
Research Article

Estimation of Total Tannins, Total Phenolics and Total Flavonoids of Different Extracts of *Grewia Asiatica* Linn. Leaves and Fruits.

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Abstract

Air dried powdered material of the leaves and fruits of *Grewia asiatica* Linn. was successively extracted with petroleum ether, hexane, acetone, methanol and water extract by soxhlet extraction and subjected to various qualitative chemical tests to determine presence of various phytoconstituents like alkaloids, glycosides, carbohydrates, phenolics and tannins, phtosterols, fixed oils and fats, proteins, amino acids, flavonoids, saponins etc. Total flavonoids content was measured with the 'Aluminium Chloride Colorimetric Assay Method'. Total Phenolic content in the aqueous and methanol extracts of fruits of *Cedrela toona* Roxb. were determined using the Folin Denis Method and expressed as mg of tannic acid equivalents per gram dry weight of extract. This study helps researchers for development of isolation method of active ingredient having vast pharmacological effects.

Keywords: *Grewia asiatica*, total flavonoids, total tannins and phenolics, Tannic acid

Introduction:

Synonyms: *Grewia subinaequalis* DC.

Biological Source¹: Drug consists of dried whole plant of *Grewia asiatica* Linn. belonging to family Tiliaceae.

Part used: bark, fruits, leaves²



Vernacular names³

Sanskrit : Dharmana, Parusha

Bengali : Shakri, Phalsa

English : Phalsa

Gujrati : Phalsa

Hindi : Phalsa

Malayalam : Sataschi

Marathi : Daman, Damni, Karavarani

Tamil : Tadachit, Sadachi, Una, Tarra

Telugu : Phutiki, Charachi, Ettatada, Nulijana

Punjabi : Phalna, Pharua

Description^{2,3}

A shrub or small tree, young parts stellately pubescent.

- **Bark:** Rough and gray.
- **Leaves:** Leaves are 7-17/6-12 cm, ovate or suborbicular, acute or subacuminate or cuspidate, sharply and often coarsely doubly serrate, subglabrous above, hairy-tomentose beneath, rounded or only slightly cordate at the base 5-6-7 nerved; petioles 6-12 mm long, thickened at the top; stipules nearly as long as the petioles, linear, lanceolate.
- **Flower buds:** Flower-buds broadly cylindrical or clavate. Peduncles axillary, usually many, long, slender, far exceeding the petioles and often 3-4 times as long, sometimes 4 cm long.
- **Flowers:** Flowers large. Bracts beneath the pedicels lanceolate. Sepals about 10 cm. long, linear oblong, acute, stellately pubescent or tomentose. Petals yellow, oblong or ovate-oblong, jagged or entire, about 6 mm. long, not bifid, gland with a wide fleshy margin, pubescent towards the edges. Gonophore long. Stigma with 4 short, rounded lobes; style much thickened above.
- **Fruit:** Fruit red, globose, 6-8 mm. diameter; pyrenes 1-2, always 1- celled only.

Habitat: Drier woodlands and on most soils as well as drier vine thickets and coastal regions".

Materials And Method:^[4,5,6,7,8,9,10]

Collection Of Plant Material

Aerial parts of *Grewia asiatica* Linn. herbs growing in natural habitat in Rampura, Panchmahal, Gujarat, India, were collected in June, 2018.

Quantitative determination of successive extract of *G. Asiatica* linn. Leaf and fruit Determination of Total Flavonoid content:

Total Flavonoids of *G. asiatica* Linn. Leaf and Fruit extract were estimated according to Gordana Cetkovic⁹. Flavonoids from *G. asiatica* Linn. Leaf and Fruit extract (0.2 g) were extracted in 2 ml of extraction medium (70% [v/v] methanol, 5% [v/v] acetic acid and 25% [v/v] distilled water) at room temperature for 60 min. The resulting solution was filtered through Whatman paper No. 4 and filtrate volume adjusted to 10 ml. The probes were prepared by mixing: 5 ml of extract, 1 ml of distilled water and 2.5 ml of AlCl₃ solution (26.6 mg AlCl₃ · 6H₂O and 80 mg CH₃COONa dissolved in 20 ml distilled water). A blank probe was prepared by replacing AlCl₃ solution with distilled water. The absorbance of probes and blank probe were measured immediately at 430 nm. Total flavonoid content, expressed as mg rutin per g dry weight of *G. asiatica* Linn. Leaf and Fruit extract, were calculated from a calibration curve using rutin as standard.

Determination of Total Phenolic content⁹

Total phenolic in the *G. asiatica* Linn. Leaf and Fruit extract was determined using the Folin-Ciocalteu reagent. The reaction mixture was prepared by mixing 0.1 ml of methanolic solution (concentration 50mg/ml) of extract, 7.9 ml of distilled water, 0.5 ml of the Folin-Ciocalteu's reagent and 1.5 ml of 20% sodium carbonate. After 2h, the absorbance at 750 nm was obtained against blank that had been prepared in a similar manner, by replacing the extract with distilled water. The total phenolic content, expressed as mg gallic acid equivalents per g dry weight of *G. asiatica* Linn. Leaf and Fruit extract were determined using calibration curve of gallic acid standard.

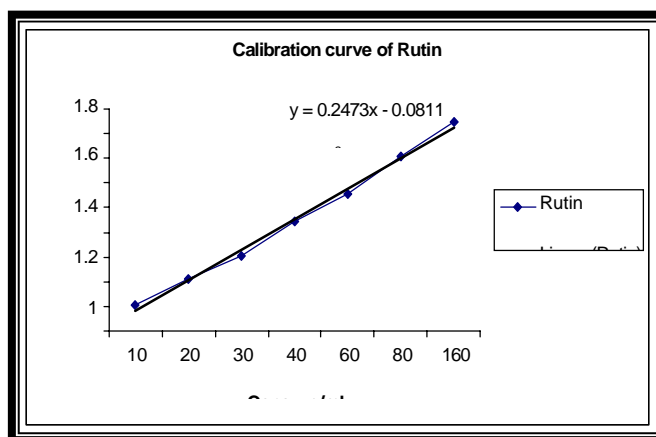
Determination of Total Tannin content^{10,11}

Take 1gm of *G. asiatica* Linn. Leaf and Fruit extract in 100ml of water, filter, transfer 10ml of filtrate to a conical flask of 1 liter capacity, add 750ml of water and 25ml of Indigo-sulphonic acid solution and titrate with constant stirring against N/10 KMnO₄ to a golden yellow colour. 1ml of N/10 KMnO₄ is equivalent to 0.004157 gm of tannin compounds calculated as tannic acid, run a blank test by titrating 25ml of Indigosulphonic acid in 750ml of water.

Result And Discussion:

Total flavonoids content

Rutin (µg/ml)	Absorbance
10	0.210
20	0.425
30	0.611
40	0.891
60	1.112
80	1.418
160	1.689



Calibration curve of Rutin was prepared by plotting concentration versus absorbances. It obeys linear relationship. ($Y = 0.2473X - 0.0811$ and $R^2 = 0.9951$) Total flavonoids content equivalent to Rutin in alcoholic and aqueous extract of GA leaf and fruit were determined according to Cetcovic G method using above equation.

Flavonoids content of alcoholic and aqueous extract of *G. asiatica* Linn. leaves and fruits

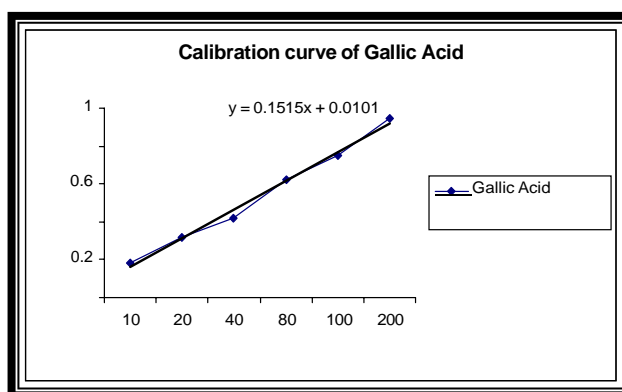
Sr. No.	Extract	Alcoholic extract (%w/w)	Aqueous extract (%w/w)
1	Leaf extract	18.96	14.63
2	Fruit extract	27.42	20.30

Result suggests that flavanoid content in leaf of *G. asiatica* Linn. was more in alcoholic extract (18.96%) as compared to their aqueous extract (14.63%) and in fruit was also more in alcoholic extract (27.42%) than that of aqueous extract (20.30%).

Total Phenolics content

Total phenolic content in alcoholic and aqueous extract of *G. asiatica* Linn. was determined using the Folin-Ciocalteu reagent and expressed as equivalents to mg gallic acid per gm dry weight of *G. asiatica* Linn. was determined using standard calibration curve of gallic acid.

Gallic acid µg/ml	Absorbance
100	0.185
200	0.315
400	0.422
800	0.625
1000	0.751
2000	0.943



Calibration curve of gallic acid was prepared by plotting concentration versus absorbances. It obeys linear relationship. ($Y = 0.1515X + 0.0101$ and $R^2 = 0.9919$). Total Phenolic content equivalent to Gallic acid in alcohol and aqueous extract of GA leaf and fruit were determined using above equation.

Phenolic content of alcoholic and aqueous extract of *G. asiatica* Linn. leaves and fruits

Sr. No.	Extract	Alcoholic extract (%w/w)	Aqueous extract (%w/w)
1	Leaf extract	9.23	12.08
2	Fruit extract	7.19	5.71

The results indicated that Phenolic content of *G. asiatica* Linn. leaf was more in aqueous extract (12.08%) than alcoholic extract (9.23%). Phenolic content of fruit was more in alcoholic extract (7.19%) than aqueous extract (5.71%).

Total tannins content

Total tannin content of *G. asiatica* Linn. leaf and fruit extract was determined by titrimetric method. Result indicated that *G. asiatica* Linn. Leaf extract contain 25.14% w/w of tannic acid and fruit extract contain 20.79% w/w of tannic acid.

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