A review on medicinal plants of *Holostemma ada-kodien* (family: Asclepiadaceae)

Junapudi Sunil, Yasodha Krishna Janapati and Pallaval Veera Bramha

Abstract

The present review focuses on the phytochemical and pharmacological studies on the plant *Holostemma ada-kodien* Shcult. Major chemical constituents are flavonoids, tannins steroids, alkaloids, anthocyanins, tannins and phenols. The most important medicinal use of plants is Hypoglycemic and Antidiabetic activity; Antipyretic Activity; Antibacterial; Anti-inflammatory Activity and Antioxidant activity is shown by *Holostemma ada-kodien* Shcult.

Keywords: Asclepiadaceae, ethnopharmacological, *Holostemma ada-kodien* Shcult, antidiabetic activity; antibacterial and antioxidant activity

1. Introduction

*Holostemma ada-kodien* (Syn: *Holostemma annulare*) belongs to Asclepiadaceae family. It is also called as Jivanti, Arkapushpi, Kshira, Dodi, Suryavalli and widely distributed in tropical forest in India [1,2]. The plant is used as Hypoglycemic and Antidiabetic activity; Antipyretic Activity; Antibacterial; Anti-inflammatory Activity, Antioxidant activity, other uses includes rejuvenative, aphrodisiac, expectorant, galactogogue, stimulant, and in ophthalmic disorders [3]. There is huge demand for this plant; more than 150 tones is required every year in south Indian pharmacies [4].

2. Method

In the present review, information regarding medicinal properties and biochemical properties of plants was gathered via searching books and scientific databases including PubMed, Elsevier, Google Scholar, Springer, etc. databases.

3. Taxonomy

*Holostemma ada-kodien* plant was belonging to Kingdom -Plantae, Phylum: Magnoliophyta, Class: Magnoliopsida, Order: Gentianales, Family: Asclepiadaceae, Genus: Holostemma and Species: Holostemma ada-kodien [5-7].

3.1. Description

*Holostemma ada-kodien* is a stems branched puberulent to glabrous. The Leaves were opposite, egg-shaped, base deeply heart-shaped, apex bluntly acuminate, margin entire, hairless, papery. Lateral nerves about 5 pairs and the lower 2 pairs arise from the base of the leaves. Influence extra-axillary, umbel-like or short raceme like, occasionally branched, shorter than leaves, usually few flowered. Flowers bisexual, 5-7 in axillary cymes, about 1.5 cm across, pinkish purple, fleshy, distinctly stalked. Large Calyx without glands. Corolla sub-rotate lobes overlapping to the right. Filaments connate. Anthers very large, decurrent to base of column. Stigma head scarcely umbonate [8-12]. Figure 1 and 2 was holostema ada kodien plant.

3.4. Phytochemistry

Preliminary photochemical investigation showed the presence of flavonoids, tannins, saponins, anthocyanins, steroids, alkaloids and phenols [13-17].
4. Pharmacological Activities

4.1. Hypoglycemic and Antidiabetic activity \[14, 15\]
This study was carried out to evaluate the hypoglycemic and antidiabetic activity of tuberous roots of *Holostemma ada-kodien* (*H. ada-kodien*) in normal and streptozotocin induced diabetic rats. Alcoholic and aqueous extract of tuberous roots of *H. ada-kodien* were prepared and given individually, orally at different doses to different groups of rat’s fasted for 18 h. The serum glucose levels were measured initially at 0 h (before treatment) and at 0.5, 1, 2, 3, 4, 6, 8, 12, 16, 20 and 24 h after the treatment. The alcoholic extract of tuberous roots of *H. ada-kodien* at higher dose (300mg/kg) produced maximal serum glucose lowering effect in both normal and streptozotocin induced diabetic rats. The aqueous extract of tuberous roots of *H. ada-kodien* produced maximal percent reduction in serum glucose levels with higher dose (400mg/kg). Alcoholic and aqueous extracts was produced hypoglycemic and anti-diabetic activities at 3 h, in a dose dependent manner. The effect produced by alcoholic extract was found better than that of standard gliclazide (2mg/kg) an oral hypoglycemic agent. The alcoholic extract has exhibited higher and better hypoglycemic and anti-diabetic activity for a prolonged period than that of the aqueous extracts \[23, 24\].

4.2. Antipyretic Activity
This study was carried out to evaluate the antipyretic activity of the traditionally used medicinal plant leaf extracts of *Holostemma ada kodien* Schult (*Asclepiadaceae*); in the methanolic and aqueous leaf extracts, in both gram positive and gram negative bacteria. The plant extracts exhibited significant antimicrobial potency, comparable to that of a standard antibiotic Gentamycin \[12\].

4.3. Antioxidant Activity
The Antioxidant activity of hexane, ethyl acetate and methanolic extracts of *Holostemma ada kodien* root tubers was studied. The above extracts exhibited a dose dependent scavenging activity against 2, 2’-diphenyl-1-picrylhydrazyl (DPPH) radicals, Superoxide radicals, and Nitric oxide radicals. Further, the methanolic and ethanolic extracts showed relatively higher reducing power compare to that of butylated hydroxytoluene. TLC of the above extracts using the DPPH as a spraying reagent revealed yellow spots against purple background indicating the presence of potent antioxidant compounds \[25\].

4.4. Antibacterial activity
This study was carried out to evaluate the antibacterial activity of the traditionally used medicinal plant *Holostemma ada Kodien Schult* (*Asclepiadaceae*); in the methanolic and aqueous leaf extracts, in both gram positive and gram negative bacteria. The plant extracts exhibited significant antimicrobial potency, comparable to that of a standard antibiotic Gentamycin \[12\].

5. Conclusion
In the present review, we have tried to summarize about Phytochemistry, Pharmacological activities of *Holostemma ada-kodien* Schult. The plant contains of flavonoids; tannins, saponines, anthocyanins, steroids, alkaloids and phenols. There is no report regarding isolation of single chemical compounds and secondary metabolites. In review reported Hypoglycemic and Antidiabetic activity, Antipyretic Activity, Antioxidant Activity, Antibacterial activity.

6. Acknowledgments
The authors are thankful to all researchers whose results are included in the present review. The authors are also thankful to anonymous reviewers for their valuable suggestions.

7. References