

Medicinal Potential of *Lilium candidum* L.- A Comprehensive Review

Riya Singh ^{1*}, Dr. Bhavana Yadav², Dr. Abhay Pratap Yadav³

¹Research Scholar (Pharmacology), R. K. Pharmacy College, Azamgarh

² Associate Professor (Pharmacology), R. K. Pharmacy College, Azamgarh

³ Professor (Pharmaceutics), R. K. Pharmacy College, Azamgarh

Department of Pharmacology, R. K. Pharmacy College, Dr. A. P. J. Abdul Kalam Technical University, Lucknow, Uttar Pradesh, India, 226031.

Abstract-

The main aim of this review article is to conclude a detailed knowledge on the Lilium candidum. The Lilium candidum Linn which is commonly known as White Lily or Madonna Lily belongs to the Liliaceae family. The plant of the Lilium candidum were widely used for the ornamental purpose, decoration purpose and also in the form of perfume. But, its also have some essential medicinal properties such as, anti- tumor activity, anti- inflammatory activity in ulcers and burns, hepatoprotective activity, and also used in the treatment of wound healing and used for many more reasons. All these details of Lilium candidum makes its good pharmacological agent.

Keywords- *Lilium, Lilium candidum, bulbous plant, medicinal properties, etc*

Introduction-

In, China, the Liliaceae family plants of genus *Lilium* were widely distributed in the world and, there cultivation were performed as in the form of ornamental plants, as well as they are also well known for their edible and biological pharmaceutical products. The genus *Lilium* has the various effects such as tranquilizing the mind, nourishment of moistened lungs and heart burn were also clear by the *Lilium*. Spirit trance, insomnia, cough, dreaminess, hemoptysis and anxiety were various pathological conditions, in which the *Lilium* is used. [1]

There are various species of genus *Lilium* plants, in which bulbs having the high amount of medicinal properties, such as *Lilium lancifolium* and *Lilium pumilum*. According to various studies materials it is concluded that the genus *Lilium* have the various chemical constituents such as sterols, saponins, phenyl propanoids, flavonoids, alkaloids, glycerides, polysaccharides and glycerols which exemplify the pharmacological activity of hypoglycaemic effect, anti-tumor effect, hypolipidemic effect, anti-depression, anti-fatigue, anti-bacterial, hypoxia tolerance effects, blood lipid reduction effect, anti- inflammatory effect.[2]

The plants of genus *Lilium*, is a herbaceous bulb containing plant which belongs to the family Liliaceae. This genus *Lilium* has its origin from China and in the parts of Europe, North America and Eastern Asia, the plants of genus *Lilium* were cultivated as ornamental plant. In the species of genus *Lilium* except *Lilium lancifolium thumb*, all species are diploid.[3]

The species *Lilium candidum L* is also called white lily, or white Madonna lily, which is well established for its traditional medicines which were widely used for the treatments of inflammations, burns, healing wounds and for ulcers in the extract of *Lilium candidum L*. On the basis of the hypothesis of the extract of the *Lilium candidum* possess the bio-protective activity due to correlations of anti-mutagenic activity of natural compounds with antioxidant effects and contents of phytochemical constituents from the flavonoids groups.[4]



Figure 1- Plant of *Lilium candidum L*. [5]



Figure 2- Flower of *Lilium candidum* L.[6]

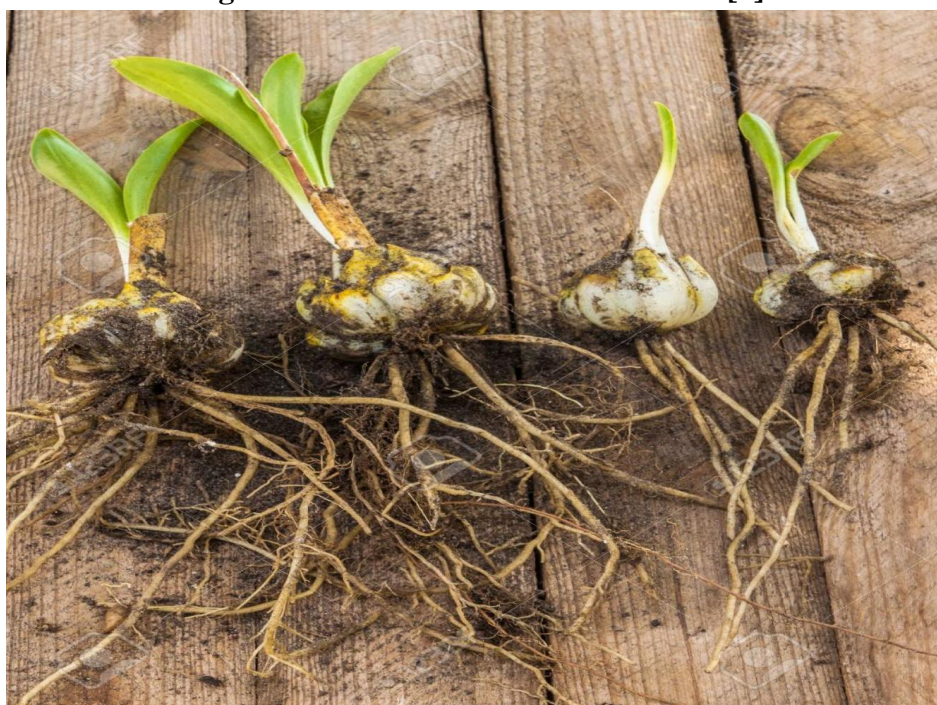


Figure 3- Leaves, Bulbs and Roots of *Lilium candidum* L.[7]

Botanical Description-

In the ancient Crete civilization thousands of years of BCE, there were lilies were cultivated in Knossos according to the historical records [8]. According to the record it was estimated that, the Romans cultivates the lilies, daffodils and hyacinths for various rituals in the palace gardens. The Historians also estimated, that 5000 years ago, from the time of Sumerian tablets dating,

there was a city in Iran which has been surrounded with lilies gardens and the city were named was Susa city after the field of this plant [9]. In, Today’s scenario, the lilies were used for medicinal and ornamental commercial purposes and these lilies were also used for making perfumes [10]. The Bulbs and flowers of *Lilium candidum* were used for various activities by isolating their ethanolic extracts [11].

For the purpose of healing wounds, treating ulcers, burns and inflammation, the *Lilium candidum* extract were used as an ancient medication [12]. Belonging to the Liliaceae family plants, we can say that, the *Lilium candidum* is a bulbous and herbaceous perennial plant. The *Lilium candidum* plant is famous as “Madonna Lily” or “White lily”. In the recent years in many countries such as, Europe, Turkey, USA, the plants of *Lilium candidum* were used for the long time in the market for its big flower, the medicinally useful bulbs and for its fragrant too [13].

- The family is Liliaceae.
- The bloom size is 8 to 12 cm.
- The colour of bloom is near white or white.
- The height of plant is 60-150 cm.
- The time of bloom is May to June.
- The full sun exposure is needed for the plant.
- The shape of the flower is Trumpet shape.
- It is an evergreen deciduous plant having shiny/glossy or smooth textured.
- The cultivation of *Lilium Candidum* plant is performed and they are grown in well drain enriched soil, where the rolled organic matter or leaf moulds.
- The *Lilium candidum* were propagated by dividing bulbs, rhizomes and tubers [14].
- The spacing between the plants is 22-30 cm.
- The over watering to the plant is not beneficial average water quantity is required for the plant.
- The *Lilium candidum* should be plant in the Autumn season, between September to November.
- The useful soil for this plant is clay, loam, sand and chalk.
- Exceptionally, the lilies were tends to grow well in tubes and pots. To protect the sensitive bulbs of lilies, necessary precaution should be taken such as they are light sensitive [15,16].

• **Botanical Classification-**

Kingdom	Plantae
Division	Magnoliophyta - Flowering plants
Class	Liliopsida - Monocotyledons
Order	Liliales
Family	Liliaceae
Genus	Lilium
Species	Candidum

- **Botanical Name-**

Botanical name of white Liliy is known as *Lilium candidum*.

- **Common Name-**

➤ The *Lilium candidum* symbolizes the innocence and purity and commonly known as Madonna lily. In the all countries of the world, its high cultivation due to its beautiful flower and also for its modesty. The species *Lilium candidum* freely grows in the mediterranean and in the minor Asia [17].

➤ In the various countries of middle east, the *Lilium candidum* is a geophytes belonging to the Liliaceae grow widely and commonly known as Meadow, white lily or Madonna [18]

➤ In Colombia is known as Lirio, Nardo; Azucena, Manoediós, Ecuador. It is known as Azucena (In Spanish) [19].

- **Native-**

There are approximately 100 species of the genus *Lilium* were native to Europe, north America and Asia in the northern hemisphere. The china is the diversity center of the Wild *Lilium* in the world associated with 55 species [20]. From number of centuries in China, the bulb of lily were used as a traditional Chinese medicine and food too. The bulb of Lilies were have various properties which promotes the help such as, it help in the treatment of Pneumonia, Bronchitis, etc. [21,22]. The *Lilium candidum* is also the native of Korea, Japan and China within the boundaries of East Asia [23].

- **Occurrence-**

The *Lilium candidum* was originated from Israel and Lebanon, and it also covers the various parts of Greece [24-26]. Hence, the southern boundaries of the Israel was covered by the *Lilium candidum* and it also covers some portion of the Galilee regions in the Carmel city. However, as an endangered species and its need to be protected [24-27]. There are various locations from where, the wild *Lilium candidum* of ecotypes category were collected due to which, there is exhibition in the morphological and phonological traits with genetic variation, there is also some genetic variation were found in the leaf extracts phytotoxicity [27,28].

- **Lilium Species-**

Belonging to the Liliaceae family, the genus *Lilium* were described as a persistant herbaceous bulb plant, which originates from country China and cultivated in the parts of Eastern Asia, North America and Europe as an ornamental plant. If we do not consider *Lilium lancifolium* Thumb., than all other specioes of genus *Lilium* except this are diploid. In the Iki islands of Japan and Tsushima islands of Japan, and in the southern and western coastal areas of the Jeju islands and in the Korean Peninsula, these diploids are cytotype. In the North America, in the south- east portion of Europe, Russian far east, in Hokkaido Hanshu, in large part of China, in Shikoku and Kyushu islands of Japan, in Korean peninsula, in Jeju and Tsushima islands, the triploids forms are found of genus *Lilium* [29]. There are 22 species of genus *Lilium* are present in the Europe, 11 species in Korea, 15 species in Japan, 14 species in North America and 55 species in China and some species are in other regions, over all there are 100 species of genus *Lilium* are present [30-33].

Lilium candidum as Traditional medicine-

From the ancient time, the *Lilium candidum* is used to treat various symptoms of inflammatory diseases in humans, they are mostly used as an important biomedicine in China and also used as edible plant [34] and in all over the world, they are cultivated as an ornamental plant. From where the time can be calculated, from that starting, the plant of *Lilium candidum* is used in the treatments of skin inflammations, ulcers, burns, inflamed and suppurative wounds and in different injuries [35]. The *Lilium candidum* has also its use in gynecological problems and muscle pains. It is also used for wound healings after surgeries [36].

Pharmacological properties of Lilium candidum-

- **Anti- Tumor Activity-**

From the result of various research papers [37], it were concluded that, the extracts of *Lilium candidum*, in human breast carcinoma cell line MCF-7 cells, having the cytotoxic activity and this activity were stimulated from the apoptosis mediated P53. Due to the presence of the polysaccharide that were isolated [38], the anti- tumor activity may be detected and which is responsible for increasing the immune function in H22 tumor which is induced in mice and it inhibits the tumor growth H22.

- **Hepatoprotective Activity-**

From the research studies [39] it were concluded that, some active ingredients produce the hepatoprotective potential which were obtained from the methanolic extracts of flowers of *Lilium candidum*. The bioactive component due to which this plant produce the hepatoprotective activity is still unknown.

- **Anti- Inflammatory Activity-**

In the case of ulcers and burns, the *Lilium candidum* is used to reduce the inflammation. For the treatments of the wound healing, the *Lilium candidum* is also used [40]. The bioactive components such as steroid glycosides are the reasons due to which anti- inflammatory action is produced in the *Lilium candidum* [41,42]. From the butanolic extracts of the petals of *Lilium candidum*, the beta- sitosterol and beta- sitosterol glucoside were obtained [43,44]

Important bioactive components of Lilium candidum-

I) Jatrophan,

II) 5-hydroxy-3-methyl-1-(3-methyl-2-oxo-3-pyrroline-5-yl)-3-pyrroline-2-on,

III) 5,5-oxydi-(3-methyl-3-pyroline-2-on),

IV) kaempferol,

V) (25S)-3 β -{ β -D-glucopyranosyl-(1 \rightarrow 4)-[α -L-rhamnopyranosyl-(1 \rightarrow 2)]- β -D-glucopyranosyloxy}spirost-5-ene-27-ol [45].

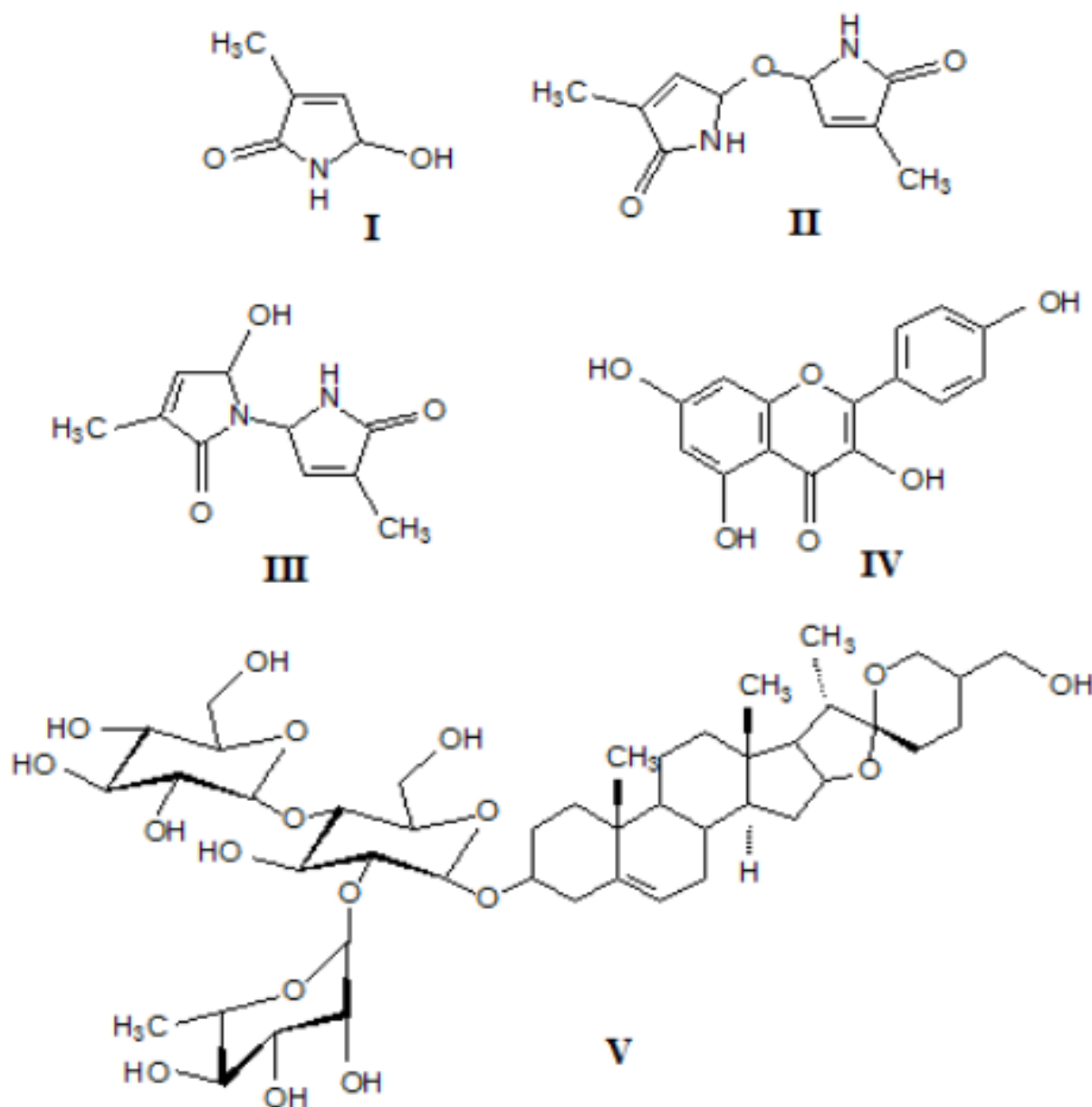


Figure 4- Important bioactive components of *Lilium candidum*

Table 2- Medicinal properties of phytochemicals present in *Lilium candidum*

Compound	Medicinal Uses	References
Kaempferol	Anti-apoptotic, pro-wound healing, anti-cancer, cardioprotective, anti-oxidant, pro-apoptotic, anti-allergic, anti-parasitic, anti-diabetic, anti-adipogenic, antithrombotic, anti-inflammatory, anti-metabolic syndrome, anti-bacterial, immunoregulatory, hepatoprotective, anti-atherosclerosis	[46–53]
Linalool	Anti-parasitic, anti-convulsant, anti-cancer, anti-bacterial, neuroprotective, anti-oxidant, anti-inflammatory, anti-Alzheimer, anxiolytic, hepatoprotective, anti-hyperalgesic, neuroprotective	[54–61]

Citronellal	Anti-fungal, insect repellent, hepatoprotective, anti nociceptive, anti-inflammatory, anti-bacterial	[62–64]
Caryophyllene	Anti-cancer, anti-mutagenic, anti-bacterial, oxygen deprivation protective, neuroprotective, hepatoprotective, anti-convulsant, anti-diabetic, anti-microbial, anti-Alzheimer, pro-longevity, analgesic, nephroprotective	[65–74]
Humulene	Insecticidal, anti- cancer, anti- inflammatory	[75,76,77]
Neridiol	Anti- parasitic, anti- oxidant, neuroprotective, pro- wound healing, anti-microbial	[78–81]

Conclusion-

From this review paper, we were concluded that, the *Lilium candidum*, which is also known as White Lily or Madonna lily, is a beautiful flower and its plant is full of various medicinal benefits. As a natural compound, the White lily is very useful on the basis of pharmacological aspects in the past and in the future too. The *Lilium candidum* consist of a number of medicinal activity such as, anti- tumor, hepatoprotective, anti- inflammatory, cytotoxic activity, etc.

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