

Qualitative and Quantitative Analysis of *In Vitro* Phytochemical Screening and Antioxidant Activity of Jamun (*Eufenia jambolana*) Medicinal Plants

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Abstract: Our research work based on the qualitative and quantitative photochemical studies including the antioxidant activity of extracts (ethanolic and aqueous) obtained from leaf, stem and seed of *Eugenia Jambolana* plant. Qualitatively phytochemical analysis was done by biochemical testing, quantitative estimation was taken spectrophotometrically and antioxidant activity of extracts was tested by DPPH (Diphenylpicrylhydrazyl) radical scavenging. Qualitative and quantitative outcome of our study explain that ethanol is applicable solvent system that comprises high quantity of bioactive compounds than water solvent system. Antioxidant activity revealed that ethanolic leaf, seed and stem. Extracts ethanol solvent system displayed protruding antioxidant activity and also contains high amount of phytochemicals.

Keywords: phytochemical, anti-microbial, anti-oxidant, Tannins, flavonoids, steroids, saponins, ethanolic, *Eugenia jambolana* (jamun)

1. Introduction

Jamun or Indian Black berry is obtained from *Eugenia jambolana* synonymously know as *Syzgium cumini* Lam of Family **Myrtaceae**. It is considered as a traditional medicine that helps in controlling several lifestyle diseases such as **diabetes mellitus, age related, macular infection and other in India for many decades**. The characteristics parts of *E. jambolana* plant included leaves, seed, stem and fruit have excessive remedial worth (Ayanar *et al.*, 2013).

E. jambolana habitually grows in the rain forest. It is most frequently cultivated in indian subcontinent, and also in many others adjoins regions of south Asia such as India Bangladesh, Nepal (Nelvana *et al.*, 2014).

It grips countless beneficial compounds that divulge numerous health benefits (Mudiana, 2016). A number of primary and secondary phytochemical bioactive compounds like phenol, flavonoids, alkaloids, saponins, tannins, terpenoids and steroids, Which are valuable for spawning drugs for action numeral of illness covering with diabetes (Ayanar *et al.*, 2013).

They give away various pharma-logical actions such as diabetes mellitus, stomach disorders, antioxidant, antibacterial, anti-viral, anti-cancer, anti-HIV, antifungal, antidiarrheal and antifertility. *Eugenia jambolana* is highly rich in compounds covering alkaloid and glycoside is an effective for diabetes controlling and healing stomach disorders or inflammation bronchitis dysentery and controlling blood pressure (Laouini *et al.*, 2013).

The biochemical formation and antioxidant action of *E. jambolana* fruits have intended that tannis take out from *E. jambolana* fruit. *E. jambolana* comprehends substances that have capability to keeps against oxidation damage and lessen swelling. *E. jambolana* plays vital role in liver

protection, anti-hyperglycemic, anti-inflammatory, cardioprotective, and antioxidant (Agor *et al.*, 2014).

Traditional Indian Medicines like Ayurveda and Unani prescribe Jamun for different health problem including diabetes, dental problem, digestive disorders, liver trouble and skin ailments. Keeping in view of the above factor, it was intended to adopt an overview on highly medicinal plant (Daniel *et al.*, 2017).

Jamun is obtained from *Eugenia jambolana* which is synonymously called *Eugenia cumini* and *Syzgium cumini* Lam. It belongs to the family **Myrtaeae**.

2. Research Aim

The aim of this research was to carry out detailed qualitative and quantitative activities of the leaf, stem and seed of *E. jambolana* using ethanolic and aqueous extracts.





Fruits

Seeds

3. Materials and Methods

Collection of Plants Material

The natural and aseptic plant parts Leaf, Stem and Seeds of *Eugenia jambolana* were collected carefully. The plant materials leaf, stems seeds were properly cleaned and keep in room temperature.

Preparation of Extracts – Six collected crude extracts prepared for study were as follow:

Leaf in ethanol, leaf in water, stem in ethanol, stem in water, seeds in ethanol and seed in water

Table 1: Ethanolic Fraction extracts

Ethanolic Fraction (95% ethanol)		Dry Extracts	Water Fractions	Dry Extracts
<i>E. Jambolana</i> leaf	50%	1.4g	70g	1.9g
<i>E. jambolana</i> Stem	50%	2.4g	50g	1.3g
<i>E. Jambolana</i> seeds	25%	1.08g	40g	1.5g

Qualitative phytochemical Analysis

Qualitative phytochemical analysis was investigated by biochemical testing with the extracts of leaf, stem and seeds of *Eugenia jambolana* to detect the presence or absence of numerous primary and secondary metabolites with the help of standard protocols (Thite *et al.*, 2013).

Quantitative phytochemical Analysis

Quantitative photochemical screening done by spectrophotometer methods of ethanolic and aqueous extracts of *E. jambolana* to measure the total flavonoids,

total alkaloids, total carbohydrate, total steroid, total phenol, total tannins and total carotenoids with the help of standard protocols (Daniel *et al.*, 2017).

DPPH scavenging antioxidant assay

1 ml of ethanolic and water extract of each sample was taken and 1 ml of DPPH was pipette in all the samples very carefully. The reaction mixture was kept in dark for 24 h. After incubation period, absorbance was measured at 517nm. Standard curve was drawn by taking ascorbic acid as standard (Daniel *et al.*, 2017).

4. Result

Qualitative phytochemical analysis

To check the qualitative phytochemical analysis of *E. jambolana* leaves, stem and seeds having the solvent water and ethanol (Cingi *et al.*, 2019). Current study showed the presence of primary and secondary phytoconstituents in ethanol and water extracts of *E. jambolana*. Some of the active ingredients present in each plant part under different extraction methods were carbohydrate, saponins (Shahnawaz *et al.*, 2010).

Table 2: Qualitative phytochemical constituents of *Eugenia jambolana* leaves, stems and seeds extracts in the water and ethanol solvent system.

Phytochemical	Leaf in Water	Leaf in Ethanol	Stem in Water	Stem in Ethanol	Seeds in Water	Seeds in Ethanol
Alkaloids	+	-	-	-	-	-
Carbohydrate	-	-	+	+	+	+
Proteins	-	-	-	+	+	-
Tannins	+	+	-	+	+	+
Phenolic	-	+	-	+	+	+
Glycosides	-	+	+	+	+	+
Saponins	+	+	+	+	-	+

Quantitative phytochemical analysis

Current study exposed that ethanolic leave and seed extracts contain highest quantity of bioactive compounds as compared to water solvent (Kouitcheu *et al.*, 2011).

Table 3: These bioactive compounds have great medicinal importance as it attributed high anti-diabetic, anti-oxidant, anti-inflammatory, anti-microbial, anti-bacterial, anti-HIV, anti-fungal

Solvent extraction mg/g of dry extract	Phenols	Tannins	Alkaloids	Flavonoids	Carotenoids	Steroids
Leaf in Water	3.26	2.24	5.27	3.26	14.25	0.95
Leaf in Ethanol	54.26	62.27	31.24	66.25	2.24	3.04
Stem in Water	2.25	1.26	2.24	4.02	1.17	6.25
Stem in Ethanol	12.29	42.13	12.26	33.26	26.26	2.06
Seeds in Water	7.8	1.28	4.25	12.24	1.07	14.27
Seeds in Ethanol	4.5	23.24	70.23	5.26	4.26	2.09

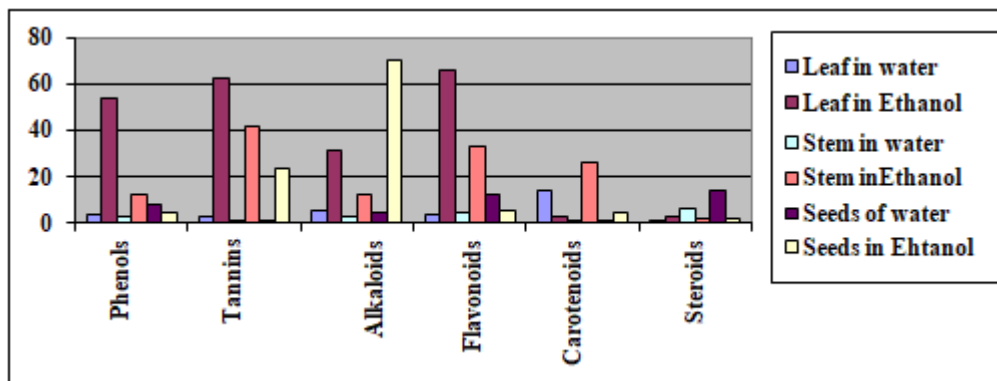


Figure 1: Quantitative phytochemical analysis

Antioxidant Activity

DPPH radical scavenging activity assay make know the significant antioxidant activity of *Eugenia jambolana* ethanolic seed and leaves extract than other extract than other extracts (Sharma *et al.*, 2015).

Table 4: DPPH free radical scavenging activity of *Eugenia jambolana* (%)

Plant Extract	%
Leaf Ethanol	70.27
Leaf Water	4.08
Seeds Ethanol	96.28
Seeds Water	1.24
Stem Ethanol	36.29
Stem Ethanol	8.26
Ascorbic Acid	98.84

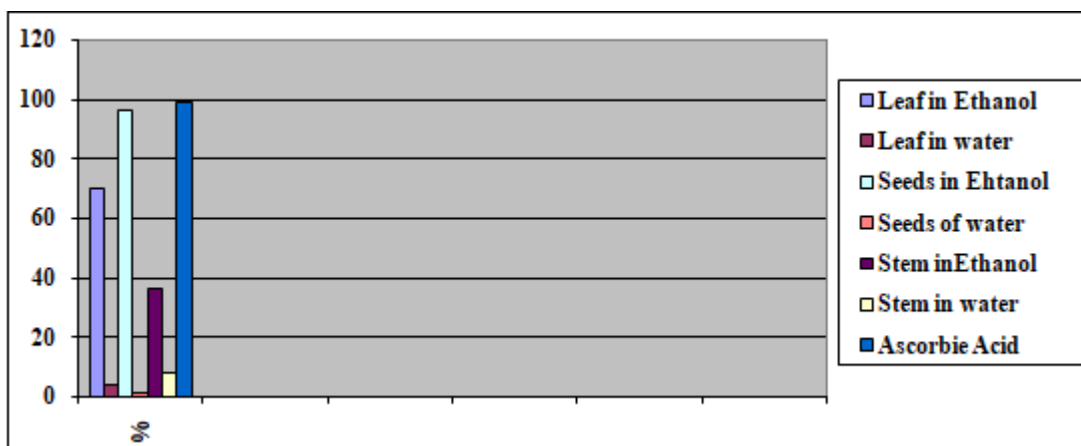


Figure 2: DPPH Scavenging activity of *Eugenia jambolana* and water solvent

5. Discussion

Qualitative analysis of phytochemical compounds of *Eugenia jambolana* in methanolic extract and reveals the presence of amino acid, alkaloids, glycosides, saponins, tannins, steroids. Some phytochemicals components are present in both solvent and others are present in water solvent system (Fitriansysh *et al.*, 2018). A higher content of both total phenolics and flavonoids were found in the methanolic extract compared with other extract (Daniel *et al.*, 2017). Our current study of spectrophotometric analysis to quantified phytochemicals revealed that phenolic, tannins, alkaloids, flavonoids, carotenoids and steroids present in high amount in ethanol extracts as comparison with extracts (Zahra *et al.*, 2019).

Antioxidant activity of all extracts of *Eugenia jambolana* were examined by using two methods, namely DPPH and FRAP. In both methods, the methanol extract exhibited a higher antioxidant activity than methylene chloride and essential oil extract (Zhang *et al.*, 2018). Our present results

demonstrate that ethanolic extracts contained maximum antioxidant activity than water extracts. The series of distribution of antioxidant activity was ethanolic seed extract>ethanolic leaves extract>ethanolic stem extract>water stem extract>water leaves extract>Water seed extract.

6. Conclusion

The purpose of present research work was to determine the phyto-constituents present in different parts of *Eugenia jambolana* qualitatively and quantitatively phytochemical screening, and to investigate the antioxidant activity *E. jambolana* leaves, seeds and stem in ethanolic extracts exhibits great amount of primary and secondary metabolites than the extracts of water solvent system. Quantification results of ethanolic and water extracts presented that it contains secondary metabolites while ethanolic leaves and seed contains maximum secondary phyto-constituents. Quantified result moreover demonstrated that some bioactive components are also extant in extract of *Eugenia*

jambolana in average amount but they were not identified by qualitative phytochemical screening. *Eugenia jambolana* shows noticeable antioxidant activity in ethanolic solvent system while ethanolic seed and leaves keeps high antioxidant activity because it contains rich amount of phytochemicals. It is clear that the traditional drugs i.e. Unani and ayurveda can play a significant role in controlled such types of diseases without producing any known side effects as exhibit while using the conventional medicines. Keeping in view of the said statement it is also suggested that to strengthen the claims of Unani physicians, various controlled randomized blind clinical trials of different parts of this drug (jamun) should be carried out on large sample sizes.

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