IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 8, May 2024

Phytochemical Analysis of Some Wild Edible Fruits

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Abstract: *Wild edible plants are a traditional source of daily nutrition in addition to regular diet. Local people of Maharashtra, India utilize large number of wild edible plants sustainably. The purpose of this study was to investigate the phytochemical composition of 4 edible wild fruits. It was collected from local market. The phytochemicals estimation is screened by using aqueous solvent. The wild and edible fruits such as Aegle marmelos, Limonia acidissima, Psidium guajava and Thai guava. The phytochemicals like protein, carbohydrates, phenol, tannin, starch, flavonoids, flavonols and glycosides were estimated. The results show the presence of phytochemical constituent was present in aqueous extract. We recommend further studies to determine if the presence of a particular class of phytochemicals would translate into the bioactivity capability of these edible fruits.*

Keywords: Edible fruits, *Aegle marmelos, Limonia acidissima, Psidium guajava*

I. INTRODUCTION

Plants are the gift to humans by nature and have been used as an important source of food. Many plant species are domesticated by humans for their daily requirement of food. In addition to several of these domesticated crops, many wild plants not cultivated by humans have been used as a source of food. Wild edible plants can be defined as those plants which grow in the wild and various parts of these plants can be safely consumed. Fruits are traditional use of food, potentially they have many advantages. They are edible and having nutritional food value, which provides the minerals like sodium, potassium, calcium, phosphorus magnesium and iron. They are immune to many diseases and often used in different formulation of 'Ayurveda' Deshmukh B. S. and Waghmode A. (2011). The defensive effects of natural antioxidants in vegetables and fruits are related to three major groups: vitamins, phenolics, and carotenoids Thaipong K. *et al.*,(2006).

II. MATERIALS AND METHODS

Phytochemical Analysis

Qualitative Analysis

Qualitative tests for the presence of starch, tannins, saponins in water extractives while for alkaloids, glycosides and flavonoids in alcoholic extractives.

Qualitative test for Starch:

3 g of plant material was add in 30 ml distilled water for 24 h under dark condition. Then plant material filtered through filter paper. Filter extract was used for further analysis. Starch was tested by testing with iodine in 2% aqueous potassium iodide.

Qualitative test for Protien: (Trease and Evans, 2002)

The millions reagent was used for protein detection.

Procedure: About 2 ml of the test solution was boiled with a few drops of Millions reagent and observed the colour.

Qualitative test for Saponins: (Trease and Evans, 2002)

Water extract of the plant material was vigorously shaken (with few drops of neutral water). A permanent lather (foam) indicated the presence of saponins.

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Qualitative Analysis for Tannins:
The water extract from plant material was treated with ferric chloride (acidic) and observed for the presence of tannin.
Qualitative testfor Alkaloides:
Mayer's reagent test: 1ml of 1% HCl was added to 3ml of extract in a test tube. The mixture was heated gently for 20 minutes, allowed to cool and filtered. After this, two drops of Mayer's reagent was mixed in 1ml of filtrate and observed for turbidity or creamy precipitates.
Qualitative test for Phenols: (Trease and Evans, 1983)
The powdered saple (200 mg) homogenized with 10 ml of 80% Ethanol and centrifuged. The supernatant (5 ml) was treated with a mixture of equal volume of (a) Ferric chloride (0.3%) in 0.4 hydrochloric acid and (b) Potassium ferrocynide (0.3%). The resultant blue green colour confirms the presence of Phenol.

Qualitative test for Flavonoids:
To 1 ml of ethanol extract , few drops of concentrated hydrochloric (HCL) and magnesium (Mg) turnings were added. The development of pink or maneta colour indicated the presence of flavonoid.
Qualitative test for Glycosides: The plant material was extracted in absolute alcohol. It was filtered through whatman no. 1 filter paper. To 2-3 ml of filtrate added equal volume of warm benzene slowly from the edge of test tube. A white precipitate developed at edge's indicated the presence of Glycoside.
Qualitative test for Carbohydrates: Molisch test: About 1ml of extract was treated with 2-3 drops of Molisch's reagent (10% of 1-napthol in ethanol). The test tube was hold at an angle and 1-2 ml of conc. H2SO4 was added carefully along the sides of the test tube and observed for the formation of reddish violet ring at the junction.
Qualitative test for Reducing Sugar: 2-3ml of Fehling solution A and B were heated gently and allowed to cool. Then 1ml of extract was added to it. The mixture was boiled for 5-10 minutes. Brownish red precipitates indicated the presence of reducing sugars.

Quantitative Analysis-
Determination of total Carbohydrates by Anthrone Method- (Sadasivavam and Manickam, 2008)
II) Protein estimation – Bradford Method. (Sadasivam and Manickam, 2008)
V) Estimation of Flavonoids- Flavonoid was extracted and estimated by the method of Cameron et. al., 1993)
VI) Estimation of Flavonol
Quanlitative assessment of Phyto-constituents: In this chapter specific results have been described. Powdered fruit pulp were subjected to chemical tests using standard reagents. Response obtained has been compiled in table form (Table 4). The data indicates presence of the primary and secondary metabolites such as flavonoids, Flavonol, glycosides, Phenols, Carbohydrates, Proteins, and tannins in fruit pulp of *A. marmelos, L. acidissima, P. guajava* and Thai guava.

Metabolites	*Limonia acidissima*	*Aegle marmelos*	*Psidium guajava*	*Thai guava*
Protein	+	+	+	+
Carbohydrates	+	+	+	+
Phenol	+	+	+	+
Tannin	+	+	+	+
Starch	+	+	+	+
Flavonoids	+	+	+	+
Flavonols	+	+	+	+
Glycosides	+	+	+	+

Table. Qualitative Phytochemical Test for pulp of different fruits (Key: Present = +)

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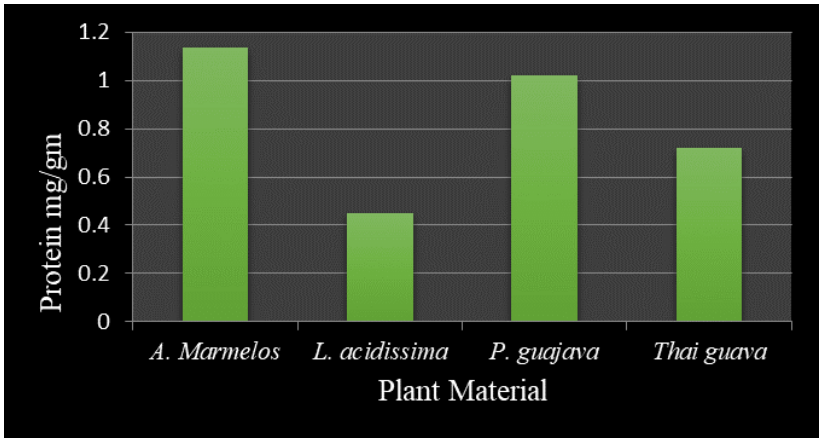
Quantitative assessment of Phyto-constituents:

Powder fruit pulp were subjected to quantitative assessment pertaining different primary and secondary metabolites and active ingredients.

Protein

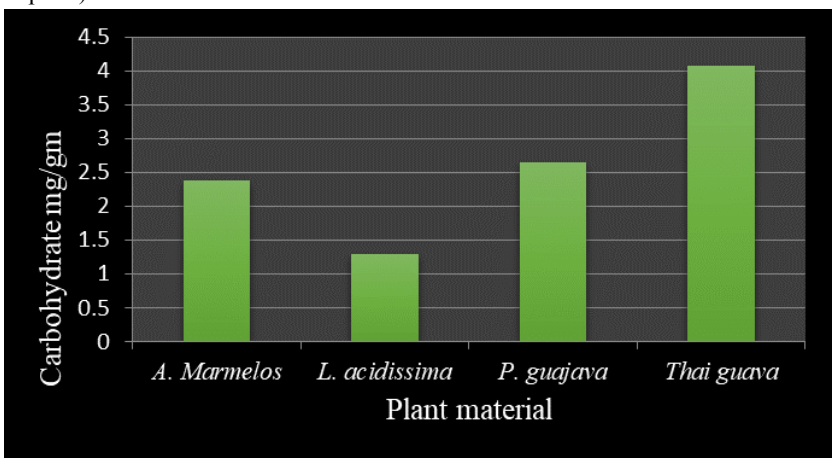
Protein is estimated by using Folin- Ciocalteau reagent at 660 nm absorbance. The pulp extract from different plant showed variation in content of protein. Among the four fruits, *Aegle marmelos* possessed high amount of protein content (Graph.1).



Graph.1 Plant material showing variation in protein content

Carbohydrate

The total content of carbohydrates in given plant material is estimated by using Anthrone reagent at 630 nm absorbance. It was observed that the amount of carbohydrates was higher in pulp of Thai guava when compared to the other fruits pulp (Graph. 2).



Graph.2 Plant material showing variation in Carbohydrate content

Phenol

Phenol is estimated by using Folin-Ciocalteau phenol reagent. As per the given results almost all the fruits are contains phenol but among them *Aegle marmelos* is rich in phenol content (Graph.3).

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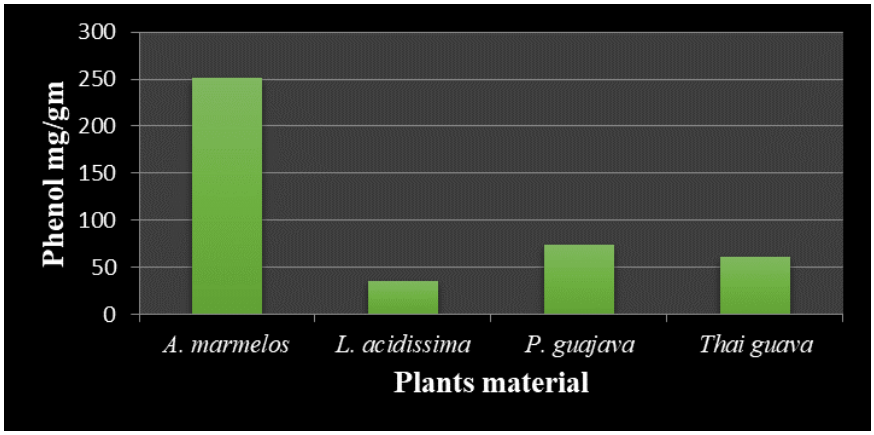
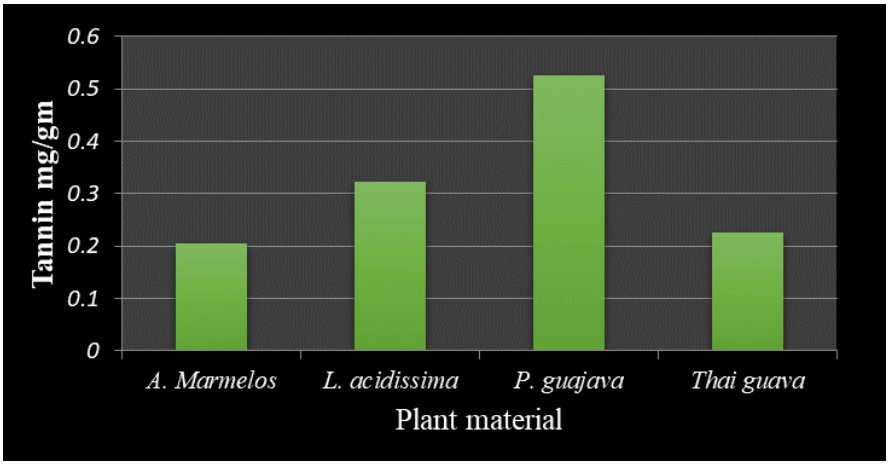


Graph.3 Plant material showing variation in Phenol content

Tannin

Folin-Denis reagent is used for the estimation of tannin in given fruit pulp extract. In a result, all the four fruits showed variation in presence of tannin content. Among the four fruits Psidium guajava possessed high amount of tannin content (Graph.4)



Graph.4 Plant material showing variation in Tannin content

Flavonoid

Flavonoid estimation was done by taking absorbance at 510 nm. Almost all the four fruit pulp contains Flavonoid but Limonia acidissima possessed high amount of flavonoid content (Graph.5).

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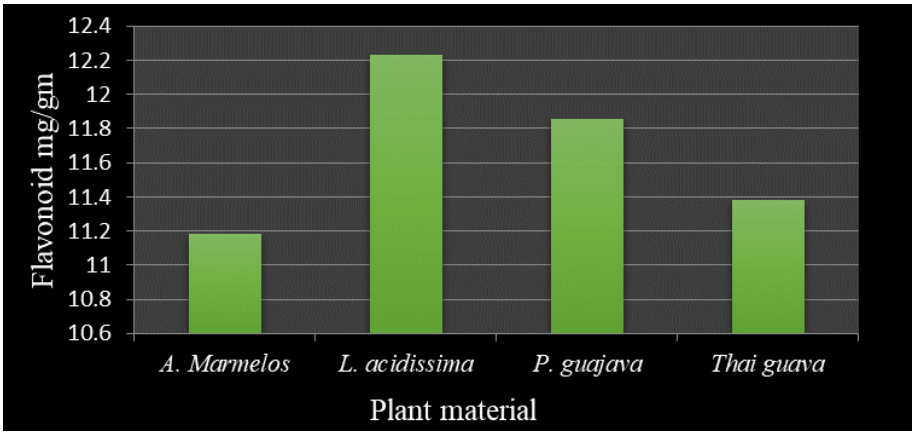
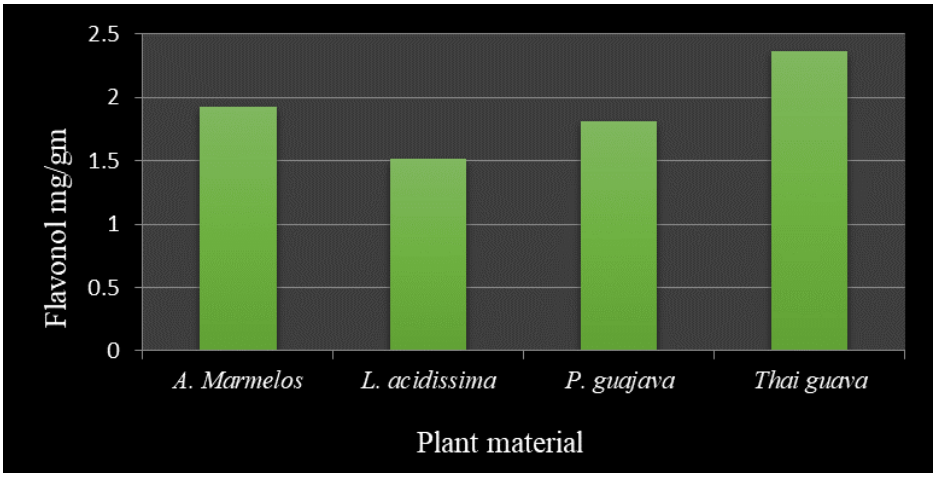


Graph.5 Plant material showing variation in Flavonoid content

Flavonol

Flavonol content is observed at the 440 nm in a spectrophotometer. Almost all the fruits are similarly rich in flavonol. But as per the following results (Graph.6) Thai guava shows higher content as compared to the other three fruits.



Graph.6 Plant material showing variation in Flavonol content

Glycoside

Plants	Protein Mg/gm	Carbohydrate Mg/gm	Phenol Mg/gm	Tannin Mg/gm	Flavonoid Mg/gm	Flavonol Mg/gm
Aegle marmelos	2.27	4.76	0.50	0.0004	22.36	3.84
Limonia acidissima	0.90	2.58	0.070	0.0006	24.46	3.02
Psidium guajava	2.03	5.31	0.147	0.0010	23.70	3.62
Thai guava	1.43	8.14	0.123	0.0004	22.76	4.72

Table Nutritional value of the *A. marmelos, L. acidissima, P. guajava* and Thai guava fruit pulp.

Ramula et al., 2003 reported quantitative analysis of *Aegle marmelos* indicates that the fruit pulp is rich in water, Protein, Carbohydrates and some dietary fibers. According to him the *A. marmelos* phytochemical analysis shows the presence of some polar and non-polar chemical constituents. The present study indicates the fruit pulp is rich in flavonoids, carbohydrates, protein, Flavonol and small amount of some secondary metabolites such as phenol and tannin. The preliminary phytochemical analysis of *Limonia acidissima* fruit pulp possessed high amount of protein (Thomas, 2006). And in present study *s* shows high content of flavonoid and carbohydrate which may help for human

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diet. This variation in result may due to the some manual errors or due to the maturity of fruit used as a material and change in the cultivated field. There is also presence of flavonol, protein and phenol in small amount. As compared to the *Limonia acidissima, Psidium guajava* is rich in carbohydrate and protein. In ripe fruit of guava a high percentage of vitamin C, carotene, free sugars and high percentage of pectin have been reported (Misra, 1967).

Thai guava is an exotic fruit rich with high amount of biologically active metabolites and nutritional values (Dembitsky, 2011). Present study reported a high content of carbohydrate and flavonoids in fruit pulp of Thai guava as compare to the *A. marmelos, L. acidissima and P. guajava.*

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