SPECTROPHOTOMETRIC DETERMINATION OF TOTAL PHENOLIC CONTENT IN AMALAKI, ASHWAGANDHA, LAKSHMAN PHAL

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Abstract

Introduction: Amalaki, Ashwagandha and Lakshmanphal are the three common rejuvenating drugs which has been used treatment, due to its high phenols and antioxidant activity hence study conducted the analysis total phenols content in above samples.

Materials & Methods:
Aims & Objectives: Estimation of total phenolic content, Study setting: ACRL Laboratory SJGAMC&H Koppal.
Total phenolic content using UV Visible spectrophotometer the amounts of phenols were determined by Folin Ciocalteau reagent method, Gallic acid is used as standard and total phenols were expressed as mg/g equivalent to Gallic acid.

Results & Discussion: The value obtained for Amalaki is 275.57 mg of GA/g equivalent, Ashwagandha is 210.89 mg of GA/g equivalent, Lakshmanphal 73.05 mg of GA/g equivalent

Conclusion: Amalaki shown high total phenol content in all three samples, Ashwagandha, Lakshmanphal also rich source of phenols and justifies their use for health benefits.

Keywords: Amalaki, Ashwagandha, Lakshmanphal, Total phenols content.

Study and Article History: Sample Received at 12/08/2022 study conducted in ACRL, revised on 24/07/2022 & published in Avishkara Vol 1, Issue 4, Sept 2022

Graphical Abstract:
Introduction:
Amalaki, Ashwagandha and Lakshmanphal are the three common drugs which are used in Ayurveda for their versatile use. Amalaki (Emblica officinalis), also known as amla, is a potent rejuvenating herbal adaptogen, renowned for its impressive list of health benefits and all-encompassing support. The fruits of Amalaki are widely used in the Ayurvedic preparation and it increase defense against diseases. It has a beneficial role in degenerative diseases like cancer, diabetes, liver treatment, ulcer, anaemia, eye diseases, and heart trouble and also is an important constituent in hepatoprotective and rejuvenating formulas available. It is a highly nutritious fruit and is one of the richest sources of vitamin-C, amino acids and minerals. It contains several chemical constituents like tannins, alkaloids and phenols.

Ashwagandha (Withania somnifera) Solanaceae family, is a therapeutically important medicinal herb used in Ayurvedic and traditional systems of medicine for the treatment of an array of ailments. Diverse therapeutic properties reported from Ashwagandha are mainly due to the high content of polyphenols and antioxidant activities present in different parts of the plant. It has been reported that although all major parts of Ashwagandha such as the roots, fruits and leaves provide potential benefits for human health because of their high content of polyphenols and antioxidant activities but the roots are main part of the plant that are widely used as therapeutic agents.

Lakshmanphal (Annona muricata) is a member of the family of custard apple tree called Annonaceae and a species of the genus Annona known mostly for its edible fruits annona. Annona muricata produces fruits that are usually called 'sour sop' due to its slightly acidic taste when ripe. The fruit is juicy, acidic, whitish and aromatic with abundant seeds, the average weight of 1000 fresh seeds is 470g and has an average oil content of 24%. The creamy and delectable flesh of the fruit consist of 80% water, 1% protein, 18% carbohydrates and fair amount of vitamins B1, B2 and C, potassium and dietary fibre.

Lakshmanphal selectively hunts down and kills 12 different types of cancer cells, including breast, prostate, lung, colon and pancreatic cancer. All the three common ayurvedic drug are rich in phenols and their antioxidant activity hence study has conducted to assess the total phenols contents of all the three common ayurvedic plants Amalaki, Ashwagandha, Lakshmanphal.

Materials and Methods

Samples: All the three samples Amalaki, Ashwagandha, Lakshmanphal collected from Kapadguddha, Karnataka, India. And identified from taxonomist.

Instrument: Readings were recorded using UV-visible spectrophotometer.

Chemicals: Folin-Ciocalteu phenol reagent, Sodium carbonate, Gallic acid standard, methanol. All the chemicals used were of analytical grade.

Preparation of extracts Amalaki, Ashwagandha, Lakshmanphal: Samples were collected and washed in tap water and dried in room temperature and powdered, the coarse powdered was macerated by using methanol into 1mg/1ml ratio, later extract was filtered through whatman filter paper No 41. The extracts were stored in polythene containers and used for further analysis.

Detection of Phenols: Ferric chloride test: 1 ml of tea extract when mixed with few drops of 2% solution of ferric chloride, a blue green or black coloration obtained showing the presence of phenols.

Determination of total phenolic content in tea samples: The amount of phenol in the sample extracts was determined by Folin-
Ciocalteu phenol reagent method. 2.5 ml of 10% Folin-Ciocalteu phenol reagent and 2 ml of 7.5% of NaCO were added to the 2 ml of sample extract. The resulting mixture was incubated for 15 minutes at room temperature. The absorbance of the sample was measured at 765 nm spectrophotometrically. Gallic acid was used as standard compound (1mg/ml).

Concentrations of 100, 200, 300, 400 and 500 microliter, mg/ml of gallic acid were prepared in methanol. All the readings were recorded. The results were determined from the standard calibration curve of Gallic acid and total phenolic contents were expressed as Gallic acid equivalents (mg/g of GAE of extracted compound).³

<table>
<thead>
<tr>
<th>Gallic acid in microliter</th>
<th>Methanol in microliter</th>
<th>Concentration in</th>
<th>FC in ml</th>
<th>7.5% Sodium carbonate in ml</th>
<th>Absorbance at 760 nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>900</td>
<td>100</td>
<td>2.5</td>
<td>2</td>
<td>1.3326</td>
</tr>
<tr>
<td>200</td>
<td>800</td>
<td>200</td>
<td>2.5</td>
<td>2</td>
<td>1.6523</td>
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<tr>
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<td>700</td>
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<td>2.5</td>
<td>2</td>
<td>1.7523</td>
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<tr>
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<td>600</td>
<td>400</td>
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<td>500</td>
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<td>500</td>
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<td>600</td>
<td>2.5</td>
<td>2</td>
<td>2.2654</td>
</tr>
</tbody>
</table>

Table 1: Absorbance of standard compound Gallic acid.

![Image of absorbance readings](image)

Dig 1: Abs of Standarad Gallic Acid

<table>
<thead>
<tr>
<th>Sample</th>
<th>Absorbance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amalaki</td>
<td>1.7339</td>
</tr>
<tr>
<td>Ashwaganda</td>
<td>1.3491</td>
</tr>
<tr>
<td>Lakshman phal</td>
<td>1.611</td>
</tr>
</tbody>
</table>

Table 2: Absorbance of samples

**Results and Discussion:**

The amount of total phenolic content in the examined plant extract using Folin Ciocalteus reagent expressed in terms of Gallic acid equivalent (the standard curve equation \( y = mx + c \), \( y = 0.0019x + 1.2103 \) \( R^2 = 0.9694 \)), Gallic acid is used as standard compound for phenols. The value obtained for Amalaki is 275.57 mg
of GA/g equivalent, Ashwagandha is 210.89 mg of GA/g equivalent, Laksmanphal 73.05 mg of GA/g equivalent. The maximum phenol content was found in Amalaki. The results shown that all three samples were rich in phenol contain and it justifies their uses for human health benefits.

![Calibration Curve of Gallic acid](image)

**Fig 1:** Calibration curve of Gallic acid

<table>
<thead>
<tr>
<th>Sample</th>
<th>mg of GA/g of extract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amalaki</td>
<td>275.57</td>
</tr>
<tr>
<td>Ashwagandha</td>
<td>210.89</td>
</tr>
<tr>
<td>Laksmanphal</td>
<td>73.05</td>
</tr>
</tbody>
</table>

**Table 3:** total phenol contain of Samples

**Conclusion:**

Three common Ayurveda samples like Amalaki, Ashwagandha, Lakshmanphal were analyzed by spectrophotometric determination of total phenols using Folin Ciocalteu reagent method and Gallic acid as standard. The maximum phenol content were found in Amalaki (275.57), Ashwagandha (210.89), lakshmanphal (73.05) all the three samples found high phenols and justifies their use for human health benefits.

**Reference:**


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