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Research Article

Pharmacognostic Studies on *Hibiscus sabdariffa* - A Potential Anti-Obesity Drug

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Abstract

Hibiscus sabdariffa L, belongs to family Malvaceae. It is grown in China, India and Taiwan and is used as a traditional remedy to treat high blood pressure and liver disorders. Hibiscus flowers are used in Ayurveda for various diseases. An extract from the Hibiscus flower could have the same heart health benefits as red wine and tea. Hibiscus sabdariffa is also a well-known edible plant This plant extract is used as a potential anti-obesity drug. It is commonly known as Roselle and in Karnataka it is called as Kempupundi.

Keywords: Anatomical studies; *Hibiscus sabdariffa*; Obesity; Pharmacognosy; Physicochemical; Thin Layer Chromatography (TLC)

Introduction

Hibiscus sabdariffa is listed as a medicinal plant used in Ayurveda, Siddha and Unani systems of medicine. *Hibiscus sabdariffa* is known as roselle or sorrel and is an edible hibiscus. Roselle is an annual or perennial, simple or branched herb. Stem with sparse, simple, bulbous, spiny hairs. Blade ovate and not lobed in the lowermost part, in the upper part 3 - 7 partite; lobes elliptic-lanceolate, coarsely serrate, nearly glabrous on both sides; stipules 6-8 mm long, filiform; petiole 4 - 15 cm long, almost somewhat spiny near the top. Flowers axillary, solitary, sub sessile; epicalyx segments 7 - 8, linear, 6 - 10 mm long, sparsely prickly. Calyx fused at the base, 1 - 2.5 cm long, wooly, also setose or prickly, lobes long acuminate-aristate, with a swollen, linear gland on the central nerve at the base. Corolla yellow with a crimson centre, 3 - 5 cm across; petals obovate, 4-6 cm long, 2 - 4 cm broad. Staminal column inserted. Capsule 1.5 - 2 cm long, c. 1 cm across, conical, beaked, appressed-setose. Seeds many, 2 - 3 mm long, brown. As a multiple-use species, roselle is often mentioned as an energy candidate, yielding fiber, beverage, edible foliage, and an oil seed. The young shoots and leaves are cooked or eaten raw, while part of the flower is also used to make sauces, drinks and even preserves. This plant was possibly introduced to the West Indies and Brazil during the seventeenth century and with the slave trade. It was introduced to Australia in the early twentieth century and today it is a major crop in India.

A Roselle tea extract was found to have high inhibitory activity against porcine pancreatic alpha-amylase. Hibiscus acid and its 6-methyl ester were respectively isolated as active principles from the 50% methanol and acetone extracts of roselle tea. The activity of each isolate was compared to that of structurally related citric acid, a previously known inhibitor of fungal alpha-amylase [1].

A brief review on the phytochemical, pharmacological and toxicological properties of *Hibiscus sabdariffa*, reveals that the calyces are used in many parts of the world to make cold and hot drinks. Nutritionally, these contain ascorbic acid (vitamin C). The pharmacological actions of the calyx extracts include strong *in vitro* and *in vivo* antioxidant activity. In rats and rabbits, the extract showed antihypercholesterolaemic, antinociceptive and antipyretic, but not anti-inflammatory activities. In rat and man, a strong antihypertensive action has been demonstrated. The antioxidant effects of the aqueous extracts from dried calyx were quantitatively investigated *in vitro* using rat Low-Density Lipoprotein (LDL). The dried calyx extracts exhibit strong antioxidant activity in Cu (2+)-mediated oxidation of LDL ($p < 0.05$) *in vitro* [2].

In view of its reported nutritional and pharmacological properties and relative safety, *H. sabdariffa* and compounds isolated from it (for example, anthocyanin's and protocatechuic acid) could be a source of therapeutically useful products. considering its efficacy this could be a potential lead for use as anti-obesity plant. In the present work an effort is made to study its Pharmacognostic features.

Materials & Methods

Voucher specimen: The plant material Calyx of *Hibiscus sabdariffa* was collected from the wild and Identity was confirmed with the voucher specimen using [3] and deposited in VVPL herbarium.

Physicochemical values such as the percentage of total ash, acid-insoluble ash, water-soluble ash, and water and alcohol-soluble extractives were calculated as per the Indian Pharmacopoeia [4,5]. TLC fingerprinting profile carried as per [6]. For the Anatomical studies, Transverse Sections (TS) were prepared and stained [7,16]. A standard, Limit for total microbial count provided by [8] was followed and also [9,11-16].

Results and Discussion

Physicochemical Constants			Organoleptic Characters	
Parameters	Values	Limit	Parameters	Values
TA	7.75%	NA	Taste	Slightly acid
AIA	0.70%	NA	Color	Reddish
ASE	12.50%	NA	Odour	Mild
WSE	52.40%	NA	Texture	Mucilaginous

Table 1: Physicochemical constants and organoleptic properties.

The Physicochemical and Organoleptic characters are not reported earlier and after repetitive trials we got above Physicochemical standards.

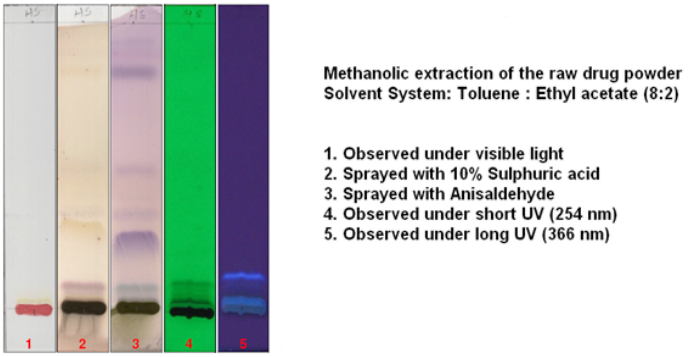

Figure 1: TLC Finger printing profile.

The TLC profile showed 7 bands each with different rf values when observed under Visible light, UV light at 254nm and UV light at 366nm. Whereas same plates when observed after spraying with 10% H_2SO_4 and Anisaldehyde showed 6 bands each with different Rf Values.

Anatomical studies

The TS of leaf:

Mucilaginous epidermis is present on both dorsal and ventral surface. Stomata are present on both surfaces. Glandular hairs are present, Ad axial hypodermis present, Mesophyll containing mucilage cells with sclerenchymatous idioblasts. Palisade parenchyma and spongy parenchyma cells are present with chlorophyll content. At the midrib region vascular bundle is present phloem cells are 2-6 layers which covered the xylem cells. Proto xylem cells towards the upper epidermis region and meta xylem cells towards the lower epidermis. Phloem cells are parenchymatous; at the dorsal surface of the vein reddish purple cells are present.

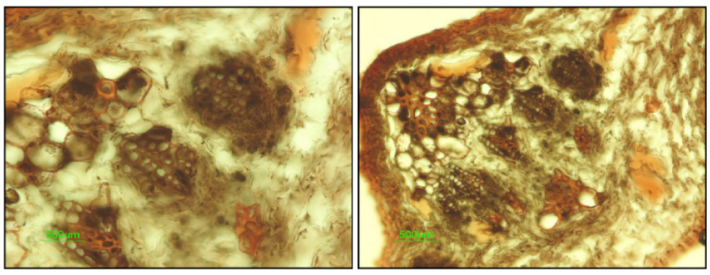

Figure 2: The TS of Calyx.

Microbial limit test

Total Aerobic Bacterial Count (TABC): 31 × 103 cfu g^{-1}

Total Yeast and Mould Count (TYMC): 1.8 0 × 103 cfu g^{-1}

(Microbial contamination limit for raw herbs - TABC: <1E+07 cfu g^{-1}, TYMC: <1E+05 cfu g^{-1})

Total aerobic bacterial count (TABC): $\leq 1\times10^7$ & total yeast and mould count (TYMC): $\leq 1\times10^5$. Results of microbial assay of

***Hibiscus sabdariffa* L.** showed 31000 colonies for aerobic bacteria and 1800 colonies for yeast and moulds which is below the limits of international guidelines [9-10].

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