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

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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 distribute 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].



Fig 1: *Holostemma ada-kodien* leaves and flowers



Fig 2: *Holostemma ada-kodien* flowers

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 were produced hypoglycemic and antidiabetic 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); the methanol and ethyl acetate leaf extract (200 and 400mg/kg) was challenged against the Acetylsalicylic acid (300mg/kg) as

positive control for the assessment antipyretic activity in wistar rats; on subcutaneously treated with aqueous suspension 15 ml/kg of 20% w/v brewer's yeast. The methanolic extract showed the dose dependence reduction in hyperpyrexia when compared with the ethyl acetate extract and positive control. Hence further investigation on the separation and isolation of active principle will lead to a potent anti-pyretic agent^[25].

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^[26].

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 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.

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