



## Ethnic uses of plants belonging to family solanaceae and convolvulaceae in district Bilaspur, Himachal Pradesh, India

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### Abstract

Humans relied on plants for their vital needs of food, flavour, medicine, clothing and shelter, since time immemorial. The present study gives diversity, morphological description and traditional uses about the family Solanaceae and Convolvulaceae in Bilaspur district along with major phytochemicals recorded in literature. The total of 23 plant cultivars documented belongs to 22 species under 12 genera. Family Solanaceae was represented by 17 species belonged to 10 genera and Convolvulaceae by 5 species of 2 genera. Ethnobotanical uses include edible (6 spp) ornamental (5spp), medicinal (13spp) religious ceremonials (4spp) and one species for fencing and soil binding. The claimed therapeutic uses of plant species need to be investigated through modern scientific methods to synthesize herbal drugs and to promote the scientific cultivation and conservation.

**Keywords:** ethnobotanical, convolvulaceae, solanaceae Bilaspur, phytochemicals

### Introduction

Ethnobotany is the study of precious knowledge of interrelationships between human cultures and plants, which is passed on verbally through generations. Humans relied on plants for their vital needs of food, flavour, medicine, clothing and shelter, since time immemorial. The knowledge of ancient man about utility of plants has carried down to modern day by ethnic societies through faith and folk tradition, and still nearly 80% of the world population trust in traditional medicines for their primary healthcare needs (Kala *et al.*, 2006) <sup>[1]</sup>. India represents about 2.4% of the world's total area harbours about 11.4% of world flora representing a total of 47,513 plant species. (Singh and Dash, 2014) <sup>[2]</sup>

Majority of Indian peoples live in villages and rural masses especially the tribal ones exhibit a very close association with surrounding environment. Himachal Pradesh, a hilly state in Northwest Himalaya. The Indian Himalayan region is a mega hot spot of the biological diversity. It comprises about 18% of area of India. It includes about 8,000 species of Angiosperm, 44 Species of Gymnosperm, 600 species of Pteridophytes, 1734 species of Bryophytes, 1139 species of Lichen and 6,900 species of Fungi (Chauhan *et.al* 2014) <sup>[3]</sup>. Himachal Pradesh has more than 3500 higher plants and nearly 1500 species have been valued for their medicinal and aromatic properties (Chauhan, 1999) <sup>[4]</sup>.

The district Bilaspur lies in Shivalik hills of Himalaya in basin of river Satluj between 31° 12' 30" and 31° 35' 45" North latitudes and between 76° 23' 45" and 76° 55' 40" East longitudes. Geomorphic characters show lesser hills and wider valleys, drained by khadds and nallahs with 1478.8 mm annual average rain fall. Bilaspur district have three types of forest namely Northern Tropical Dry Deciduous, Himalayan Sub-Tropical Pine Forest, and Lower Western Himalayan Temperate Forests (Champion and Seth, 1968) <sup>[5]</sup>. The 93% population of the district resides in

rural areas, associated with occupation of agriculture, animal husbandry and horticulture. Peoples of the area are religious, God fearing, ecofriendly, and hardworking,

Solanaceae, the Potato family or the Nightshade family is very significant to humans, being comprised of most valued food plants like potato, eggplant, tomato and chilies, a large number of medicinal and drug plants like nightshade and tobacco along with plants having horticultural significance. Besides, many plants from the family like tobacco and tomato had been utilized as experimental plants in genetics and molecular biology experiments. This family includes herbs, shrubs or small trees with alternate, simple or pinnately compound, exstipulate leaves. Flowers generally bracteate, bisexual, solitary, or in cymes, fascicles or panicles. Calyx 5-lobed, usually persistent, accrescent in fruit. Corolla inflated 5-lobed, stamens usually 5, epipetalous, anthers bi-celled. Ovary superior, bicarpellary, biloculate, ovules numerous, placentation axile, style linear, entire, stigma 2-lobed or capitate. Fruit is a berry or capsule, sometimes enclosed within persistent calyx, bears many seeds. Plants have many volatile or non-volatile alkaloids, chiefly concentrated in fruits or leaves, sometimes in roots. These alkaloids act differently in a variety of disorders and, thus, have a great potential as medicines (Singh *et al.*, 2014). Modern taxonomic and phylogenetic studies of the Solanaceae have recognised four main clades at subfamily level, 14 main clades at tribe level, around 100 genera and 2500 species are currently recognized (Olmstead *et al.*, 2008) <sup>[8]</sup>. The Solanaceae comprises about 98 genera and 2,700 species, (Olmstead and Bohs, 2007) <sup>[7]</sup> with a great diversity of habitat, morphology and ecology.

Convolvulaceae is one of the major families of flowering plants popularly called as morning glory family, distributed in both tropical and temperate regions of the world. It has approximately 2000 species and of 58 genera from all over the world (Staple and Yang, 1998) <sup>[9]</sup>. This family includes

herbs or shrubs, climbers; leaves alternate, simple, exstipulate, rarely stipulate; inflorescence cymose; flowers actinomorphic, hermaphrodite, hypogynous; calyx 5, polysepalous; corolla gamopetalous, campanulate; stamens 5, epipetalous, alternipetalous, disc present; ovary bicarpellary, syncarpous, superior, axile placentation, generally two ovules per loculus; fruit capsule or nut. In India family Convolvulaceae is represented by 158 species among 20 genera and also by the reportedly 60 species of *Ipomoea* from the entire country (Oudhia, 2001) [10].

Earlier the ethnobotanical studies in the state were conducted by many workers (Chauhan, 1999; Aggarwal *et al.*, 2004; Sood and Thakur, 2004; Parkash and Aggarwal, 2010) [4, 11, 12, 13] but there were still some knowledge gaps. The indigenous knowledge about the plant resources of district Bilaspur is documented by some workers (Gautam and Bhadauria, 2008; Sharma and Mishra, 2009; Gautam *et al.*, 2011; Kumar and Guleria, 2014; Kumar, M., 2015; Kumar, S., 2017, 2019; Bhardwaj and Seth, 2017; Kumar *et al.*, 2018) [14, 15, 16, 17, 18, 19, 21] during last few years, but for complete exploration still comprehensive efforts are required. The community based traditional knowledge on ethnobotanical plants is, however, progressively eroding due to loss of traditional cultural systems, and thus calls for a strong need for documentation of indigenous knowledge related to plant uses so as to make it available for the welfare of future generations. The present study is an effort

to explore the diversity, morphological description and traditional uses about the family Solanaceae and Convolvulaceae in Bilaspur district along with study of major phytochemicals recorded in literature.

### Materials and Methods

The extensive exploratory survey had been carried in 16 villages of district Bilaspur, H.P. during 2019-2021 to collect primary information on ethnobotanical uses of plant species of family Solanaceae and Convolvulaceae. Information was recorded according to the methodology suggested by Jain and Goel (1995) [22] through questionnaires, interviews and discussion among villagers in their local dialect. The specimens of plant species were collected and photographed with the help of local informants. Herbarium specimens of all the plants were prepared and identified with the help of floras of Himalayan regions, India, various plant books and previous works (Collet 1902; Chowdhery and Wadhwa, 1984; Singh *et al.*, 2014; Sultana and Mahbubur, 2016) [23, 24]. Furthermore, the details pertaining to botanical names, synonyms, common names, habit, availability, morphology and ethnobotanical uses has enumerated in Table 1. The knowledge about phytochemical constituents of plant species was surveyed in literature and present in table.

### Observations

Table 1

Sr. No.	Plant Name/ Family	AS	PU	Local Uses	Morphology	Phytochemicals
1	<i>Brugmansia suaveolans</i> Berch. & Presl. Bada Datura Angel's trumpet Solanaceae	UC	Fl	It is grown for its showy and attractive flowers. Flowers used in worship of God Shiva.	Perennial shrub or small tree, 3-4.5 m tall, branched. The leaves are oval, 25 cm long 15 cm wide. The flowers are white, yellow or pink; beautiful and sweetly fragrant, hang downward, about 25-30 cm long and trumpet shaped. The fruits are capsule, smooth, 10x3 mm, 4-valved indehiscent, lanceolate or fusiform. Seeds are numerous, compressed unevenly shaped, rugose, 4x3 mm.	Alkaloids, volatile compounds (mainly terpenes), coumarins, flavonoids, steroids, and hydrocarbons (Petricevich <i>et al.</i> , 2020). Tropane alkaloids scopolamine, atropine are recognized as main active principles (Reis <i>et al.</i> , 2019).
2	<i>Capsicum annuum</i> L. Pipali Red Chili Solanaceae	A	Fr	Fruits are used as condiment in all food recipes; in making pickles and chutney. 'Malham' (paste) made by heating fruits in mustered oil is used as pain killer and antiseptic for wounds caused by iron implements and in skin diseases. Fruit powder is used as pain killer and to check blood loss from cuts. Fruits are used to shoo away the bad souls from children by revolving the chillies over head	Annual or perennial herb, 30-80 cm tall. Leaves are solitary or paired; petiole 4-7 cm, leaf blade oblong-ovate, ovate, or ovate-lanceolate, 4-14 x 1.5-4 cm, becoming hairless, base narrowed, margin entire, tip pointed. Inflorescences solitary or few-flowered clusters. Flower-stalks are bent at tip, 1-2 cm. Sepal cup-shaped, wavy, corolla white, anthers purplish. Chilli fruit is mostly red (orange, yellow, or purple in cultivation), variously shaped, up to 12 cm.	anthocyanins, vitamins, phenolic acids, flavonoids, carotenoids, and capsaicinoids (Kumar, and Tata, 2009; Howard <i>et al.</i> , 2000). Two main capsaicinoids identified are capsaicin and dihydrocapsaicin (Kosuge and Furuta, 1970).

				and then burning in fire.		
3	<i>Capsicum annuum</i> L. var <i>annuum</i> Shimla Mirch Bell pepper Solanaceae	UC	Fr	Fruits are used as vegetable and salad. Green fruits are offered in donation during “tula dan” ceremony.	Annual or perennial, short shrub up to 1m high. The leaves are alternate, elliptical with entire margin. Flowers are white or purplish, bell-shaped, 2.5 cm in diameter. Berries are red or yellow, with disc shaped seeds.	Phenols, flavonoids, carotenoids, tocopherol and pectic polysaccharides (Anaya-Esparza <i>et al.</i> , 2021).
4	<i>Cestrum nocturnum</i> L. Rat ki Rani Night-blooming jasmine Solanaceae	UC	Fl	Flowers are used during celebration programs and plant is cultivated for ornamental and fragrance purposes.	Evergreen shrub with slender branches growing to 4 m tall. The leaves are simple, narrow lanceolate, 5-15 cm long and 2-4.5 cm broad, smooth and glossy, with an entire margin. The flowers produced in cymose are greenish-white, with a slender tubular corolla 2–2.5 cm long with five acute lobes, open at night, highly fragrant. The fruit are white berries having 10 mm length and 5 mm diameter.	Flavonoids, saponins, alkaloids, steroids, tannins, glycosides (Sahane <i>et al.</i> , 2014).
5	<i>Cuscuta reflexa</i> Roxb. Akash Bel Amar bel Giant Dodder Convolvulaceae	UC	Wp	Stem paste is used for cleaning sores and to treat itching and swelling. Decoction of whole plant is used to bake the body parts to get relief from pain and swelling. Constipation and gastritis in cattle are cured with mixture of <i>Cuscuta</i> stem, leaves of <i>Vitex negundo</i> , kali basuti ( <i>Pogostemon benghalensis</i> ), mahedu (residue of clarified butter) and jaggery.	Stout succulent twiner; stem green or yellowish up to 2.5 mm in diameter, branched and leaf less. Flowers sessile, creamish in colour, arranged in lateral racemes. Calyx cupular, suborbicular; Corolla, 6-8 mm long, funnel-shaped; Stamens 5, filaments very short; Ovary 2 mm long, conical, stigma acute. Capsules succulent, 5 mm across, globose-conical. Seeds 3-3.5 mm long, black.	Cuscutin, amarbelin, $\beta$ -sitosterol, stigmaterol, kaempferol, dulcitol, myricetin, quercetin, coumarin and oleanolic acid (Raza <i>et al.</i> , 2015).
6	<i>Datura metel</i> L. Datura Indian thornapple, Solanaceae	UC	Wp	Leaf juice is applied for ring worm. Leaves and seeds are fried in oil, and paste applied on the inflamed areas. Seeds are smoked for hallucination. Leaves and seeds are smoked with tobacco to cure asthma. Flowers and fruits are considered sacred and offered to appease Lord Shiva. Dried stem is used in “hawan samagri”. Ash of stem is applied for cracks in teats of cattle.	Annual herb, grow up to 1.75 m height. The stems are hollow, green or purple-black, somewhat woody, slightly pubescent and have a strong odour. The leaves are simple, alternate, petiolate, oval often dark violet and exhibit entire or deeply lobed margins. Flowers pleasantly-scented, 15-20 cm long, immensely varied, and can be single or double. Corolla colour ranges from white to cream, yellow, red, and violet. The indehiscent capsule is covered with numerous sparse spines.	Alkaloids, carbohydrates and proteins. Principal alkaloids are scopolamine, hyoscyamine and atropine (Kuang <i>et al.</i> , 2010; Firdaus <i>et al.</i> , 2020).
7	<i>Datura stramonium</i> L. Datura Thorn apple Solanaceae	UC	Wp	Leaf juice is applied for ring worm. Leaves and seeds are fried in oil to make paste and applied on the inflamed area. Seeds are smoked for	Annual herb, erect, branching dichotomously, with foul smell, grows up to 1.50 m height. The leaves are simple alternate, large, broadly ovate, margins toothed or lobed, dark-green, up to 15-20cm long. The flowers are solitary in	Alkaloids, saponins, tannins, flavonoids, phenols and glycosides. Atropine and scopolamine are main alkaloids (Shagal <i>et al.</i> , 2012; Oseni <i>et al.</i> , 2011).

				hallucination. Leaves and seeds are smoked with tobacco to cure asthma. Flowers and fruits are considered sacred and offered to appease Lord Shiva. Dried stem is used in "hawansamagri". Ash of stem is applied for cracks in teats of cattle	the axils of branches, large, white or purple, trumpet shaped and 6-9 cm long. The capsules are subglobose, erect, 4-6 cm long, covered with soft spines. Seeds are black and numerous.	
8	<b><i>Ipomoea nil</i> (L.) Roth.</b> Kaudani bel Ivy morning glory Convolvulaceae	A	Sd	Seed powder is used as hair shampoo to remove dandruff.	Annual twiner, stem sparsely hirsute. Leaves broadly ovate to orbicular, entire or 3-lobed, base cordate, apex acuminate, pilose with short appressed hairs. Flowers one to several in axillary umbellate cymes, blue or white. Fruit a globose capsule.	Gibberellins, glycosides, phenols, lignans, saponins and alkaloids (spermidine) (Goel <i>et al.</i> , 2021).
9	<b><i>Ipomoea cairica</i> (L.) Sweet</b> Railway creeper Coast morning glory Convolvulaceae	C	Fl	Weed of waste land but also grown as an ornamental climber.	Annual twiner, bulbous roots, stem hairless. Leaves 4-10 cm diameter, palmately lobed up to the base with 5-7 segments, segments elliptic to elliptic-oblong. Flowers in axillary cymes; corolla 4-5 cm long, funnel-shaped, white. Capsule 5 mm, ovoid, papery, concealed in the calyx.	Alkaloids, sterols, flavonoids, reducing sugars, tannins, saponins, terpenoids, anthraquinones, glycosides and phenols (Ralte, 2014).
10	<b><i>Ipomoea quamoclit</i> L</b> Cypress vine Convolvulaceae	UC	Fl	Weed in waste land but also grown as an ornamental climber.	Annual twiner; Leaves 7.5-10 cm long, pinnately lobed up to the midrib into many pairs of linear to filiform segments. Flowers one to few in axillary cymes. Corolla salver-shaped, red, tube 2.5-3.5 cm long. Capsule ovoid about 1 cm long.	Alkaloids, carbohydrates, saponins, phenols, tannins, phytosterols, amino acids, proteins and flavonoids (Kumar <i>et al.</i> , 2014).
11	<b><i>Ipomoea fistulosa</i> Mart. ex Choisy</b> <i>Ipomoea carnea</i> Walaiti Ak, Pink morning glory Convolvulaceae	C	Wp	Plant is grown to make fences around land boundaries and to check the soil erosion. Milk of the plant and smoke of the wood is considered as poisonous by local peoples.	Perennial shrub, up to 3 m tall, branches ascending, usually fistular, containing milky juice. Leaves ovate to ovate-oblong, base cordate to truncate acuminate. Flowers few to many in axillary and terminal cymes. Fruit a capsule, ovoid, pale brown, 2- or incompletely 4-celled, 4-valved.	Phenolic acid, alkaloids, flavonoids, coumarins and sterols. Major bioactive alkaloids are 2-epi-lentiginosine, swainsonine calystegines B1, B2, C1 and B3 and <i>N</i> -methyl- <i>trans</i> -4-hydroxy-L-proline (Lamidi <i>et al.</i> , 2000; Haraguchi <i>et al.</i> , 2003).
12	<b><i>Lycopersicon esculentum</i> L. Mill.</b> Tamatar Tomato Solanaceae	A	Fr	Fruits are edible, used as vegetable, used in almost all food recipes, soups, ketchup, chutneys and salad. Local peoples consider tomato fruits as source of vitamins.	A small, hairy herb. Irregularly pinatisect, dentate, hairy leaves. Flowers yellow in colour produced in cymes. Calyx 5-10 lobed, ovate-lanceolate, persistent. Corolla rotate, yellow and plicate. Stamens 5, exerted, oblong. Ovary many-locular. Fruit berry, 3-12 cm in diameter, spherical, globose, compressed or pear shaped, yellow green to red and many seeded.	Citric acid, malic acid, soluble sugars, vitamin B1, B2, vitamin A, C and many mineral salts. High levels of lycopene, $\beta$ -carotene and L-ascorbic acid (Mladenović <i>et al.</i> , 2014; Mallick, 2021).
13	<b><i>Nicotiana tabacum</i> L.</b> Tambakhu Tobacco	C	Wp	The dried leaves and stem are smoked and chewed as an intoxicant. Tobacco leaves are smoked with	Annual herb grows 1- 2 m high and is sticky hairy on all parts. The leaves are up to 50 cm long, ovate to elliptical, or obovate, pointed and sessile. Inflorescence	Alkaloids, phenolics, flavonoids, terpenoids, steroids and polysaccharides. Main alkaloids include nicotine, nornicotine,

	Solanaceae			Datura leaves and seeds for treatment of asthma. Infusion of plant is used in condition of Eczema, itching, toothache, wounds, veterinary antihelminthic. Fermented stem and leaves mixed with molasses is given for inducing vomiting to a person who has taken poison.	is panicle; flowers white, pink or red. The corolla tube 3.5 to 4.5 cm long. The fruit is 1.5 - 2 cm long. Capsule is narrowly elliptical to egg-shaped. Seeds are spherical or broadly elliptical and are up to 0.5 mm long with a wavy networked surface.	anabasine anatabine (Shen and Shao, 2006; Sisson and Severson, 1990).
14	<i>Petunia hybrid</i> L. Patuniya Petunia Solanaceae	UC	Fl	The plants are cultivated in the garden for the ornamental purposes.	Cultivated annual herb. The leaves are sessile and are usually oval-shaped with smooth margins; some feature fine sticky hairs. The flowers are funnel-shaped, variously coloured, consisting of five fused or partially fused petals and five green sepals. The seed are minute borne in a dry capsule.	Anthocyanin contents include Cyanidin, Delphinidin, Pelargonidin, Malvidin, Peonidin, Petunidin etc (Benvenuti <i>et al.</i> , 2016; Berardi <i>et al.</i> , 2021).
15	<i>Physalis minima</i> L. Patkai Gooseberry Solanaceae	A	Fr	Ripe fruits are edible.	Annual herb 20–45 cm high at its maturity. Leaves are soft and smooth, with entire or jagged margins, 2.5–12 cm long. Flowers are cream to yellowish have accrescent calyx. Fruit is a berry, spherical, yellowish, and enclosed in papery cover of calyx which turns straw brown on fruit ripening.	Flavonoids, steroid alkaloids, ellagic acid, catechol, gallic acid, catechins, vitamin C, free amino acetamide, cyclopentane, palmitic acid, stearic acid, octadecanoic and linoleic acids (Novita <i>et al.</i> , 2020; Joseph, and Ravi, 2022).
16	<i>Solanum erianthum</i> D. Don. Radakh Mullein nightshade Solanaceae	C	Sd	Infusion of seed is given with butter to cure bleeding piles.	Evergreen shrub or small tree, 4–6 m high, grey or brown bark, flat-topped and spreading. The wood is soft and brittle. The leaves are simple, alternate, ovate or elliptic and 10–35 cm long. Flowers are in lateral cymes and are 1.1–1.8 cm in diameter. The five-lobed corolla is white and the five stamens have yellow anthers. The fruit is a yellow berry 1–1.2 cm in diameter with many seeds.	Flavonoids, steroidal alkaloids, amides, fatty acids Sesquiterpenes and monoterpenes. Alkaloids include solanine, or solasodine, the nitrogen analogue of diosgenin (Nguyen <i>et al.</i> , 2008; Essien <i>et al.</i> , 2012).
17	<i>Solanum indicum</i> L. Badi Bhindi Indian nightshade Solanaceae	UC	Wp	Decoction of whole plant is taken for the cure of asthma, fever, cough and cold. Fruit juice is poured in nostrils to induce sneezing during flu and cold.	Herbs or subshrubs, up to 2 m tall. Stems and branches, densely pubescent, armed with recurved prickles. Leaves broadly ovate, unevenly lobed, petiole and lamina with prickles and glandular hairs on both surfaces. Inflorescence extra-axillary, raceme. Flowers andromonoecious, only basal ones fertile. Calyx campanulate, lobes oblong-lanceolate, hairy. Corolla greenish white, lanceolate, pubescent. Berry pale yellow, variegated or green when young, globose, 2-3 cm in diameter. Seeds many and brown.	Steroidal saponins, steroidal glycoside, sesquiterpenoids, sesquiterpenoids, hydroxycoumarins, phenolic compounds, coumarins, coumarinolignoids alkaloids, saponin, fatty acid, glycerides of the oil, polysaccharide, triterpenes. Alkaloids include Solasodine, Solasonine, Solamargine, Solanidine and Solanine (Sharma <i>et al.</i> , 2017; Jayanthi <i>et al.</i> , 2016).

18	<b><i>Solanum melongena</i> L.</b> Baingan Egg plant Brinjal Solanaceae	A	Fr	Fruits are used as vegetable, considered good for gastric problems. Ash of fruit mixed with honey is used for piles treatment.	Tropical perennial under shrub often cultivated as annual. The stem is 50-150 cm high, often spiny with large, coarsely lobed leaves, 10-20 cm long and 5-10 cm broad. The flowers are white to purple, with a five-lobed corolla and yellow stamens. The fruit is a berry, egg-shaped, glossy, and purple with white flesh. Fruits of some cultivars are white, green or violet in colour and longer in shape. The seeds are numerous small, soft, edible.	Carbohydrates (23.09%); proteins (13.34%); lipids (1.85%); total fibers (39.19%); phenolic compounds; saponins; minerals (K, Mg, Cu, Fe, Zn and Mn); ascorbic acid, niacin flavonoids, tropane, glycoalkaloids, arginine, tyrosine lanosterol, gramisterol, aspartic acid (Scorsatto <i>et al.</i> , 2017; Das and Barua, 2013).
19	<b><i>Solanum nigrum</i> L.</b> Kali Chayain black nightshade Solanaceae	A	Wp	Paste of leaves is applied for the treatment of piles. Decoction of whole plant used for liver infection and kidney stones.	Herb grows 30-90 cm high; leaves 4.0-7.5 cm long and 2 - 5 cm wide, ovate to heart shaped, with wavy or large-toothed edges, petiole 1-3 cm long with a winged upper portion. The flowers have petals greenish to whitish, recurved when aged and surround prominent bright yellow anthers. The berries are 6-8 mm in diameter, dull black or purplish-black.	Steroidalglycosides, steroidal alkaloids, steroidal oligoglycosides, including solamargine, solasonine, solavilline, solasdamine, and solanine, flavonoids, steroidal saponins and glycoprotein, many polyphenolic compounds (Sudha <i>et al.</i> , 2017).
20	<b><i>Solanum surattense</i> Brum. f</b> <i>S. xanthocarpum</i> Chhoti Bhindi yellow-berried nightshade Solanaceae	UC	WP	Decoction of whole plant including roots and fruits used for bronchitis, asthma, fever, thirst and fruit juice for stone in bladder. Fruit juice is used to cure redness of cattle eyes.	A prickly, deep-rooted, diffuse, biennial or perennial, herb or under shrub. Stem woody at base, armed with yellow prickles. Leaves ovate-elliptic to oblong, 7-10 x 2-4 cm, hairy on both surfaces, pinnatifid, dentate. Flowers distinct and deep blue in raceme. Calyx lobes recurved. Fruit (berry) is a globose, surrounded by the enlarged calyx, about 2 cm in diameter and yellow. Seeds are small, glabrous, smooth, sub-reniform and yellowish-brown.	Steroid alkaloids like solanocarpine, solamorgine, and solanocarpidine, polyphenol (caffeic acid), coumarins (esculentin and aesculin), steroids (carpsterol, campesterol, daucosterol, cycloortanol, cholesterol), triterpinins and sapogenin (lupeol and diosgenine) (Jayakumar and Murugan, 2016; Singh and Singh, 2010).
21	<b><i>Solanum tuberosum</i> L.</b> Aalu Potato Solanaceae	A	T	Potato tubers are eaten as vegetables. Crushed potato pulp mixed with honey, is used to skin diseases such as pimple and dark spots. It is also used to relieve pains from burns, and induce its healing.	Herbaceous, up to 0.4-1 m tall and may range from erect to fully prostrate. Stem hairless to densely hairy, green or purple. Leaves are dark green, pinnate with a single terminal leaflet and three or four pairs of large, ovoid leaflets with smaller ones in between. Flowers are white, pink, lilac, blue, purple, and red-purple. The fruits are spherical to ovoid berries, about 1-4 cm in diameter. The seeds are ovoid and brownish when dry.	Carbohydrates, proteins vitamin B6, vitamin B3, pantothenic acid, K, Mn, P, Cu and fibres. anthocyanin, alkaloids, flavonoids, phenols, saponins tannins, terpenoids, and glycosides (Sahair <i>et al.</i> , 2019; Das <i>et al.</i> , 2017)
22	<b><i>Solanum villosum</i> (L.) Moen.</b> Lal Chayain Red nightshade Solanaceae	A	Wp	Ripen fruits are edible considered as laxative, good for heart diseases and fever. Decoction of whole plant used for liver infection and kidney stones	Annual herb, up to 70 cm high and hairy. The leaf blade is ovate, up to 8 cm long, 3-6 cm wide, entire or shallowly lobed, and petioles to 4.5 cm long. Flowers are borne in clusters of 3-8. The corolla is white. Fruits are dull light red or orange-yellow globular berries, 5- 9 mm diameter. The seeds are 1.6-	Alkaloids, flavonoids, phenols, saponins, tannins, terpenoids, steroids, carbohydrates, glycosides, amino acids and proteins (Jacob and Radha, 2013).

					2.4 mm long and pale yellow.	
23	<i>Withania somnifera</i> (L.) Dunal  Ashwagandha Winter cherry Solanaceae	UC	L,R	The leaves are chewed to reduce the obesity, diabetes and also used as aphrodisiac, tonic and diuretic. Root powder is also used for diabetes, liver disorder and rheumatism. Powder of root is taken with milk to control the high blood pressure and relieve mental tension.	Small tender shrub growing 30–80 cm tall. Tomentose, radially extended branches. Leaves are dull green, elliptic, usually up to 10–12 cm long. The flowers are small, green and bell-shaped. The ripe fruits are orange-reddish in colour.	Flavonoids, phenolic acids, alkaloids, glycoside, saponins, tannins, and steroidal lactones (withanolides, withanine) (Mukherjee <i>et al.</i> , 2021; Glotter <i>et al.</i> , 1973).

Abbreviations Used: AS-Availability status; Fl.-Flower; Fr.-Fruit; L.-Leaf; Sd.-Seed; R-Root; PU-Part used; T-Tuber; Wp.-Whole plant; UC-Uncommon; C-Common; A-Abundant.

### Results and Discussion

Present study enumerated the use of 23 plant cultivars belonging to 22 species, 12 genera. Family Solanaceae was represented by 17 species belonged to 10 genera and Convolvulaceae by 5 species of 2 genera from district Bilaspur of Himachal Pradesh, India (table-1). Among these 23 species cultivars showed abundant (8), common (4) and uncommon (11) presence in this area. The rural peoples of study area use these plants for food, treatment of their own ailments and their livestock, besides as ornamentals and ceremonial plants. Although the people of study area have good modern agriculture practices and access to hospitals and dispensaries, but they also believe that local edible plants are rich in nutrition and herbal medicines are free from side effects. Habit wise the documented plant species were herbs (12), shrubs (6) and climbers (4). Ethnobotanical uses included 6 species edible (*Caspicum annuum*, *Lycopersicum esculentum*, *Physalis minima*, *Solanum melongena*, *S. tuberosum* and *S. villosum*), 5 species ornamental (*Brugmansia suaveolans*, *Cestrum nocturnum*, *Ipomoea cairica*, *I. quamoclit* and *Petunia hybrida*), 13 species medicinal (*Cuscuta reflexa*, *Datura metel*, *D. stramonium*, *Ipomoea nil*, *Nicotiana tobacum*, *Solanum erianthum*, *S. indicum*, *S. melongena*, *S. nigrum*, *S. surattense*, *S. tuberosum*, *S. villosum* and *Withania somnifera*), 4 species religious ceremonials (*Brugmansia suaveolans*, *Caspicum annuum*, *Datura metel*, *D. stramonium*) and one species for fencing and soil binding (*Ipomoea fistulosa*).

The plant parts used for various purposes and preparations included leaves (3 spp.) flowers (3 spp.) fruits (7 spp.), stem tuber (1 sp.), roots (1 sp.), seeds (2 spp.) and whole plants (9 spp.). Medicinal species were used for cure of many human as; one species each for cuts, external injuries, antiseptic, burns, toothache, laxative, high blood pressure, aphrodisiac, gastric malfunctioning, diabetes, rheumatism and mental tension; two species each for piles and liver infection; three species each for inflammation, fever, cold and cough, pain, urinary disorder and kidney stones; six species each for skin diseases and respiratory disorders (bronchitis and asthma). Veterinary medicinal uses included *Cuscuta reflexa* for constipation and gastritis, *Datura metel*, *D. stramonium* for teat cracks and *Solanum surettense* for eyes infection. The modes of administration and application of herbal medicine

were decoction (5), powder (3), infusion (2), paste (6), juice (5), ash (3), food (1), smoking (3) and raw plant part (1). Among edibles fruits were eaten raw in two species, fruits used uncooked as chutney and pickles in two species, fruit and tubers cooked as food recipes in three species and fruits as condiment in one species.

Literature studies revealed that the plant species documented in present study have various phytochemicals such as Alkaloids, carbohydrates, saponins, phenols, tannins, phytosterols, amino acids, proteins and flavonoids. The most of the results of present study were comparable with previous studies carried out in district Bilaspur and in adjoining areas (Devi *et al.*, 2012; Bharwaj and Seth, 2017; Kumar *et al.*, 2018; Godara *et al.*, 2019) <sup>[65, 66, 67]</sup> The similar results regarding medicinal uses of *Datura metel*, *Solanum indicum*, and *S. surettense* were reported by Bharwaj and Seth, 2017. The result of present study regarding *C. annuum*, *S. melongena*, *S. nigrum* and *S. tuberosum* were supported by results of study conducted in Hamirpur district by Godara *et al.* (2019) <sup>[67]</sup> and Devi *et al.* (2012) <sup>[65]</sup>. Kumar *et al.*, 2018 <sup>[66]</sup> reported comparable results regarding ethnobotanical uses of *D. stramonium*, *Withania somnifera* and *C. annuum* from district Bilaspur.

### Conclusion

The present work provides detailed information on diversity, morphology, availability status, ethanics uses and phytochemicals of the plant species belonging family solanaceae and convolvulaceae of district Bilaspur of Himachal Pradesh. Based on the results, it can be concluded that the area has high floral diversity and rich ethnobotanical heritage. But due to change in socio-cultural traditions and more dependence on modern health and market resources, the rural inhabitants are losing their traditional knowledge. So, it is the need of hour to enumerate and conserve this traditional knowledge for future generations. The claimed therapeutic uses of plant species need to be investigated through modern scientific methods to synthesize herbal drugs and to promote the scientific cultivation and conservation.

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