

Phytochemical and Biological Evaluation of *Phlomis bracteosa*: A ReviewRiaz Ullah¹, Iqbal Hussain², Shabir Ahmad²¹Department of Chemistry, Sarhad University of Science & Information Technology, Peshawar, KPK, Pakistan²Department of Chemistry, Islamia College University Peshawar, KPK, Pakistan

Abstract: *Phlomis bracteosa* belong from family labiatae is important medicinal plant. Literature survey of *Phlomis bracteosa* revealed the presence of different classes of natural product including (monoterpene, diterpene, triterpene, flavanoid and saponin). Different pharmacological activities have also been reported from this specie. The plant is traditionally reported for its use for the treatment of bone fractures, sinus congestion, lymph fluid disorder and indigestion. This review provide up to date information on the medicinal plant *Phlomis bracteosa*

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Introduction

God the designer of the world made our galaxy and the most beautiful planet of the galaxy is our earth that is composed of lithosphere, hydrosphere and the atmosphere very important for life cycle. Remedial properties carrying plants have been in use for human being safety since dawn of the development. Many herbal medications individually or in combination with different formulation such as leaf powder, pastes, decoction, infusion and tablets etc in various medical treatise for different disease (Zafar, R 1994). Edible medicinal plants generally recognized as the Nutraceuticals or Nutraceuticals play prominent role in the curing or the control of a variety of ailments. However, their mode of action, level of success and overall limitation of their healing power depend upon on their chemical structures that exactly dictate the functionality at the cellular level. The plan of using medicinal plants for treatment is not new. Many of the active constituents in chemically manufactured drugs were originally derived from plant compounds. Medicinal plants put forward a well-off foundation of structural biodiversity in the form of a different bioactive natural constituents, which has played a vital role in drug discovery process (Choudhary, M. I. and Atta-ur-Rehman 2004). In the search for food ancient, man began to differentiate those medicinal plants which are appropriate for nutritional reasons from others plants with classic pharmacological activities (purgative, emetic, and stimulant, depressant) that progressively were grouped into a distinct pharmacopoeia. As a result, a number of medicinal plants came to extensively use as food while others demonstrated useful properties against different human sufferings like wounds and ailments. This link has developed between medicinal plants and human being. A number of plants have appear to be used as medicines. The development of awareness to treat

ailments carries on at an accelerating rate, as a result increases noted in plant derived drug (Guerra, F 1979)

Botanical Description of *Phlomis bracteosa*

Perennial with a rather slender rootstock. Stems few, 20-50 (-100) cm, usually unbranched with an indumentum of simple usually retrorse glandular hairs, sometimes also with irregularly rayed branched hairs. Leaves ovate, herbaceous, aromatic; lamina 5-10 x 4-7 cm, +- regularly crenate, deeply cordate to truncate, above with chord glandular un branched hairs, below with un branched and irregularly rayed branched hairs, nervation inconspicuous; petiole 3- 8 cm on lower leaves, less above. Verticillasters at least lower most in axils of upper leaves, dist ant, c. 14- 20-flowered, 2-4 (- 5), 2.5- 4cm in diameter. Bracts numerous, slightly shorter than calyces, herbaceous, +- a depressed to calyx, linear, acuminate to spinulose, fimbriate with long simple glandular hairs only or also with irregularly rayed branched hairs. Calyx 10- 12 mm, with a similar indumentum to bracts, sometimes glabrescent; teeth 3- 4 mm subulate to spinulose. Corolla rose, or pinkish purple or violet, 1.5- 2cm; upper lip 18 falcate densely white-villous, inner margin white-bearded, laterally denticulate. Mature nut let's not seen. Distribution: East Afghanistan, Pakistan and Kashmir to Nepal. This is a variable species in its indumentum, bract and calyx characters. Although *P. setigera* Falconer ex Benth. (Type locality: India, Uttar Pradesh, badrinath) has at various times been recorded from our area, I believe that these are misidentifications of *P. bracteosa*. *P. setigera*, sometimes regarded as a synonym of the essentially eas Himalayan *P. macrophylla* Wall, ex Benth, reputedly differs from *P. bracteosa* in the harder stiffer bracts and its taller sturdier habit. From the available field notes *P. bracteosa* appears to be a high altitude plant (from 3100 to 3700 m in Kashmir) of dry rocky slopes whereas *P. macrophylla* (incl. *p.*

setigera) is a more mesophytic plant of forest habitats. Two specimens from our area are apparently very anomalous in *P. bracteosa* having some of the characters of *p. macrophylla* / *setigera* swat: jaba, large handsome shrub in forest, 2740m, E. nasir 3936 (E, RAW); Ilam, 2560m, R. R. Stewart 24382 (RAW). In their large leaves they resemble *P. macrophylla*/*setigera* but the small c. 12mm corollas (of the Nasir specimen) are anomalous both for the latter and *Phlomis bracteosa*. Further gatherings are needed, as is a review of all the Himalayan taxa involved (Ali S and Qaiser M 2002).

Traditional uses of medicinal plant *Phlomis bracteosa*

The plant is traditionally reported for its use for the treatment of Bone fractures, Sinus congestion, lymph fluid disorder and indigestion (**Javid H et al 2010a**)

Chemical composition and Antimicrobial activity of Essential oil;

A total of 18 different components were identified and quantified in essential oil of *P. bracteosa*. Methyl ester of octadecadienoic acid was found in high concentration 6.88 %, among the identified analytes of interest. In addition methyl ester of Elaidic acid 4.37%, pentadecanoic acid 3.84% and stearic acid 1.91% were found. While the concentration of other analyte of fatty acid oil were found less than 1%. (Naser M. AbdElIslam et al 2013)

The antimicrobial activity of the essential oil of *Phlomis bracteosa* showed significant activity against the tested microorganisms at three different concentrations (0.25 µg/ml, 0.125 µg/ml and 0.062 µg/ml). The oil showed significant activity against tested Gram-positive and Gramnegative

bacteria and *Trichophyton rubrum* was much susceptible to the essential oil, followed by *Microsporum canis* and *Candida albicans* are relatively less susceptible. The principal component of the essential oil of *Phlomis bracteosa* was germacrene D (**Joshi RK et al 2011**)

Biological Activities of *Phlomis bracteosa*

The antiglycation, antibacterial and antifungal activities of *Phlomis bracteosa* (Labiatae) were investigated. Ethyl acetate (EtOAc) fraction showed 57.90% antiglycation activity against the protein glycation and chloroform (CHCl₃) fraction showed 54.25% inhibitory potential, while an aqueous (H₂O) and *n*-hexane fractions showed less than 50% inhibitory potential.

The antibacterial effect of this plant was tested by agar well diffusion method and tested fractions (H₂O, EtOAc, CHCl₃ and *n*-hexane) showed activity bacteria *Escherichia coli*, *Bacillus subtilis*, *Shigella flexenari*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Salmonella typhi*. Surprising tested fractions didn't show any antifungal activity (**Javid H et al 2010b**).

Immunomodulatory study showed that ethyl acetate fraction has a potential suppressive effect and clear inhibitory activity for oxidative burst of PMNs at a concentration of 15.8 µg /ml as compared to chloroform and aqueous fraction, while CHCl₃ has a significant potential suppressive effect in whole blood at a concentration of 31.8 µg /ml. (**Riaz U et al 2011**)

A tricyclic labdane type diterpene was isolated for the first time from ethyl acetate soluble part of *P. bracteosa*. Its structure was confirmed by x-ray which was found to be marrubiin. When studied in isolated rabbit jejunum, marrubiin caused concentration-dependent relaxation of spontaneous and high K⁺ (80 mM)- induced contractions, like that caused by verapamil, indicating that marrubiin exhibits spasmolytic activity, possibly mediated through Ca⁺⁺ channel blocking action (**Javid H et al 2011a**)

P. bracteosa constituents: marrubiin, phlomeic acid, RA, and RB exhibit vasodilator action occurred via a combination of endothelium-independent Ca⁺⁺ antagonism and endotheliumdependent N^ω-nitro-L-arginine methyl ester-sensitive nitric oxide-modulating mechanism (**Arif-Ullah K et al 2011**). Insecticidal Bioassay, cytotoxicity (brine shrimp bioassay) and Phytotoxicity. Methanol, *n*-hexane, chloroform, ethyl acetate and water fractions derived from the aerial parts of *Phlomis bracteosa* were screened for various in vitro biological activities. These fractions did not display any significant results (Riaz U et al 2013a).

The ethyl acetate extracts from *P. bracteosa* at 500µg/mL exhibited highest 69.01% DPPH activity followed by chloroform showing 57.09%. The other extracts of plants also showed significant antioxidant activity (Riaz U 2013 c).

Phytochemical and elemental analysis of *Phlomis bracteosa*

Phytochemical and elemental analysis of *P. bracteosa* showed that it consist of Phytochemical; Alkaloids 1.22±0.02 mg/100 g, Flavanoids 1.52±0.11 mg/100 g, Saponin 1.42±0.11 mg/100 g, Tannins 0.70±0.20 mg/100 g. While elemental analysis showed that the it composed of Magnesium 10.739± 0.20 mg/100 g, Sodium 7.015± 0.10 mg/100 g, Iron 6.125± 0.20 mg/100 g, Copper 12.81± 0.11 mg/100 g,

Manganees 0.263 mg/100 g, Cadmium 0.106 mg/100 g (Javid H et al 2009).

Transition metal and proximate analysis of *Phlomis bracteosia*

Proximate analysis and transition metal evaluation confirmed the below composition of *P. bracteosia*.

Carbohydrate (%) Protein (%) Fiber (%) Fat (%) Ash (%) Moisture (%) 47.09 ± 0.24%, 10.61 ± 0.12%, 24.50 ± 0.22%, 24.24 ± 0.17%, 10.83 ± 0.22%, 7.22 ± 0.21%; Fe = 6.125 ppm, Cu = 12.81 ppm, Mg = 10.739 ppm, Mn = 0.263 ppm, Cr = 0.202 ppm, Cd = 0.176 ppm, Na = 7.015 ppm, Pb = 1.069 ppm (Javid H et al 2010a)

Chemical constituents reported from *Phlomis bracteosia*

Phlomeoic acid, ursolic acid, glutinol (Javid H et al 2011b), marrubiin (Arif UK et al 2011) Phlomiside, β-amyrin, β-sitosterol, stigmasterol, oleanolic acid (Ullah R et al 2013). benzoic acid, chrysin, hencosanoic acid methyl ester, thymine, hexadecyl ethers of glycerol, azukisaponin V, astragaloside VIII, quercetin, 5,4'-dihydroxy-3,6,7-trimethoxyflavone, *p*-hydroxybenzoic acid, tenaxin II, 5,7,2'-trihydroxyflavone, lupeol and taraxasterol (Riaz U et al 2013b)

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