn't upheld by turmeric. Turmeric is utilized in Ayurveda to maintain vata, pitta, and Kapha, however in overabundance, it can bother pitta and vata. It has an especially advantageous impact for rasa and rakta dhatus (the blood and plasma of the circulatory system). It likewise ignites Agni (stomach related fire), decreasing kapha and ama (poisons). As referenced above, turmeric is generally utilized for supporting the blood, liver, joints, immune system, and stomach related problems. Its severe and impactful taste and warming nature empower it to have a mobilizing and purifying energy. Turmeric is said to give the energy of the Divine Mother and to give prosperity. A similarity of Ganesha is regularly cut in an entire turmeric root and the power to fight against different obstacles. This is also famous in yogic culture, as it is utilized to purge the unobtrusive channels and chakras, and is generally used to help the tendons in hatha yoga ^[61, 62, 63].

Rasa panchak of haldi (*Curcuma longa*) ^[64]

Hindi/ Sanskrit	
Virya	Ushana
Vipak	Kattu
Guna	Ruksha, Laghu
Rasa	Tikta, Katu
English	
Potency	Hot
Metabolic Property	Bitter
Physical Property	Dry, Light
Taste	Pungent, Astringent

Ayurvedic Properties of Haldi ^[65]

- Abhiyantar Nadisanshthan
- Pachan-sanshthan-It helps in digestion.
- Raktavah sanshthan-Due to tikta rasa it helps in blood circulation. O Sawashan sanshthan-Used to cure respiratory or cough problems. O Mutravah sanshthan-It is also beneficial in urination issues.
- Taapkaram-Fever is predominant due to the Pitta sedative.
- Satambhikaran-Maintains the equilibrium.
- Tavacha-Grind turmeric and mix it in the sesame oil and it will eliminate skin disease. For the dry skin mixing turmeric in mustard oil and applying it on the body is beneficial.
- Injury-Drinking one tea spoon of turmeric mixed in warm milk relieves pain.

The Ayurvedic Indian medication asserts the utilization of turmeric against biliary issues, anorexia, coryza, hack, diabetic injuries, jaundice, stomach tumor, stiffness, and sinusitis. From the various studies published in the Journal of General Virology demonstrated that curcumin can prevent Transmissible gastroenteritis virus (TGEV)-an alpha-group coronavirus that infects pigs-from infecting cells. At high doses, the compound also acts to kill virus particles. In corona times it is considered as an immunity booster ^[66].

Haldi as a Folk medicine

Turmeric has a long convention of utilization in both the Chinese & Indian frameworks of medication. Effective utilization of turmeric glue is advised against vertigo, hyper-extends, cuts wounds, swellings, skin diseases, nibbles of creepy crawlies/scorpions/snakes, pimples and diabetic injuries. Oral intake of turmeric is supposed to be compelling against toothache, heartburn, loose bowels, biliary and hepatic issues and anorexia. Breathing in of vapor of consumed dry turmeric is a typical practice against sinusitis, coryza and so forth in rural India. It has been utilized as a mitigating specialist to treat gas, colic, furthermore, feminine challenges. It assists with managing the female reproductive system and refines the uterus and breast milk. It also provides relief against labor pain. It was likewise used to help with stomach problems (gastritis and corrosiveness, assisting with expanding bodily fluid creation and to ensure the stomach lining). Turmeric powder was utilized to be spread on the cut off umbilical harmony of infants in the Indian wide open as a germicide. Turmeric is also known to make the eyes clean and can improve the vision. It has been utilized to add flavor and color to food, particularly in South Asian cooking. Turmeric is one of the standard elements of curry powder. In the

Western world, it is utilized in sauces, mustard mixes, and pickles. Turmeric tea is well known in specific zones of Japan, especially in Okinawa. Turmeric has likewise been customarily perceived as a beauty and health enhancer [67, 68].

Haldi for skin

Turmeric glue is applied on the face and skin as a veil to improve skin appearance and to help in the blurring of imperfections. It was utilized as a face pack alongside usheer (vertiver) and additionally as an antiseptic. Turmeric is mostly used to revive the skin. It delays the indications of maturing like wrinkles and furthermore has different properties like antibacterial, germicide and calming. It is ideal wellspring of blood purifier. It is viable in treatment of skin inflammation due to its antiseptic and antibacterial properties that battle pimples furthermore, breakouts to give a young gleam to your

skin. It too lessens the oil emission by the sebaceous organs [69, 70].

Haldi in modern view

These days, herbal medication assumes significant job in enhancing and keeping up individuals' wellbeing. Herbal medication regularly originated from few known agricultural items that likewise used as food or food flavors. Turmeric (*Curcuma longa* L.) is one of the noticeable herbs utilized as medicine and food spice. To take ideal health advantages from turmeric or other herbal formulations, it is critical to furnish turmeric with great quality. The normalization and quality control of herbal plant items are become a significant issue that denies their ease of use and respectability in therapeutic medication [71, 72, 73].

Various Uses of Haldi	
1. Anticoagulant activity	Curcumin shows anticoagulant movement by restraining collagen and adrenaline-induced platelet [74]
2. Antifertility activity	Petroleum ether and aqueous extracts of turmeric shows antifertility effect on various models. Curcumin additionally represses human sperm motility and has the potential for the producer of a novel intravaginal contraceptive [75, 76, 77, 78].
3. Antidiabetic effect	Curcumin avoids galactose-prompted cataract development at very low doses. Both turmeric and curcumin decline glucose sugar level in alloxan-induced diabetes [79, 80, 81].
4. Antibacterial activity	Both curcumin and the oil portion kill development of a few microbes like Streptococcus, Staphylococcus, Lactobacillus, etc. Both curcumin and the oil portion kill development of a few microbes like Streptococcus, Staphylococcus, Lactobacillus, etc. The watery constituents of turmeric rhizomes have antibacterial effects. It also inhibit the development of Helicobacter pylori Cag A + strains [82, 83, 84].
5. Antifungal effect	Ether and chloroform concentrates and oil of <i>C. longa</i> have antifungal effects [85, 86, 87]. The rough extract of ethanol also possesses antifungal property. Turmeric oil is additionally dynamic against <i>Aspergillus flavus</i> , <i>A. parasiticus</i> , <i>Fusarium moniliforme</i> and <i>Penicillium digitatum</i> [88, 89].
6. Antiprotozoan activity	The ethanol concentrate of the rhizomes has anti- <i>Entamoeba histolytica</i> movement [90, 91, 92].
7. Antiviral effect	Curcumin has been shown to have antiviral activity. It is an efficient inhibitor of Epstein-Barr virus (EBV) key activator Bam H fragment z left frame 1 (BZLF1) protein transcription in Raji DR-LUC cells. Most importantly, curcumin also shows anti-HIV (human immunodeficiency virus) activity by inhibiting the HIV-1 integrase needed for viral replication. It also works to resists UV light induced HIV gene expression. Thus curcumin and its analogues may have the potential for novel drug development against HIV [93, 94, 95].
8. Anti-oxidant	Curcumin has been demonstrated as an amazing scavenger of oxygen free extremists. It can shield lipids or haemoglobin from oxidation. It can fundamentally suppress the responsive oxygen species ROS, for example, H ₂ O ₂ , superoxide anions and nitrite initiated macrophages. Curcumin pre-treatment has been appeared to diminish ischemia-actuated oxidative pressure and changes in the heart [96, 97].
9. Anti-cancer	A few studies have illustrated that curcumin can restrain carcinogenesis at three stages: angiogenesis, tumor promotion, and tumor development. In two investigations of colon and prostate malignant growth, curcumin was appeared to restrain cell multiplication and tumor development. Turmeric and curcumin are likewise ready to smother the action of a few regular mutagens and cancer-causing agents. The anticarcinogenic impacts of turmeric furthermore, curcumin have been identified with direct cancer prevention agent and free-extremist scavenging impacts, just as their capacity to by implication increment glutathione levels, along these lines helping in hepatic detoxification of mutagens and cancer-causing agents, and restraining nitrosamine arrangement. Curcumin has moreover been appeared to repress the mutagenic enlistment impact of UV beams [98, 99, 100, 101].
10. Hepatoprotective	The hepatoprotective and Reno protective impacts of turmeric are basically because of its cell reinforcement properties, just as its capacity to diminish the arrangement of supportive of pro-inflammatory cytokines [102].
11. Anti-HIV	Curcumin has been appeared to have antiviral property. It is an effective inhibitor of Epstein-Barr infection (EBV) key activator Bam H section z left frame 1 (BZLF1) protein record in Raji DR-LUC cells. Currently Curcumin additionally shows anti-HIV (human immunodeficiency infection) action by hindering the HIV-1 integrase. Required for viral replication. It likewise represses UV light induced HIV quality expression. Along these lines curcumin and its analogs may have the potential for novel medication advancement against HIV [103, 104].
12. Anti-inflammatory	Curcumin is a potent anti-inflammatory with specific lipoxigenase-and COX-2-inhibiting properties. <i>In vitro</i> , and <i>in vivo</i> studies have demonstrated its effects at decreasing both acute and chronic inflammation [105].
13. Antivenom effect	It is having anti-venoms property. The chemical constituent of <i>c. longa</i> i.e. Ar-turmerone isolated and neutralizes both haemorrhagic activity of Bothrops venom and 70% lethal effect of Crotalus venom [106, 107].
14. Anti- Alzheimer's	Alzheimer's disease (AD) is the most well-known type of dementia and the two constituents of the curcuminoid mixture additionally contribute essentially to the adequacy of curcuminoids in the particular disease [108].

Conclusion

From the review, it can be concluded that the Turmeric (Haridra) has a ton of possibilities with regards to its restorative utilization. Turmeric has an expansive range activity with specific impacts and is valuable for long haul and day by day use. Turmeric is most commonly used spice in

variety of cooking styles in all parts of India since numerous hundreds of years. For the most part the rhizome powder of Turmeric is utilized as a spice all over India but very not all people are aware of its remedial properties. Turmeric is viewed as outstanding amongst other medication in numerous sicknesses like Diabetes, Skin infections and so forth, which

is being used since ages owing to its numerous pharmacological activities.

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