



E-ISSN: 2278-4136
P-ISSN: 2349-8234
www.phytojournal.com
JPP 2020; 9(4): 185-187
Received: 28-05-2020
Accepted: 30-06-2020

GP Panda

Instructor (Horticulture), APC
(Hort.), OUAT, Bhubaneswar,
Odisha, India

CR Mohanty

Former Professor, Deptt. of
Floriculture & Landscaping,
OUAT, BBSR, Bhubaneswar,
Odisha, India

L DIP

Scientist, KVK, OUAT, BBSR,
Bhubaneswar, Odisha, India

A review of recent research on therapeutic properties of Asiatic *Lilium* hybrid

GP Panda, CR Mohanty and L DIP

Abstract

The genus *Lilium* in the Liliaceae family was cultivated and has been used for different purpose like ornamental plants throughout the world, as well as important edible plants and biological medicinal products. The petals, roots and bulbs of the plant contain many bioactive compounds; many of them could also find their place in modern medicine. The active ingredients of genus *Lilium* mainly contain flavonoids, alkaloids, soluble polysaccharides and steroidal saponins. The therapeutic properties of *Lilium* include anti-tumor, anti-inflammatory, diuretic, anti-bacterial, anti-depression and expectorant. It is recommended in the form of herbal tea to prevent various gynaecological disorders, associated with menstruation as well as against insomnia, anxiety, sinusitis, dry cough, asthma, and cardiac arrhythmias. The plant is mainly applied externally to the skin for the treatment of skin ulcers, rashes, burns, wounds, eye-irritation and inflammation. The present study has been attempted to explore the therapeutic effects of Asiatic *Lilium* hybrids as an herbal remedy.

Keywords: *Lilium*, therapeutic effects, chemical compounds

Introduction

The genus *Lilium* (family Liliaceae) includes approximately 110 species of herbaceous perennials, which has been classified into 5 to 10 sections or subgenera (Mabberley, 2008) [11] distributed throughout the cold and temperate region of the northern hemisphere. In India it is distributed in a few pockets in Jammu and Kashmir, Himachal Pradesh and Uttarakhand (Ved *et al.*, 2003) [23]. The importance of the genus in the world flower market is due to diversity and large number of hybrid and cultivars commercially available. However, some species are also known for medicinal and food value (Chang *et al.*, 2000; Dhyani, 2007) [2, 4] which increase the economic importance many folds.

Medicinally, bulbs of the genus *Lilium* plants have a quite high medicinal value such as *L. polyphyllum*, *L. lancifolium* and *L. Candidum*. Medicinally bulbs possess soothing, astringent and anti-inflammatory properties. The preparation are used as refrigerant, galactagogue, expectorant, aphrodisiac, diuretic, antipyretic and tonic, and in cough, bronchitis, seminal weakness, strangury, burning sensation intermittent fever, haematemesis and general disability (Rana and Samant, 2011) [16]. The bulbs are also used in revitalizing night cream and in chyawanprash (Rana and Samant, 2011) [16]. Bulbs are eaten raw to get the relief from cold in high altitudes. In traditional system of medicine the species reported to restore health immediately and work as antioxidant in the body (Sharma & Balkrishna, 2005) [19].

Many studies have been conducted for the chemical constituents of the genus *Lilium*, which illustrated their pharmacological effects of anti-tumor, hypoglycaemic, anti-bacterial, anti-inflammatory, hypolipidemic, reducing blood lipid, anti-depression anti-fatigue and hypoxia tolerance. In this paper, the review is intended to provide a comprehensive and critical evaluation of the chemical, botanical, pharmacological aspects of *Lilium* hybrids, with a view to facilitating further in depth therapeutic properties of the plant as pharmacopoeial species.

Methods

Diverse electronic and scientific search engine and specialized reference tools such as Google Scholar, web of science, scientific literature, publishing sites, and electronic database were used in the search for relevant literature. In addition, a systematic search in online research libraries such as E-library and specific pharmacological publications was carried out in order to get exhaustive data on the medicinal uses of *Lilium* as an herbal remedy.

Corresponding Author:**GP Panda**

Instructor (Horticulture), APC
(Hort.), OUAT, Bhubaneswar,
Odisha, India

Findings

A. Botanical Characteristics

The plant of *Lilium* in the Liliaceae family are distributed in the area from Europe to North Asia. The habitat of “white lily” is a herbaceous bulbous perennial plant is restricted to its native habitat in the Himalayan region (Rana & Samant, 2010) [15]. It is found in high altitude cold zones of Afghanistan, Pakistan, Nepal and India (Dhyani *et al.*, 2012) [5]. The species of lily is cultivated artificially for its modesty and beautiful flower. The lanceolate leaves grow from the ground rosette. The stem has straight, densely overgrown leaves and grow up to 70-150cm in height. The flowers are up to 10 cm in size, bright white and smell great. Up to 15 flowers are arranged on one stem. Blooms in June and July. The fruits are capsule. Bulbs mainly have concentric layers of scale leave arising from a basal disc. The bulb of *L. polyphyllum* contains linalool and α -terpineol (Balkrishna *et al.*, 2012) [1].

B. Composition of Biologically –Active Compounds

The chemical composition of the *Lilium* has so far not received much research attention. Many biological active substances were isolated from extract of flower, root and bulbs. The presences of alkaloids in all parts of the plant as well as saponins and flavonoids in the aerial parts have been established. The bulbs contain large amount of proteins, vitamins, sugar, and boron. (Kucherov, 1990) [9]. The flavonoids mainly (Quercetin, isorhamnetin, Kaempferol) (Tappi and karrer, 1949) [21], but the other important bioactive substances are carotenoids, steroidal alkaloids, pyrrole alkaloids (lilalin, jatrophan), steroids(beta-sitosterol) and steroid saponins of furostane and spinostane type, tannins, polysaccharides, organic acid and amino acid (Haladova *et al.*, 1991) [7]. The steroidal saponin compounds have been obtained from species of the genus *Lilium* (Zhou *et al.*, 2010) [23]. The steroidal alkaloids and another alkaloids of steroid glycoside were found from *L. candidum* and *L. Longiflorum* respectively. (Mimaki and Sashida, 1991). The underground and aerial parts of the plant γ -methylene glutamic acid is accumulated at the highest concentration, as revealed from TLC analysis of plants at different vegetative periods(at initial growth period, during growth, at the beginning of flowering and flowering stage) in the spring-summer period (Rossetti, 1981) [18].

C. The pharmaceutical properties of *Lilium*

The bulbs, stems, leaves and flowers of *Lilium* species are used as medicine raw materials. The juice of *L. martagon* is used for the healing of external wound and stomach ulcers. The *L. candidum* is also an ancient plant which is used as an important edible plant and important biomedicine in china to alleviate the symptoms of various human inflammatory disease (Jin *et al.*, 2012) [8] and they are cultivated as an ornamental plant throughout the world. This plant helped from time immemorial in the treatment of inflamed and suppurative wounds, ulcers, skin, inflammations, burns and various injuries (Pieroni, 2000) [14]. The preparations of *L. Martagon* have anti –inflammatory, sedative, analgesic and haemostatic properties and are used for treating gynaecological diseases. Lily bulbs are widely used for treating inflammation of the rectum and bladder, and as effective anti-hemorrhoidal agents. The flower infusion is used for treating gallbladder diseases (Znamensky, 1932) [24]. Moreover, *L. martagon* is popular for its used in treating cancers (Hatwell, 1967). Extracts of *L. martagon* are

beneficial in the inhibition of melanin synthesis in the skin epidermal tissues and also for skin lightening (Mahmood, 2016).

The therapeutic effects of *Lilium* is well known as anti-inflammatory remedy for ulcers and burns and it is also proven means against healing of wounds (Rasoulzadeh *et al.*, 2019) [17]. Many steroids and steroid glycosides are likely to be responsible for anti-inflammatory effects of lilies (Munafu *et al.*, 2010) [13]. Spirostanol and furostanol saponins were isolated from the fresh bulb of *L. candidum* (Mimaki *et al.*, 1999) [12]. The root extracts of *L. lancifolium* had anti-inflammatory effects (Kwon *et al.*, 2010) [10]. So the anti-inflammatory mechanisms were the inhibitory effect of inflammatory factors production to show the effect of anti-inflammation. These data suggested that *Lilium* plants may be potential therapeutic effects for the treatment of inflammatory diseases.

The bulbs of *Lilium* plants including *L. brownii* and *L. lancifolium* are used as anti-tumor herbs in Chinese medicine. Results of (Tokgun *et al.*, 2012) [22] indicate that *L. candidum* extracts have cytotoxic effects on human breast carcinoma cells, that this cytotoxic effect comes from P⁵³-mediated stimulation of apoptosis. The study of (Han and xie, 2013) [6] revealed that the anti-tumor effects may be due to the polysaccharide and which enhances immune function in H₂₂ tumor growth. From these finding it can be seen that the crude extracts and some active constituents from *L. brownii*, *L. lancifolium*, and *L. candidum* exhibited potential anti-tumor effects.

The bulb extracts of *L. lancifolium* had significant antioxidant capacity and could be a potential nature source of anti-oxidants. The study of (Jin *et al.*, 2012) [8] has revealed that the phenolic compounds extracted from bulbs of *L. lancifolium* showed strong anti-oxidant capacity and free radical scavenging capacity.

The study of (Devi *et al.*, 2016) [3] has shown that the methanol extracts of flower of *L. candidum* contain some active ingredients with the hepatoprotective potential.

According to (Tang, 2010) [20] the antibacterial activity of the bulbs of *L. davidii*, *L. leucanthum*, *L. regale*, *L. brownii*, and *L. lancifolium* were related with effective substances such as alkaloids, flavanoids and saponins. There existed a significant dose effect relation between the antibacterial activity and the contents of lily bulb extracts. The result of (Tang,2010) [20] have also shown that the antibacterial activity increased proportionally along with the increasing contents of lily bulb extracts.

Conclusion

Lilium is a herbaceous perennial, bulbous herbal drug with beautifully scented flowers used traditional as well as modern system of medicine to treat various physiological disorders. The plant contains a group of bioactive substances such as saponins, flavonoids, alkaloids, aminoacids and polysaccharides. That exhibits anti-inflammatory, sedative, anticancer, analgesic and antitumor effects. The therapeutic effects of different types of compounds with diverse chemical structure isolated from *Lilium* are yet to be explored and the mechanism is validated further. There is need to study the relationship between chemical composition of various bioactive substances of *Lilium* and its pharmacological effects in health care products and related drugs should be explored in depth research, so as to it will soon take its place among the health research oriented programs.

References

- Balkrishna A, Srivastava A, Mishra RK, Patel SP, Vashistha RK, Singh A *et al.* Astavarga plants-threatened medicinal herbs of the North-West Himalaya. *Int. J Med. Arom. Plants.* 2012; 2:661-676.
- Chang C, Chen CT, Tsai YC, Chang WC. A tissue culture protocol for propagation of a rare plant, *Lilium speciosum* thumb. Var. *Gloriosides baker.*, *Bot. Bull. Acad. Sin.* 2000; 41:139-142.
- Devi NI, Kuar SN, Rajaram C. Evaluation of hepatoprotective activity of *Lilium candidum* L. In experimental models., *World. J Pharmaceu. Res.* 2016; 5(12):725-749.
- Dhayani A. Exploring *Lilium polyphyllum* in Uttarakhand, India. *The Lily yearbook of North American Lily Society.* 2007, 79-82.
- Dhayani A, Nautiyal BP, Nautiyal MC. Age determination of the perennial herb *Lilium polyphyllum* (Liliaceae). *Nor. J. Bot.* 2012; 30:503-505.
- Han H, Xie HC. A Study on the extraction and purification process of Lily polysaccharide and its anti-tumor effect. *African. J Trad. Compl. Alter. Med.*, 2013; 10(6):485-489.
- Haladova M, Buckova A, Eiseenreichova E, Tomko J, Uhrin D. Dimeric pyroline alkaloids from *Lilium candidum* L. *collect. Czech. Chem. Commun.*, 1991; 56(2):436-438.
- Jin L, Zhang Y, Yan L, Guo Y, Niu L. Phenolic compound and antioxidant activity of the bulb extracts of six *Lilium* species native to china. *Molecules.*, 2012; 17(8):9361-9378.
- Kucherov EV. Wild food plants of Bashkiria and their use, 1990, 68-69.
- Kwon OK, Lee MY, Yuk JE. Anti-inflammatory effects of methanol extracts of the root of *Lilium lancifolium.*, *J Ethnopharmacol.*, 2010; 130(1):28-34.
- Mabberley DJ. *Mabberleys plant book: a portable dictionary of plants their classification and uses.* United states of America by Cambridge university press publishers, New York, 2008.
- Mimaki Y, Satou T, Kuroda M, Sashida Y, Hatakeyama Y. Steroidal saponins from the bulbs of *Lilium candidum*. *Phytochemistry.* 1999; 51(4):567-573.
- Munafa JR, Ramanathan JP, Jimenez A, Gianfagna TJ. Isolation and structural determination of steroidal glycosides from the bulbs of Easter Lily (*Lilium longiflorum* Thunb.) *J. Agr. Food. Chem.*, 2010; 58(15):8806-8813.
- Pieroni A. Medicinal plants and food medicines in the folk traditions of the upper Lucca Province, Italy., *J Ethnopharmacol.* 2000; 70(3):235-273.
- Rana MS, Samant SS. Threat categorization and conservation prioritization of floristic diversity in the Indian Himalayan Region- a state of art approach from manali, wildlife sanctuary., *J Nat. Conserv.*, 2010; 18(3):159-168.
- Rana MS, Samant SS. Population biology of *Lilium polyphyllum* D. Don ex Royle-a critically endangered medicinal plant in a protected area of North-Western Himalaya., *J Nat. Conserv.* 2011; 19(3):137-142.
- Rasoulinezhad S, Yekta NH, Fallah E. Promising pain – relieving activity of an ancient Persian remedy (mixture of White Lily in sesame oil) in patients with chronic low-back pain., *J Fam. Med. Prim. care.* 2019; 8(2):634.
- Rossetti V. γ - Methylenglutamic acid in *Lilium martagon*. *Planta. Med.*, 1981; 41(02):204-205
- Sharma BD, Balkrishna AV. *Vitality strengthening Astavarga plants (Jeevaniya & Vayasthapan Paudhe).* Divya publishers, Divya yog Mandir, Haridwar, Uttaranchal, 2005.
- Tang M. Research on extraction, Purification and Bacteriostatic Activity of Polysaccharides in *Lilium*. Hunan. Agriculture. University, 2010.
- Tappi G, Karrer P. Isorhamnein aus den Staubbeutel von *Lilium candidum*. *Helv. Chem. Acta.* 1949; 32(1):32.
- Tokgun O, Akca H, Mammadov R, Aykurt C, Deni G. Convolvulus gulticus crocks antalyensis and *Lilium candidum* extracts show their antitumor activity through induction of P₅₃ – mediated apoptosis on human breast cancer cell line MCF-7 cells., *J Med>Food.*, 2012; 15(11):1000-1005.
- Ved DK, Kinhal GA, Ravikumar K, Prabhakaran V, Ghate U, Vijaysankar R *et al.* Conservation assessment and management prioritisation for the medicinal plants of Himanchal Pradesh, Jammu and Kashmir and Uttaranchal foundation of Revitalisation of Local health Traditions, Bangalore, India, 2003.
- Znamensky IE. Plant raw materials part iv. Wild edible plants, chemical and technical Reference., 1932, 12.
- Zhou ZL, Shi RB, Liu B. Chemical constituents of Juandan (*Lilium laancifolium* Thunb.). *J Beijing Univ. Tradit. Chin. Med.* 33(1):57-61.