

**COMPARATIVE EVALUATION OF PHYTOCHEMICAL
CONSTITUENTS OF RIND, PULP, AND SEED OF *HODGSONIA
HETEROCLITA* FRUIT ENCOUNTERED IN KOKRAJHAR DISTRICT,
BTAD, ASSAM, INDIA**

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Article Received on
04 April 2015,

Revised on 24 April 2015,
Accepted on 16 May 2015

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ABSTRACT

Hodgsonia heteroclita is an important medicinal plant that has been associated with the life of different tribes of North east India over years. In view of its varied traditional use of medicine, it has been the subjected to scientific validation. The present study was aimed to evaluate the presence of various phytochemicals and estimate the total phenol, flavonoid and flavonol of the 70% methanolic extract of pulp, peel and rind of *H. heteroclita* fruit. The results revealed the presence of various phytochemicals like carbohydrates, reducing sugars, tannins, saponnins, flavonoids, steroids, alkaloids, anthraquinones, glycosides. The total phenol and flavonol content was found to be highest in rind while the pulp had the highest flavonoid. Thus it can be ascertain that *H. heteroclita* fruit can be used potentially as a readily available source of natural antioxidants and as a possible pharmaceutical supplement.

KEYWORDS: *Hodgsonia heteroclita*, phytochemicals, phenol, flavonoid.

INTRODUCTION

Hodgsonia heteroclita Hook. f. & Thomson (Cucurbitaceae) is believed to have originated in North east India, China and Malaysia.^[1,2] It is found to occur in India, China, Bangladesh, Malaysia and Nepal.^[1, 3, 4] In India, *H. heteroclita* is encountered in the hilly areas of Assam, Manipur, Meghalaya, Nagaland, Arunachal Pradesh, Tripura and Sikkim.^[5] Popularly known as Chinese lard plant, is locally addressed as Hagrani jwgwnar by the *Bodos*.

H. heteroclita is closely associated with the life of the tribe of North east India. The seeds are consumed by the tribals in different forms as either wholly or with other accessories like meat, fish or along with other edible vegetables. This plant is not only valued as food but also have significant medicinal values. Tribes of Manipur and Nagaland use crushed seeds for the treatment of intestinal worms. The later also use the fruit pulp to prevent from bacterial infections. The tribals of Tripura uses leaf juice on fresh cuts and wounds. Apart from this the seed oil is much valued and forms the base form many Eastern medicines.^[6] The fruit pulp is used by the *Bodos* as a remedy against diabetes.^[7] Review of literature showed that till date there has been no scientific evidence that substantiates its traditional uses and thus this plant virtually remains unexplored on scientific grounds. Thus, in this study an attempt has been made to estimate the biochemical constituents of different parts of *Hodgsonia heteroclita* fruit.

MATERIALS AND METHODS

Plant material collection and extraction

Fruits of *H. heteroclita* were collected from the market and forests of Kokrajhar District, BTAD, Assam, India during Nov-Dec, 2013 (Fig 1). After authentication by a plant taxonomist and a voucher specimen (Voucher No. DBT/BU/001) was been deposited at Bodoland University, Kokrajhar, BTAD, Assam, India.



Figure 1: *Hodgsonia heteroclita* fruits showing pulp, seed and rind

The pulp, seed and rind were air dried and ground to powder using mechanical grinder. Ten grams of the each powdered samples were extracted in a Soxhlet apparatus using 70% methanol (v/v) separately (the ratio of plant material to solvent was 1:15 m/v).^[8] The extraction was carried out at boiling temperature for 6 h. The extract obtained was evaporated under pressure at 50°C to a constant weight and stored at 4°C until required. Before use, the extract was dissolved in double-distilled water (DDW) in desired concentrations.

Preliminary Phytochemical Screening: The presence or absence of the phytochemical constituents like Carbohydrates, Reducing sugars, Tannins, Saponins, Flavonoids, Steroids, Alkaloids, Anthraquinones, Glycosides of the powdered plant material were analyzed using the standard methods.^[9,10]

Determination of Biochemical Constituents: The total soluble phenolics (TPC) were determined by Singleton and Rossi^[11] method with slight modifications.^[12] The total flavonoid content (TFC) was determined according to Zhishen *et al.*^[13] with minor modifications using quercetin as a standard.^[14] The modified method of Goyal *et al.*^[15] was used to estimate the total flavonols using quercetin as a standard.

RESULTS

Preliminary phytochemical screening

The qualitative data showing the presence of different phytochemicals in 70% methanolic extract of *H. heteoclita* fruit pulp (HMP), seed (HMS) and rind (HMR) is depicted in table 1.

Table 1: Preliminary phytochemical screening of *Hodgsonia heteroclita* fruit

Chemical compounds	Pulp	Seed	Rind
Saponins	+	+	++
Steroids	+	+	+++
Alkaloids	+	++	+++
Tannins	+	+	+
Carbohydrates	+	+	+
Flavonoid	++	+++	+++
Anthraquinone	+	+	++
Glycosides	+	+	+
Reducing sugars	+	+	+

- = Compound not detected; + = moderate detected; ++= high; +++= very high

Determination of Biochemical Constituents

The total phenolic, flavonoid and flavonol contents of the 70% methanolic extract of different parts of *H. heteroclita* ranged between 13.86 ± 0.01 to 18.91 ± 0.01 mg/g GAE, 161.15 ± 0.03 to 167.95 ± 0.02 mg/g QE and 74.2 ± 0.01 to 75.9 ± 0.02 respectively. Among the different parts under study the highest phenolic and flavonol was found in the rind (HMR) (figure2 and 3) while the flavonoid content was similar to the fruit pulp (HMP) (fig 4). Seed extract was found to posses the least amount of the biochemical constituents. The fruit pulp (HMP) was found to have moderate amount of phytoconstituents when compared to HMR and HMS.

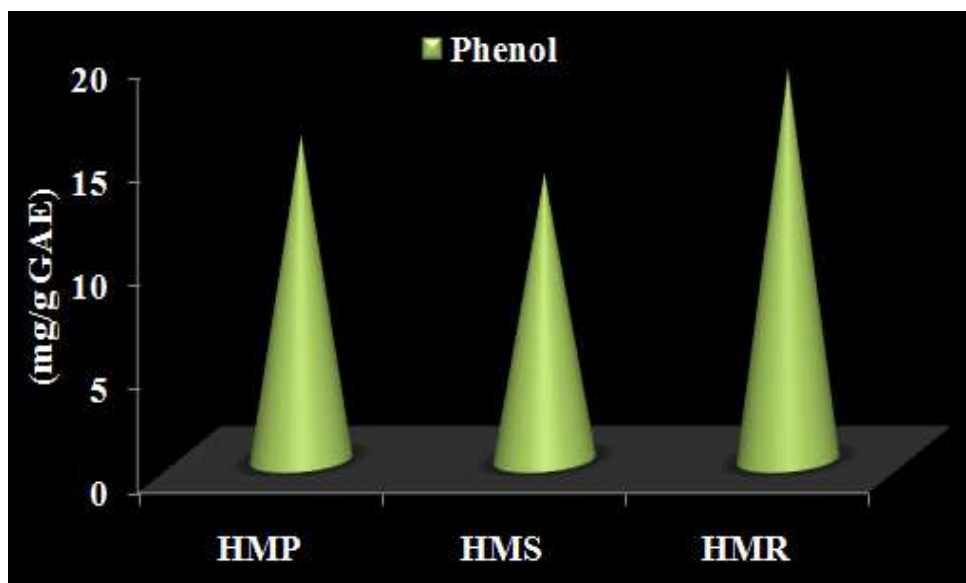


Figure1: Total phenolic content present in different parts of *Hodgsonia heteroclita* fruit

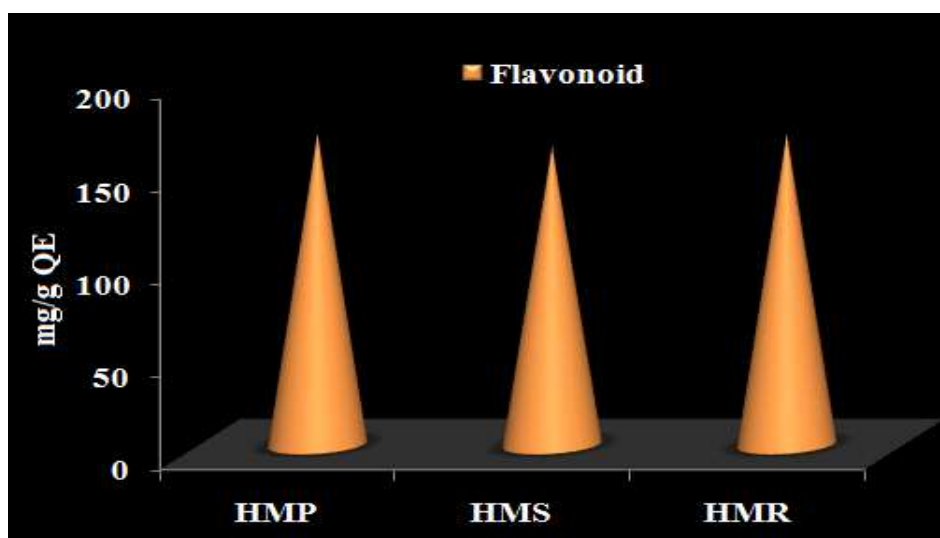


Figure2: Total flavonoid content present in different parts of *Hodgsonia heteroclita* fruit

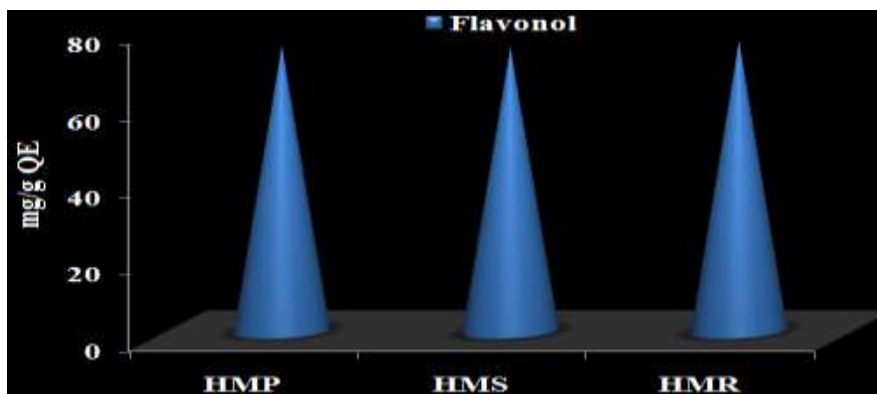


Figure3: Total flavonol content present in different parts of *Hodgsonia heteroclita* fruit

DISCUSSION

Plants are rich sources of different phytochemicals having varied biological activities that can be of value in both food and medicine.^[16] Different plant extracts may therefore contain different phytochemicals having its unique biological activity.

The biochemical constituents present in fruits and vegetables have received considerable importance because they possess a broad spectrum of chemical and biological activities including antioxidant activity.^[17]

Preliminary phytochemical screening of pulp, seed and rind of *H. heteroclita* revealed the presence of various bioactive components like saponins, steroids, alkaloids, tannins, carbohydrates, flavonoid, anthraquinone, glycosides, reducing sugars ranging from moderate to high and very high. These phytochemicals are reported to perform several important functions not only in plants, but also may exhibit different biochemical and pharmacological actions in the animals when consumed. These actions range from cell toxicity to cell protective effects.^[18]

Plant saponins are widely distributed amongst plant that exerts a wide range of pharmacological activities including expectorant, antiinflammatory, vasoprotective, hypocholesterolemic, immunomodulatory, hypoglycaemic, molluscicidal, antifungal, antiparasitic etc.^[19, 20]

Tannins are water-soluble polyphenols having anticarcinogenic and antimutagenic along with antimicrobial properties. Tannins have also been reported to exert other physiological effects, such as to accelerate blood clotting, reduce blood pressure, decrease the serum lipid level, produce liver necrosis, and modulate immunoresponses.^[21]

The alkaloids have been long recognised as an important group of metabolite because of various biological activities like analgesic properties.^[22]

Flavonoids, one of the largest and most widespread groups of secondary metabolite have been known to have antioxidant, antibacterial, antifungal; and antiviral activity.^[22]

Anthraquinones have been associated with anticancer, laxative and anti-arthritis properties.^[23]

One of the major functions of these phytochemicals is their role as antioxidants.^[12] It is already established that each and every phytochemical have one or the other biological property. The traditional use of *Hodgsonia* fruit pulp as anti bacterial and anti-diabetic might be due to the presence of flavonoid and saponin either individually or in conjunction with other compounds. Our study revealed the presence of medically active constituents in the different parts of the *H. heteroclita* fruit.

CONCLUSION

It is concluded from the above study the preliminary phytochemical analysis and estimation of biochemical constituents of the pulp, seed and rind of *H. heteroclita* not only validated the traditional use scientifically but also opened up a fresh line of research into discoveries of many new drugs.

CONFLICT OF INTEREST

Authors declare none

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