



## Nutritional Evaluation of Wild Edible Fruits (*Tinospora cordifolia* and *Persea americana*)

## KEYWORDS

Nutritional parameters, minerals, vitamins

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**ABSTRACT** Tropical developing countries are facing an demand for nutrient- rich food due to teeming population, The mineral nutrition is an important aspect and it play pivoted role in human life. The analysis of proximate composition of both the fruit samples of the present study showed that the *T. cordifolia* fruit contains higher levels of crude protein, crude fat and colorific values. Among the fruit samples of the present study, *T. cordifolia* fruits found to possess rich sources of total protein, total carbohydrate and higher levels of minerals than the *P. americana* fruits. In this study exhibited adequate levels of a valuable source of vitamins, ascorbic acid. The both fruit samples have potential for human feeding, judging from their proximate composition, total carbohydrate, protein and minerals were compared favorably with the conventional edible fruits.

**INTRODUCTION**

The plants have served as source of vitamins, protein, fat and carbohydrates. They become important when their functions are considered in human body (Adegoke *et al.*, 2006). The absence of some vitamins in the body can lead to primary and secondary deficiency disease (Lawal *et al.*, 2010). Guduchi is widely used in veterinary folk medicine/ ayurvedic system of medicine for its general tonic, anti-periodic, anti-spasmodic, anti-inflammatory, anti-diabetic properties (Nadkarni and Nadkarni, 1976; Chopra *et al.*, 1982; Zhao *et al.*, 1991). In this study the nutritional evaluation of different extracts from fruits of *T. cordifolia* and *P. americana* was determined through standard methods.

**Materials and Methods / Collection of Fruit samples**

Fresh fruit samples of *Tinospora cordifolia* and *Persea americana* fruits were collected from different agro-climatic regions of Coimbatore and The Nilgiris District, Tamil Nadu from the natural strands. Fresh plant materials were washed under running tap water, air-dried and then homogenized to fine powder and stored in airtight bottles.

**Crude extract preparation**

Air-dried powder (50 g) was taken in 200 ml of petroleum ether/ Ethyl acetate/ Ethanol /water in a conical flask, plugged with cotton wool and they were shaken at room temperature for 2 days. After 2 days of incubation, the supernatant was collected and the solvent was evaporated to make the final volume one fourth of the original volume and stored at 4°C in airtight bottles.

**Proximate Analysis**

The moisture content of the fruit samples was determined by following the method of AOAC (1970).

The protein content of the sample was determined by micro-kjeldahl method (Humphries, 1956).

Determination of ether extract (or) total crude fat, crude fiber, and Ash content (AOAC, 1970). Two g of air dried fruit powder was extracted with ether in a Soxhlet apparatus for 16 h. according to the Association of Official Agricultural Chemists (1970).

**Determination of Nitrogen Free Extractives**

Percentage of NFE was calculated according to the method of Muller and Tobin, (1980)

The calorific values of the fruits were determined according to the method of Sidhuraju *et al.*, (1992) by multiplying the percentage of crude protein, crude lipid and nitrogen free extractives by the factors 16.7, 37.7 and 16.7, respectively.

**Analyses of Macronutrients****Extraction and Estimation of total Carbohydrates**

The total carbohydrates content of ripen fruit flour was extracted and estimated by following the method of Hedge and Hofreiter (1962).

**Extraction and Estimation of Proteins (True Proteins)**

The protein content was measured by the method of Lowry *et al.*, (1951).

**Mineral composition****Estimation of Sodium and Potassium**

Sodium and Potassium were estimated by using *Flame Photometer Model-EEL*. The sodium Potassium contents were calculated by referring to the calibration curves, of sodium and Potassium, respectively and expressed as mg 100g<sup>-1</sup> of fruit sample.

**Calcium and Magnesium**

Triple acid digested extract (5 ml) was taken in a China dish, to this 10 ml of ammonium chloride- Ammonium hydroxide buffer (p<sup>H</sup> 10) and few drops Eriochrome black T indicator (0.1g of Eriochrome black T dissolved in 25 ml of methanol containing 1g of hydroxylamine hydrochloride) were added and titrated against 0.02N versenate solution until the colour changes to blue.

**Estimation of phosphorus**

The phosphorus content of the fruit sample was estimated by following method of Dickman and Bray (1940).

**Quantification of vitamin-C**

The vitamins of ascorbic acid (Vitamin- C) concentration in

the fruit sample was extracted and estimated by following the method of Hawks (1954).

## RESULTS

The research findings pertaining to the following parameters are presented in table 1,2,3 and 4.

### Proximate composition

The data on the proximate composition of the fruit powder samples investigated are shown in table 1

### Total carbohydrates

The total carbohydrate content of the presently investigated two different fruit sample were found to be 1.02 and 6.92 g/100gof fruit powder. Table-2

### Total (true) protein

The data on total true protein of dried fruit powder materials of *T.cordifolia* and *P. americana* contained substantial levels of total protein 7.13and 1.2 g/100g of protein. *T. cordifolia* fruit has registered the highest level of total protein. Table-2

### Mineral composition

The data on mineral composition of two different fruit samples are presented in Table 3,

### Vitamins

Ascorbic acid (vitamin-C) content of the two different fruit samples were found to be 24 to 40mg/100g fruit powder, respectively. Among the two different fruit samples the *P.americana* has registered the highest level of Vitamin-C content (Table -4).

## Tables

**Table1. Proximate Composition of *T.cordifolia* and *P.americana* fruits\***

Component Sample	Moisture %	Crude protein (%)	Crude fat (%)	Crude/ fiber %	Ash content (%)	NFE %	Calorific Value %
<i>T. cordifolia</i>	1.0	10.075	2.01	5.45	9.5	72.96	1477.59
<i>P. americana</i>	2.2	9.80	1.22	5.32	7.0	76.66	189.80

\* All Values are mean of triplicate determinations expressed on dry weight basis (g/100 g fruit powder)

**Table-2 Data on total protein and total carbohydrate content of two different fruit samples of *T. cordifolia* and *P. americana* (g/100 g DM)**

Samples	Total carbohydrates	Total protein
<i>T. cordifolia</i>	6.92	7.13
<i>P.americana</i>	1.02	1.2

\* All Values are mean of triplicate determinations expressed on dry weight basis

**Table-3 Mineral composition of two different fruit Samples of *T.cordifolia* and *P.americana*(%)\***

Samples	Sodium	Potassium	Calcium	Magnesium	Phosphorus	Iron
<i>T.cordifolia</i>	0.28	0.48	0.13	0.31	0.058	0.025
<i>P.americana</i>	0.16	0.001	0.008	0.009	0.095	0.04

\* All Values are mean of triplicate determinations expressed on dry weight basis

**Table 4 Vitamin- C content of two different fruit Samples of *T.cordifolia* and *P.americana*\***

Name of the vitamin	Fruit powder	
	<i>T.cordifolia</i>	<i>P.americana</i>
Vitamin C (mg/100 g)	24	40

## DISCUSSION

### Proximate composition

Two different dried fruit samples materials of *T. cordifolia* and *P. americana* fruits contain the protein level is comparable to earlier on *T. cordifolia* stem has (Bhawya, Anil kumar, 2010) has *P. americana* (Olayiwola olajumoke Abidemi, 2013). In this present study the crude fat content of two different fruit samples are (1.22 to 2.01% compared to earlier report on *P. americana* (Nwaogu et. al., 2008). *T. cordifolia* contain the highest level of ash (9.5g/100g) it is compared to previous report on same (Bhawya and Anil kumar, 2010; Nasreen et al., 2010). The fiber content of two plant fruit samples is 5.45 and 5.32% Which are comparable to earlier report on *P. americana* sample showed the lower level of crude fiber (Olayiwola Olajumoke Abidemi, 2013). The moisture content of two different fruit sample is comparable to earlier report is higher than that of present study in the same species (Nwaogu et. al., 2008;Olayiwola Olajumoke Abidemi, 2013) *T. cordifolia* stem sample has low levels of moisture content (Bhawya and Anil Kumar, 2010; Nazarudeen et al., 2010; Olayiwola Olajumoke Abidemi, 2013).

### Total protein and Total carbohydrates

In present study the two different fruit samples exhibits the total protein content 1.2 - 1.2 - 7.13 and 1.02-6.92 g/100 g These values are compared to *Carissa opaca* (Chandra Subhash et al., 2011) *Berberis lyceum* ((Zain and Ullah et al., 2013).

### Mineral composition

The micronutrients in presently studied wild fruits were appreciably high. The highest iron content was recorded in *P. americana* (40mg/100g) and the phosphorus content (95mg/100g) are maximum in the same species. These values are compared to earlier reports on Banana, *Carissa spinarum*, Guava, Pomegranate, *Eugenia rothii*, *Mimusops elengi*, *Mulas domestica*, Papaya, Grapes (Ajai kumar et al., 2012).

### 5.6. Vitamins

Vitamin deficiencies may result in disease conditions. In the present study, among two different fruit samples the *P. americana* fruit showed the highest value of vitamin-C (40mg/100g). These values are compared to earlier report on *Carissa opaca* (Chandra Subhash et. al., 2011) *Bridelia tomentosa*, *Carissa spinarum*, *Eugenia rothii* *Malus domestica*, *Ziziphus rugosa* (Ajai kumar t al.,2012).

### Conclusion

The both fruit samples have potential for human feeding, judging from their proximate composition, total carbohydrate, protein and minerals were compared favorably with the conventional edible fruits. The *P. americana* fruits contains high levels of iron and ascorbic acid that protect human beings from scurvy and related ailments.

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