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## Phytochemicals, bioactivities of *Lallemantia royleana*: A short review

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### Abstract

*Lallemantia royleana* Benth. is a perennial herb, of Lamiaceae family. Its name is Balangu. It grows in Western Asia, India, Pakistan and Northern of Iraq. The plant has the potency to cure infectious diseases. The seeds contained some chemical compounds as betasitosterol, linoleic, oleic, palmitic and stearic acids. The gums contained protein, and uronic anhydride. The gum is used for abscesses, inflammation and respiratory problems, and in drinks due to its sedative effects.

**Keywords:** *Lallemantia royleana*, chemical compounds, bioactivities

### Introduction

*Lallemantia royleana* Benth. is from Lamiaceae family. It is from tropical Asia, India, Afghanistan and Pakistan. The seeds are present in Pakistan <sup>[1]</sup>. The seed gum has proteins, carbohydrates, and crude fibre. The seeds are restorative agents against various diseases. The roots is effective to cure coughing and the poultices of moistened seeds are useful in boils, abscesses and inflammations <sup>[2, 3, 4]</sup>. *L. royleana* is useful for in skin tumors treatment. The seeds is effective as sedative and cephalic astringent, cardiac tonic <sup>[5]</sup>. The leaves and roots is effective to treat pneumonia. It is also used in preparation of herbal brain tonics. The seeds is effective for inflammation, and respiratory problems <sup>[6, 7]</sup>. Some compounds such as Linoleic acid, oleic acid, palmitic acid, and beta-sitosterol were present in the seeds. The seeds gum has chemical compounds as suagrs, D-galactose, L-rhamnose, pentosans, proteins, and some amino acids. The studies proved the presence of carbohydrates, fibre, oil, protein and tannins. Other studies proved this plant and food medicine are the best source of natural and a good healing therapies <sup>[8]</sup>. This review has phytochemical studies and bioactivities from the plant.

### Chemical compounds

The phytochemical analysis of *Lallemantia royleana* proved that the seeds has a high dry matter 92.75% <sup>[9]</sup>. Some studies proved that the whole seeds has moisture  $6.05 \pm 0.06$ , protein  $2.93 \pm 0.20$ , fat  $0.30 \pm 0.06$ , ash  $2.98 \pm 0.23$ , fiber  $24.24 \pm 0.11$  and total carbohydrate  $87.74 \pm 0.55\%$  <sup>[10]</sup>. The seed oil of the plant gave 2.75%, 14.24/ha, 0.980 mg/microliter, 0.941 mg/microliter and 1.520 degree respectively <sup>[11]</sup>. The seeds methanolic extract contained alkaloids, flavonoids, glycosides, tannins, volatile oils, and terpenoids <sup>[12, 13]</sup>. The oil of the seed has 90.71% unsaturated fatty acids and 9.29% saturated fatty acids, <sup>[14]</sup>. The oil of the aerial parts was investigated. Forty-six compounds, was detected and it represent 94.5% of oil. The major compounds were: tricyclene,  $\alpha$ -pinene, and  $\beta$ -myrcene <sup>[15, 16]</sup>. *Lallemantia royleana* seed mucilage has carbohydrate, protein, and uronic acids <sup>[17, 18]</sup>. The seeds water-extract of *Lallemantia royleana* was phytochemically. It has monosaccharide as arabinose, galactose, rhamnose and galacturonic acid <sup>[19]</sup>.

### Bioactivities

#### Antimicrobial effects

All *Lallemantia royleana* seeds extracts showed significant anti-bacterial effect against all the tested bacteria. The chloroform extract has the highest anti-bacterial activity (diameter of zone of inhibition=  $10.67 \pm 1.44$ ,  $11.83 \pm 3.79$ ,  $14.00 \pm 1.5$  and  $14.67 \pm 0.58$  mm against *P. aeruginosa*, *E. coli*, *E. cloacae* and *S. aureus*, respectively) at a concentration of 100 mg/m <sup>[20]</sup>. Antibacterial from *Lallemantia royleana* essential oil indicated the inhibition of the growth of all bacteria strains and also for the antifungal effect the essential oil of *Lallemantia royleana*, it inhibited the growth of some fungi <sup>[21]</sup>.

### Antioxidant potential

The crude methanolic extract of the seeds *Lallemantia royleana* proved  $IC_{50} = 140.53 \pm 4.22 \mu\text{g/ml}$  by the method of DPPH method and the value of  $576.5 \pm 0.00 \mu\text{g/ml}$  by another method of hydrogen peroxide (22). The seeds of *L. royleana* methanolic extract proved radical scavenging activity with the value of  $IC_{50} = 300 \mu\text{g/ml}$  [23].

### Antidepressant effect

The antidepressant effect of methanolic extract of *Lallemantia royleana* seeds (25, 50, 75mg/kg, orally) was investigated in mice with acute mild stress model of depression using modified forced swimming test. All doses of the methanolic extract of *L. royleana* seeds produced significant reduction in % immobility. However, the percentage of immobility time was significantly reduced at 50 mg/kg, (56.67%,  $p < 0.01$ ) [24].

### Anxiolytic and sedative effects

*L. royleana* methanol extract from the seeds proved anxiolytic and sedative effects at different concentrations [25].

### Hypolipidemic activity

Hypolipidemic effect from *L. royleana* was investigated in rabbits fed diets supplemented with cholesterol (0.5%) for 12 weeks to evoke hypercholesterolemia. The rabbits were treated with several doses from *L. royleana* seeds (0, 5, 10, and 20%) for 12 weeks. The results proved an decrease in all groups treated with *Lallemantia royleana* seeds ( $p < 0.05$ ) [26].

### Antiemetic activity

The methanol extract of the plant proved a decrease in retches induced at a dose of 50 mg/kg bw comparable with antiemetic activity to domperidone [27].

### Conclusion

*Lallemantia royleana* has several phytochemicals and pharmacological effects such as antimicrobial, antioxidant, antidepressant, anxiolytic, sedative and others. The present review proved that *Lallemantia royleana* is an important medicinal plant.

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