

Ethnobotany of turmeric (*Curcuma longa* L.)

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This paper deals with the ethnobotany of turmeric (*Curcuma longa* L.) - an ancient crop having its origin and early domestication in South Asia and ethnobotanically very important. Due to its manifold uses in cultural and social life of ethnic people of Asia with special reference to South and South East Asia, has very early domestication and evolutionary history. In India, its history begins from time immemorial, probably much prior to the great Indus valley civilization. It is grown from time immemorial in Orissa. It has been mainly used as a colouring agent, a magic substance and a substance of religious importance and medicine from ancient times. Also, several other species of the genus *Curcuma* are economically useful. An attempt has been made in the paper to assemble information and elucidate the historical, legendary, religious, literary and mythological aspects substantiating logically the probable origin of the crop in India. Its ethnic connections in relation to its common usage in the sustenance of the primitive people from the pre-historical times are documented. The information given in the paper is mainly based on available literature and the passport information on the indigenous knowledge collected by the authors during survey and collection trips conducted and the PGR work carried out by the senior author on the genus *Curcuma* during the past 25 years.

Keywords: *Curcuma*, Origin, Domestication, Ethnobotany, Uses, Medicine

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The genus *Curcuma* L. (Zingiberaceae) contains many taxa of economic, medicinal, ornamental and cultural importance. India is the largest producer of turmeric in the world (93.7% of the total world production) and is cultivated in 150,000 hectares in India¹. It is used mainly for domestic use as a condiment and occupies 6% of the total area under spices in the country. About 92% of the produce is consumed in the domestic market, and 8% exported annually. Maximum area under turmeric is in Andhra Pradesh followed by Maharashtra, Tamil Nadu, Orissa, Karnataka and Kerala. The genus *Curcuma* L. (Zingiberaceae) contains many taxa which are economically important as food, condiment and as colouring, medicinal and ornamental materials². It is found throughout the South and South East Asia with a few species extending to China, Australia and the South Pacific. The highest diversity is concentrated in India and Thailand, with at least 40 species in each area, followed by Myanmar, Bangladesh, Indonesia and Vietnam. Due to lack of a comprehensive taxonomic revision, still there is little consensus on the number of species that should be recognized. Recent estimates vary from about 503 to

80 species⁴. Their number will probably reach 120 in the near future due to ongoing detailed Botanical exploration of India and South East Asia².

The genus exhibit wide variation at intra and inter-specific levels. Turmeric having anti-inflammatory, hypocholestraemic, choleraic, antimicrobial, insect repellent, antirheumatic, antifibrotic, antivenomous, antiviral, antidiabetic, antihepatotoxic as well as anti-cancerous properties is in day to day domestic use as a folk lore medicine from time immemorial. With curcumin, oleoresin, oil and other complex chemical contents it is lately gaining importance as a potential source of drugs for various ailments. Turmeric oil is used in aromatherapy and in the perfume industry. Apart from its religious, cultural and magical uses⁵. It has been an inseparable part of Ayurvedic system of medicine in India and in Chinese systems¹. The authors attempt here to give a comprehensive ethnobotanic treatment on turmeric in India with special reference to its use as medicines based on the information already available in literature along with those collected by the authors. Great extent of diversity noticed in the crop in southern, eastern, South eastern and northern parts of India lead to detailed work on of genetic resources activity in the

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genus. The authors apart from collection, characterization and conservation of germplasm have also gathered information on various aspects including ethnobotany and the present paper gives the results in nutshell.

Genetic resources of turmeric

Studies on turmeric collection, characterization, evaluation, classification and documentation in the past resulted in amassing¹, 410 accessions of turmeric and 30 other wild species from different parts of India. Characterization and evaluation on 568 turmeric collections resulted in the identification of six different major varieties in India⁶. Several species of the genus are very closely associated with the social, ethnic, rural and folklore life of various people in Asia, some as medicinal, some as arrowroot and dye yielding plants and a few connected with religious and social ceremonies and rituals, cultural functions and folklore arts. Some species of *Curcuma* now a days, are gaining more importance due to recent reports of identifying very useful new bio-chemical compounds contained in their rhizomes. The uses of turmeric as medicine (symptoms and treatment) in combination with other plants are mentioned in Table 1.

Origin and domestication

Ethnobotanical evidences indicate that the use of turmeric in India has begun in ancient times in connection with the Sakthi worship or the worship of the divine mother or Goddess by the pre- Aryans and later as a commodity of trade as a colouring material and as a condiment has treated the subject in detail⁷. The origin and spread of the genus essentially took place in the Indo-Malayan region and hence favoured its Indo-Malayan origin and centre of diversity theory⁸. Turmeric is believed to have spread from South East Asia to nearby areas in Indochina, China, Japan and other South Pacific Islands and from there to tropical West Africa and to East Africa. Its introduction to Caribbean Islands and Central America is rather quite recent. Turmeric is very popular among the rice eating people of South East Asia and Indo-China as a condiment and spice⁹. It adds colour, flavour and taste to various dishes. Its use as a dye in weaving industry was common in the past and now it has been replaced by other synthetic dyes.

Reports indicate that around eight tuber bearing, one stolon bearing and 16 non tuberous species occur in the Western Ghats region⁶ and hence considered as

number one hot spot for the genus on par with North eastern region in India. Thus, South Western Peninsular region of India being a centre of diversity for the genus, may also be one of the original abodes of the genus in Asia. Similar situations occur in Eastern Ghats region in parts of Orissa and Andhra Pradesh and parts of Madhya Pradesh with considerable tribal population. Turmeric is the main cash crop in the tribal dominated districts of Kandhamal, Gajapati, Ganjam, Mayurbhanj and Koraput of Orissa. Turmeric was grown in Orissa from time immemorial¹⁰. In Orissa, growing turmeric is closely associated with religious rites and cultural practices of the local tribes. Khonds in Kandhamal district of Orissa used to practice peculiar ancient religious rites such as human sacrifice in order to improve the production and quality of turmeric. The human sacrifice known as Meria sacrifice was carried out during the festival known as Kedu-jatra (March-April) in which a non-Khond boy kidnapped from plains and kept in custody in the village providing him all pleasures of life before the sacrifice. In 1845, the British Governor General (Dist. Gazetter, 1908) prohibited Meria sacrifice and in its place allowed buffalo sacrifice which continues till date¹⁰.

In Kerala, as a part of the religious rights Hindu communities sing the varying forms of legendary poems as Thottem paattu as a part of Sakthi worship. Thus, it is a true reflector and paradigm of prevailing religious and social circumstances in southern parts of India. The use of turmeric powder, paste and guruthi still used as offerings to the Goddess in the above temple shows how turmeric evolved firstly as an inseparable and important substance of magic, secondly as an integral part of Sakthi worship in southern India and in other parts of India. The use of turmeric as a cosmetic, medicine and as a condiment has followed this stage as reflected in Agri-folklore songs namely Vadakkan paattukal of Kerala sung by the labourers during agricultural operations in the medieval period. In these songs Pattar, a Hindu Brahmin community migrated from Tamil Nadu to then Kerala were depicted as turmeric traders. Further, its use as a substance of cosmetic in these songs and the colour of beautiful women was compared with that of freshly cut Wyanadan manjal (fresh turmeric from hilly district of Wyanad in Kerala). Sporadic occurrence of the crop in northern plains as compared to its wide occurrence in Tamil Nadu, Andhra Pradesh, Karnataka, Orissa, West

Table 1—Use of turmeric as medicine in combination with other plants

Diseases/Symptoms	Treatment*
Anemia	Turmeric juice mixed with honey is taken in.
Worms	Twenty drops of fresh turmeric rhizome juice mixed with a pinch of salt taken in the empty stomach in the morning daily.
Extreme perspiration	Take bath after turmeric application in the form of paste made of rhizome.
Bone fracture	Apply a paste made of fresh turmeric rhizome and young leaves of mango on area of fracture.
Duodenal ulcer	Take seven leaflets of neem (<i>Azadiracta indica</i>), seven dried berries of black pepper and fresh turmeric rhizome for 21 days continuously along with one ounce of milk in the morning.
Hard growth on leg	Apply a paste made out of fresh turmeric rhizome and fruits of <i>Terminalia arjuna</i> in coconut oil on affected parts.
Hydrocele	Take a decoction made of Cumin, black <i>jeera</i> , young shoot of bamboo, dried ginger, <i>chathakuppa</i> , turmeric leaves, <i>Cardiospermum</i> roots.
Asthma	Take a small ball of paste made of turmeric and curry leaves every day for one month. A teaspoon of turmeric powder with a glass of milk daily is effective.
Eosinophilia	Turmeric powder taken in cow's urine.
Cracks on heel	Apply paste made of fresh turmeric rhizome in curd on affected legs.
For blackening of face	1. Apply a paste made of curry leaf and turmeric fresh rhizome paste. 2. Apply a paste made of turmeric, sandal wood, ripened banyan leaf, <i>Kottam</i> (<i>Gardenia gummifera</i>), sweet flag, <i>Grochanam</i> , etc.
Migraine	Smoke turmeric powder made into a paste with castor oil and rolled in cotton cloth.
Injury	1. Apply in fresh turmeric rhizome and <i>Centella asiatica</i> leaf paste externally. 2. Apply paste of turmeric, drum tick leaf and burned charcoal of white cotton cloth on the cuts.
Burning sensation in hand and under foot	Apply a pinch of turmeric powder in equal amount of lime water and tender coconut water on the parts.
Scabies	Apply a paste of fresh rhizome of turmeric in cow's urine. Apply fresh rhizome juice in affected areas.
Measles	Turmeric powder mixed with few drops of honey and juice of leaves of bitter gourd is taken in.
Padded hands and legs	Apply paste made of elephant bone in honey alongwith red soil and dry turmeric rhizome on affected parts.
Diabetes	1. Drink three ounces juice of Indian gooseberry fruits and fresh turmeric rhizome every day morning. 2. Drink juice made of fresh turmeric rhizome, <i>Phyllanthus</i> fruits and <i>Tinospermum</i> in the early morning before any food.
Skin damage by fungus (lichens)	1. Apply a paste made of fresh rhizome of turmeric and ' <i>Attuthakarayila</i> ' (<i>Cassia</i> sp.) on affected parts. 2. Paste made out of fresh turmeric rhizome and curry leaves is also applied 3. Apply a paste made out of fresh turmeric rhizome and neem leaf.
Elephantiasis	Mixture of turmeric powder and <i>jaggery</i> mixed with cow's urine is taken.
Jaundice	A decoction made of fresh turmeric rhizome, curry leaf and fruit rind of <i>Terminalia arjuna</i> is taken daily. Twelve gm of turmeric powder mixed with 48 gm of curd and taken for few days cures jaundice.
Hepatitis-B positive	Make decoction of <i>Perumkurumba</i> (<i>Cleome gynandra</i>) roots, <i>Boerhavia hirta</i> roots, turmeric and <i>Kadukurohini</i> (<i>Picrorrhiza kurroa</i>) and drink twice a day with <i>Siva gulika</i> .
Fungus infection on exposed legs	Apply a paste made out of fresh turmeric rhizome and <i>Centella asiatica</i> on affected parts.
Leech poisoning	<i>Nannari</i> (<i>Hemidesmes indica</i>) tuber, turmeric powder and ghee are mixed and eaten
Food poisoning	Fresh turmeric rhizome and curry leaf pasted and made into small balls are taken in.
Dog biting	1. Fresh turmeric rhizome, <i>ankolam</i> (<i>Alangium salvifolium</i>) root and <i>karinochi</i> (<i>Vitex nigundo</i>) roots pasted and applied. 2. Paste made of fresh turmeric rhizome and <i>Moringa oleifera</i> bark is applied on injured portion.
Leucoderma	Apply paste made of dry turmeric in <i>Ocimum sanctum</i> leaf juice.
Cold allergy on skin	Apply a paste made of dry turmeric and <i>Cynodon dactylon</i> leaves on affected skin.
Intestinal disorders	Fresh juice or dry powder mixed with buttermilk or plain water is beneficial for stomach problems.
Cough and cold	1. Half a teaspoonful of fresh turmeric powder mixed with 30 ml of warm milk is beneficial. Smoke from burning turmeric dry rhizome is inhaled. 2. Heat mixture of turmeric powder and milk; add a pinch of salt and sugar given to children. 3. Turmeric powder and ghee mixed with hot milk cures cough.

(Contd.)

Table 1 (Contd.)— Use of turmeric as medicine in combination with other plants

Diseases/Symptoms	Treatment*
Boils	Application of turmeric powder on affected parts helps in healing.
Sprains	Ash obtained by burning dry turmeric and dissolved in a cup of water is applied.
Tooth-ache	Turmeric paste mixed with lime and salt is applied in the area.
Pain in breasts	Rinse mouth with turmeric water.
Insect poison	1. Apply turmeric paste in affected parts. 2. Apply turmeric powder mixed with lime in affected parts.
Malaria	Turmeric powder mixed with powdered black pepper consumed with milk cures Malaria.
Urinary infection	Honey and turmeric powder mixed with juice of Indian gooseberry cures the discharge of puss through urine.

* In most of the cases no dose, dose form, time and duration of treatment are available as it is mostly local medicine. Information collected by the authors from *Ayirathionnu Ottamoolikal* written in Malayalam language by Namboodiri, 2004.

Bengal, Konkan of Maharashtra, several states of North east and in hilly Uttar Pradesh, Himachal Pradesh and Kerala supports the theory that it is adopted first in the subsistence and later on in the commercial agriculture in more favourable conditions closer to places of its origin than in far away and less favourable areas. Qualitatively better types of turmeric are also very frequently cultivated in Southern region.

Social and religious uses

Turmeric is regarded as a substance of purity in Hindu culture. It is widely used in various day to day religious and social ceremonies from birth to death in Orissa and other parts of India. The paste made out of fresh rhizomes of turmeric if anointed on the newly born baby and washed during the auspicious occasion in the months of November-December (Oriya month of Margasira) so as to increase the longevity of the baby. The person anointing his body with turmeric paste daily is believed to protect himself from enemies. In addition, the local Hindus believe that Maha Laxmi the Goddess of good luck, prosperity and bliss gets pleased with such people. During the annual marriage festival of Lord Shiva and Parvati, their idols are bathed after applying turmeric paste. This function called as Shital Sasthi is prevalent in coastal and western Orissa. The idols of village God and Goddess also get bathed with turmeric, arecanut and sandalwood daily and during festival season. At the time of bratopanayana or upanayana, a ceremony in connection with wearing of sacred thread by the Brahmins in the Orissa, the sacred thread is washed in water mixed with turmeric paste accompanied with enchanting of mantras. Similarly, at the time of wearing of new thread to exchange the old, it is

washed in a solution prepared by mixing turmeric powder in water. The process is repeated at every periodical replacement of the thread afterwards. Ladies on the last day of menstrual period every month, apply turmeric paste before bath and apply a little bit of cow dung slurry over the body in order to purify themselves so as to enable them to lead the routine domestic life and regain touchability and free movement in their home. This ancient practice was also common earlier in other states of southern parts of India especially among Brahmin communities. Turmeric is also known as Krishna kedara in Oriya language. The paste of the dried rhizomes is applied in the forehead of the newly born child to protect him or her from demons and evil sight from a person. As an auspicious act, even the wedding cards are also anointed with turmeric different parts of the country. Sprinkling turmeric solution is believed to purify the wedding apparels or dress materials. In Orissa, at the time of marriage ceremony, bride takes a bath in water added with turmeric paste before the bridegroom arrives and puts on Baula Pata which is washed with turmeric solution and from that time onwards the lady is called as Badua kanya. If the bridegroom does not perform this custom after his engagement with the girl, no one else will agree to marry her.

The people of Orissa celebrate around 13 festivals every year among which, Raja is an important festival falling in the second week of June and celebration continues for three days. It is named according to the annual menstrual period of goddess earth, probably indicating the fertility and productivity of the earth at the onset of monsoon. After three days, the idol of goddess is also bathed in turmeric solution for purification. During Raja Sankranti, a sowing festival,

the teenage boys and girls anoint their bodies with turmeric paste. The sister gives a little bit of turmeric in rakhi, an anklet that is tied by her around the wrist of her brothers at the time of Raksha Bandhan a festival celebrated all over North India in monsoon season.

Use of turmeric powder, paste and solution in grihapravesh ceremony, i.e. welcome ceremony of the newly wedded couple in bridegroom's house is a common custom all over India. Similar ceremony is also sometimes held when new cows and animals are bought home. All these very clearly indicate the importance of turmeric in day today social and religious life of people in every nook and corner of India.

In Kerala, worship of forefathers, along with Mother Kaali, or Sakti is still prevalent in its original form among tribal people or the aborigines and the lower strata of Hindus known as Panchamas and also in some of the other socially advanced ethnic groups. This kind of worship is the continuation of the old system of worship of the Mother Nature by the primitives. In all these forms of worship, either in temples or at homes, turmeric essentially forms as an important offering to the deity or to the spirits of ancestors in one way or the other. Usually, rice flakes, popped rice, coconut, roasted rice powder and country liquor or toddy (a fermented drink extracted from coconut tree) along with turmeric powder form the materials of offerings in such cases. Thus, turmeric with its attractive orange colour convertible into red blood colour by adding a little lime or alkali was originally domesticated in India as a material of great curiosity, magic power and sanctity. The devotees anoint their foreheads with turmeric paste offered in temples. Turmeric is an important offering in Mrithyunjaya homa, a sacrificial ritual for one's own betterment and Amala homa, another ritual for destruction of one's enemies. Both these are practiced in India, especially in Kerala, even now.

Turmeric is used in black magic. The decoction made of turmeric with other ingredients is used as certain special offerings known as Guruthi in Kaali temples. It is also offered along with milk to snake Gods in the case of snake worshipping ceremonies called Sarpam thullal, a religious ceremony which is organized once in every year in the case of certain feudal Hindu communities like Nairs of Kerala who worship Sarpa or poisonous snake in sacred grooves locally called Kavus which are special temples

established and devoted to various snakes in an undisturbed corner of their large homesteads having a natural forest cover. Kavus or sacred grooves with undisturbed natural vegetation and associated living beings are now hailed as a remarkable contribution by the Indian social and religious system in the field of in-situ conservation of biodiversity. Turmeric powder is also used in annual Kalams pattu conducted in various forms of worship in temples of feudal Hindu families.

In South India, turmeric is considered to be very auspicious during marriage ceremony by the Hindus and the bridegroom ties Mangalyasutra, Mangalasutra or Thaali, tied to sacred thread coloured with turmeric solution around bride's neck by the groom. In certain temples in South, turmeric is used in preparation of Kalabha, which the devotees apply on their forehead as thilak, gopi or pottu and sometimes smear the turmeric paste on clean shaven heads both as a part of worshipping of the idol and as an offering in Muruga temples. The last day of Mithunam, a month of Malayalam calendar of Kerala is known as Karkidaka sankranthi, an auspicious occasion when Hindus perform a special ritual in the evening to oust Cheta, the Goddess of evil from their homes and receive Sri Parvathy, the Goddess of fortune. In this ceremony, the entire house and its premises are thoroughly cleaned and the whole garbage along with old brooms and useless winnowers along with leaves of any *Curcuma* species grown in the compound is thrown far away from home. The lady who performs it takes bath immediately after cleaning, lights a lamp and worships the Goddess. The significance of the use of *Curcuma* leaves is not known. During the harvest festival of Pongal in Tamil Nadu, turmeric is an important component among the offerings to God. Hence, the farmers do not allow anybody to disturb the turmeric crop before being offered to god during Pongal.

Uses in folk and classical art forms

Turmeric probably got attracted much earlier by humans as a coloring material and was used in primitive art forms. Even now, turmeric powder is used in decorating of masks and various costumes for folklore art forms. It is also used as a colour in drawing of various types of Kalams or the colourful pictures of the deity that is being worshipped in a Hindu religious function of Kalamezhuthu paattu or Thottem paattu in Kerala. Months of April and May, i.e. Meenam and Medam months of Malayalam calendar (Kerala calendar) witness the rhetoric of

Kalamezhuthu paattu and Vettekkaren pattu in different temples of Kerala. This religious function is conducted to praise various Hindu Gods such as Bhadrakali, Muthappan, Vishnumaya, Ayyappan, Chathan and Nagadaivam (snake God) under Saivist system of Hindu religious worships. In general, 39 different religious concepts are involved in Kalamezhuthu paattu. However, each concept will have different sub concepts and accordingly Kalams are drawn using different local colouring materials including turmeric powder. People belonging to two communities such as Pulluvar and Kuruppu in the state are very proficient in this religious art. Pulluvar draws Kalam with coconut shell having a small central hole through which variously coloured natural powders are passed according to design and colour used. Kuruppan draws Kalam with his hands. The natural colours used in drawing Kalams are usually made from turmeric, rice bran charcoal, green leaves and raw rice flour.

Kummatti is a very primitive folk dance form that still survives in central parts of Kerala and is performed during Onam festival. Artists performing this used to camouflage with locally available grassy weeds and wear masks sometimes made of inflorescence spathes of arecanut colourfully decorated with different colours made of turmeric, green leaves, flowers and charcoal. This has now given way to wooden masks coloured with synthetic paints. Turmeric was also used in the Chutti decorations on face of certain characters in the world famous classical art form of Kerala namely Kathakali. In Orissa, turmeric powder along with rice flour is used in paintings. It is also associated with Theyyam a classical religious dance form of art performed in Kavus in northern parts of Kerala. In order to be blessed with children, rice and turmeric are offered to the gods in India¹¹.

Medicinal and cosmetic uses

Uses of turmeric as a major source of yellow pigment probably in cave arts in the past and later in the preparation of costumes and masks of some folklore and temple art forms would have been the primary cause of its domestication rather than its use as a food material, condiment or medicine⁵. Its wide distribution and diverse uses in India basically as a condiment and as a part and parcel of Hindu religious worship, rituals, social ceremonies and functions, in black magic and as a medicine, paved way for its rapid spread and diversification in India and

neighboring countries. Like many other tropical tubers, its domestication in Asia took place at the time of transition of primitive people from hunter gatherers to farmers. Turmeric dye is used in combination with some alkalis to colour silks and cotton. Turmeric being a natural colouring agent is used in pharmaceutical, confectionery and food industries. People use it for colouring Biriyani, a preparation of rice along with meat. Being an important condiment, its rhizome yields curcumin, an important yellow pigment and oleoresins. It is used from the historical times as a dye, medicine, a ceremonial colour and as a magic symbol¹². The cultivation or gathering of turmeric started much earlier in India. During the Vedic period, probably 4,000 yrs ago, there took place both cultural integration and disintegration between the Indus people and the newly arrived Aryans leading to the origin of a common system of religious and social practices having regional variations. It is an unavoidable commodity from birth to death ceremony of the Hindus. Quite recently, turmeric has attained importance as a pesticide. Turmeric extracts controlled storage insects in green gram¹³. In the past, rice farmers in Kerala used to store paddy seed materials along with turmeric and neem leaves placed in a storage bin made of bamboo called Kuruma to resist insect attack. Anti-fungal activity of turmeric has been reported¹⁴. Turmeric powder and mustard oil, each alone or in different combinations, have been found to protect stored milled rice from the damage caused by Curulinoid *Sitophilus oryzae*¹⁵.

In Ayurveda, an ancient system of healing developed in India before 1,000 BC, spices are dealt as wonder foods. Sacred ayurvedic texts written, deal the spices as medicines as well. Susrutha (500 BC), a well known Ayurvedic physician described the use of 700 drugs derived from spices that were popular in those days. These medicines were formulated in relation to ayurvedic concept of tridosha (defects or ailments governed by three basic elements such as Vata, Pitha and Kapha). Turmeric has bitter, pungent and astringent qualities, has healing and cooling effect on the body, helps in controlling diabetics, promotes digestion, increases Vata and Pitha if taken in excess and relieves Kapha. Ladies, especially in South India, use it as a cosmetic to anoint their face and bodies with turmeric paste also. It is considered as an antiseptic in skin ailments and a natural hair remover. Probably it is used in preparation of cotton clothes of therapeutic value in various ailments under Ayurvedic

system in parts of Kerala and Tamil Nadu. Medicinal properties of turmeric are innumerable and the practices are very ancient. Various medicinal properties of turmeric in indigenous medical system have been furnished¹⁶. It is very pungent, bitter, healing, laxative, anthelmintic, vulneric, tonic, alexiteric and emollient. It is used as medicine in various Kapha and Vata diseases of blood. The anti rheumatic activity of curcumin is clinically demonstrated in the case of rheumatoid arthritis¹⁷. In Unani system of medicine, it is used in treatment of jaundice, scabies and bruises. Neem and turmeric were effective in scabies¹⁸. Turmeric tuber can also be used as an expectorant. It is antiseptic, can be used in ulcers and wounds. Fungicidal activity of turmeric has also been proved¹⁴. Turmeric powder along with a pinch of asafoetida ground together and applied at the place of bite cures poison effect. Paste made out of turmeric rhizome and leaves of *Lawsonia alba* prevents the nail wrought. Turmeric mixed in juice of *Calotropis* spp. leaf juice is a good cure for skin diseases. Turmeric powder cures the toes affected by decay due to exposed legs to muddy waters. Turmeric powder has been found to stimulate the conversion of cholesterol to bile acids, an important pathway of elimination of cholesterol from the body in male Wister rats¹⁹. Those infected with small pox, chicken pox and measles in India use hot water boiled with crushed turmeric and neem leaves for bath. Use of turmeric to cure of common diseases in female children is given below¹¹.

Juice of fresh turmeric is taken daily for seven days in order to cure intestinal worms, gonorrhoea and other urinary diseases. If turmeric paste is taken daily at night, acts as a wormicide. It strengthens flesh and blood and helps in enhancing overall human physique. Paste of turmeric with leaves of neem and paste of turmeric and duba (*Cynodon dactylon*) helps in the healing of itches, boil, ringworm, rheumatism, urticaria, syphilis, wound, boil, itches and ringworm. Turmeric with goat's milk taken together acts as a wormicide.

Daily intake of one teaspoon full of paste of fresh turmeric with one teaspoon full of molasses for one month helps in beautification and overall body strength. Molasses with turmeric helps in blood purification. It acts as a preventive medicine in several cases. Fresh turmeric keeps the belly cool. Paste of turmeric and leaves of lemon cures scabies. Five gram of fresh turmeric and molasses cures biles

and urticaria. Smooth and thin clothes soaked with turmeric paste are used in conjunctivitis and all types of eye diseases. In case of sting/bite by poisonous insects, turmeric solution is poured on the bitten site for relief. Turmeric, honey, salt and ghee are taken in for recovery from snakebite. If snake poison spreads in the body, boiled water of turmeric is taken. Anointing the body with turmeric paste prevents snake poison quickly. Paste of turmeric helps in treatment of all kinds of poisons. The smoke made of turmeric powder and resins act as repellent for poisonous snakes. Slightly warmed paste of turmeric with lime is applied in the case of bone fracture.

Locals use turmeric to cure scabies in various ways. Turmeric powder mixed in cow's urine if consumed twice daily for seven days helps in curing itches, scabies, pimples, etc. The juice of fresh turmeric with urine of cow taken for 15 days twice a day cures worms, itches, leprosy and many kinds of skin diseases. The paste of prickly poppy seeds (*Argemone mexicana*) and turmeric also is used in the case of scabies. Paste made of turmeric and leaves of tamarind is applied on affected parts of scabies and other skin diseases (before going to bed for seven to eight days). The paste made of fresh turmeric and seeds or leaves of *Pongamia glabra* also helps in the remedy of scabies. Rural folks in Bharavanthy taluk in Shimoga district of Karnataka treat scabies by applying a paste made of turmeric and cumin seeds²⁰. Tribal people of Jharkhand use paste made of fresh turmeric rhizome and sugar for treatment of piles. The common specific uses of turmeric in curing some common ailments in Kerala state is given in table²¹.

Turmeric patent

Medicinal properties of turmeric are innumerable. Its use as an antiseptic and healing wounds of all kinds are very ancient in India. This has been recorded and well documented. However, in spite of its vast use as a folk-medicine, two non-resident Indians, Dr. Suman K Das and Dr. Hari Har P Cohly, University of Mississippi Medical Center, Mississippi, filed a patent application in the US Patent Office in December 1993 for "use of turmeric in wound healing". The patent was granted in March 1995. It claimed that the administration of an effective amount of turmeric locally and orally to enhance the wound healing process, was a novel finding. The claims were challenged by the Council of Scientific and Industrial Research (CSIR), India in March 1995 locating

32 references, some of them more than 100 years old, which showed that this finding was well known in India prior to the patent being filed. It then filed a formal request for re-examination of the patent at USPTO in October 1996. It was done and after protracted techno-legal arguments, in March 1997 unequivocally rejected all six claims, ruling that turmeric's medicinal properties were not patentable and the patent on turmeric has been revoked on the grounds of lacking the novelty requirement. The CSIR then Director General Dr R A Mashelkar described the development as one of far-reaching consequences for the protection of traditional Indian knowledge in the public domain. India has developed a multi-pronged approach to tackle IPR disputes by way of implementing Geographical Indications Bill, Plant Varieties Bill and Traditional Knowledge Digital Library.

From the foregoing account, it is clear that turmeric (*Curcuma longa* L.) is highly useful due to its manifold uses and close association with social, cultural, religious, folk and classical art forms besides its medicinal, cosmetic and ethno-botanical uses in human beings. It is an important plant with greater antiquity than many other cultivated crops. Thus, there is an urgent need to do more research work on the value addition of turmeric in view of its insecticidal, fungicidal and medicinal properties.

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