

Research Article

# An Appraisal of *Christia vespertilionis* (L. F.) Bakh. F.: A Promising Medicinal Plant

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## ABSTRACT

*Christia vespertilionis* (L. f.) Bakh. f., (Family: Fabaceae), commonly known as 'Red butterfly wing' is an important medicinal plants with promising antimalarial and anticancer properties. The plant has been enlisted under the IUCN Red list of Threatened Species. A through literature survey available from all possible scientific sources revealed very little information about this plant. There remains sufficient scope for the researchers to work on various pharmacological and phytochemical aspects of this plant drug. This review provides updated information on the traditional uses, phytochemistry and bioactivity of the plant that would be helpful to the future investigators.

**Keywords:** *Christia vespertilionis* (L. f.) Bakh. f., traditional use, phytochemistry, bioactivity

## INTRODUCTION

The genus *Christia* Moench is an ornamental legume in the Fabaceae family consisting of 13 species found in tropical South East Asia, Malaysia and Australia<sup>1,2</sup>. *Christia vespertilionis* (L. f.) Bakh. f., (syn. *Hedysarum vespertilionis*, *Lourea vespertilionis*), commonly known as 'Red butterfly wing' is a non climbing perennial herb used as an ornamental plant in cultivated gardens in South East Asia because of its uniquely shaped trifoliate leaves. The herbs grow to a height of about 60-120 cm in open grasslands, thickets, seaside and roadsides. The juvenile leaves have a purple tint and mature dark green with pale green stripes along prominent veins. The terminal leaflet blade is rhombic, base slightly cordate, apex broad and truncate<sup>2</sup>. The International Union for Conservation of Nature and Natural Resources (IUCN) under IUCN Red List Assessment has enlisted this plant under the IUCN Red list of Threatened Species<sup>3</sup>. A through literature survey available from all possible scientific sources revealed very little information about this plant. There remains sufficient scope for the researchers to work on various pharmacological and phytochemical aspects of this plant drug. This review provides updated information on the traditional uses, phytochemistry and bioactivity of the plant that would be helpful to the future investigators.

### Traditional Uses

The whole plant is used for treating tuberculosis and snake bites while the leaves are used as a topical treatment for healing bone fractures<sup>2</sup>. The plant is also reported to be used to treat bronchitis and inflamed tonsils, colds, muscle weakness and poor blood circulation<sup>5,6</sup>. The crushed fresh leaves are applied to the body for treating scabies<sup>7</sup>.

### Phytochemistry

The plant is reported to contain alkaloids, triterpenes, fatty acids, phenols, alkanes and long chained alcohols. Presence of palmitine and corynoxidine was reported in the aerial parts<sup>8</sup>. Isoquinoline alkaloids typically related to Papaveraceae or closely related families are reported in *Christia* plant extracts. In one study, pheophorbid-a, a chlorophyll derivative in *C. vespertilionis* plant extracts exhibited high antiproliferative activity in MTC cells<sup>8,9</sup>. Upadhyay *et al.*<sup>10</sup>, reported presence of 7-isopropylidene-1-methyl-1, 2, 6, 7, 8, 9- hexahydronaphthalene (named as christene), 2'-hydroxydecanylpentadec-5, 8, 10, 12-tetraenoate (named as christanoate, a colourless oil), three pentacyclic triterpenes (D:C-friedoolean-8-en-29 $\alpha$ -ol), ursolic acid methyl ester, oleanolic acid methyl ester and erythrodiol), three isoflavonoids (2'-hydroxy genestin, orobol and 2, 3-dihydro-2'-hydroxy-genestin), two flavonoid glycosides (quercetin-3-O-glucoside and catechin-3-O- $\beta$ -D glucopyranoside), three steroids (stigmasterol,  $\beta$ -sitosterol acetate and  $\beta$ -sitosterol) and a monoterpene (geraniol) in the plant. The compound christene was found to possess significant antiplasmodial activity (IC<sub>50</sub> = 9.0  $\mu$ g/ml) against *Plasmodium falciparum*.

### Bioactivity

#### Antiplasmodial activity

Nguyen-Pouplin<sup>11</sup> and co-researchers reported antiplasmodial and cytotoxicity activity of *C. vespertilionis*. The cyclohexane, methylene chloride and methanol fractions of 80% ethanol extract of the whole plant were screened for antiplasmodial activity against chloroquine resistant FcB1/Colombia strain of *Plasmodium falciparum* (IC<sub>50</sub> chloroquine = 0.1  $\mu$ M). The cyclohexane fraction revealed highest IC<sub>50</sub> value (10.8  $\mu$ g/ml) and further studied for cytotoxicity activity on



Figure 1: *Christia vespertilionis* (L. f.) Bakh. f.<sup>4</sup>

human Hela (IC<sub>50</sub> = 9.9 µg/ml) and MRC5 cells (IC<sub>50</sub> = 12.9 µg/ml) with selectivity index of 0.9 and 1.2 respectively. The study discovered potential antiplasmodial and cytotoxicity activities of the cyclohexane extract on target cells. The antiplasmodial activity of the methanol and aqueous-methanol (1:4, v/v) extracts of the roots, leaves and stems were evaluated in vitro for against *Plasmodium falciparum* NF-54. The results of the study revealed promising antiplasmodial activity of the aqueous-methanol extract of the stem (IC<sub>50</sub> = 7.5 µg/ml) followed by the methanol extract of the leaves (IC<sub>50</sub> = 32.0 µg/ml). The combined plant extracts was also studied in *P. berghei* infected mice that demonstrated 87.8% suppression of parasitaemia when compared with chloroquine that showed complete suppression on the 8<sup>th</sup> day of the study<sup>10</sup>.

#### Antitumor activity

The antitumor activity of *C. vespertilionis* extract was studied in vivo in mice with S180 and H22 tumor cells. The results revealed significant inhibition of the tumor growth and prolongation of the survival time in tumor bearing mice<sup>12</sup>. The petroleum ether, ethyl acetate, butanol and aqueous fractions of dichloromethane extract of the aerial parts were studied for antitumor activity in human medullary thyroid carcinoma (MTC) and human small intestinal neuroendocrine tumor (SI-NET) cell lines. The extracts revealed antiproliferative and proapoptotic effects in all MTC and SI-NET cell lines with a high growth inhibition by the ethyl acetate fraction in tumor cell lines but not in normal human fibroblasts. The extract also resulted in alterations of gene expression of PDCD5, MTDH and TNFRSF10b in both MTC and SI-NET cells. The overall results of the study indicated that the plant may be an important source for treating neuroendocrine tumors<sup>8</sup>.

#### CONCLUSION

Plants have become the major source of important phytochemicals with tangible evidence to cure several diseases since time immemorial and thus contribute to be the major source of natural drugs. Due to lack of

conservation, many medicinal plants are being destroyed at an unprecedented rate and are threatened with extinction. The International Union for the Conservation of Nature (IUCN) describes the conservation status of a species. The aim of IUCN Red List is to convey the urgency of conservation issues of a species to reduce its extinction. *C. vespertilionis* is an important plant having potential antiplasmodial and anticancer properties. But there are only a few reports available in the literature. Much work is therefore needed to explore the plant for possible medicinal activities together with isolation of lead molecules to be integrated in to treatment of deadly diseases like malaria and cancer.

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#### CONFLICTS OF INTERESTS

The author declares no conflict of interest

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