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Original Article

Proximate Composition Screening of Leaves and Stem of *Delonix regia* Medicinal Plant

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ABSTRACT

Delonix regia is also known as a flame tree and belongs to the family leguminosae. This plant is well known for his medicinal properties like Anti-bacterial, Anti-diabetic activity, Anti-Inflammatory activity etc. Because of these medicinal properties this work was carried out to determine the proximate composition. Taking this in to consideration the proximate screening like moisture, cold water solubility, hot water solubility, 1% HCl and 1% NaOH solubility, ash, fat, crude fibre, and carbohydrate from the leaves and stem were carried out. The result shows that proximate composition in leaves and stem of *Delonix regia* could be a good source of carbohydrate and moisture.

Keywords: *Delonix regia*, proximate analysis, moisture, carbohydrate, medicinal properties

1. INTRODUCTION

Medicinal plants are of great importance to the health of individuals and communities [1-3]. The medicinal properties of several herbal plants have been documented in ancient Indian literature and the preparations have been found to be effective in the treatment of diseases [4]. *Delonix regia* have a wide application in medicinal field because of their Anti-bacterial, Anti-diabetic activity, Anti-Inflammatory properties against various bacteria's. Proximate contents like percentage of moisture, percentage of acid and alkali solubility plays an important role while the delivery of medicinal constituents to the body parts [5-6]. Also determination of some periodic elements from the ash of the

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selected plant is also considered as a important term. Considering all of these facts and uses the leaves and stem of *Delonix regia* considered for the proximate screening.

2. MATERIALS AND METHODS

Collection of plant material

Delonix regia selected from the warud tahsil of Amravati district Maharashtra state, India. The leaves of the plant were cut by using scissor. The collected leaves were washed with deionised water to removes dust and suspended particles and then sun dried for 48 hrs. The same procedure was carried out for the collection of stem. The dried leaves and stem were grind by using mixer machine and kept the sample for further analysis.

Procedure for conducting proximate analysis

1) Determination of moisture percentage

One gram of sample of leaves and stem taken in two different crucibles and kept in a oven for 48 Hrs at 120^{o}C then cool and weigh. The following formula is used for the calculation of percentage of moisture in leaves and stem.

$$Percentage\ of\ moisture = \frac{\text{weight of sample after drying in oven}}{\text{weight of sample taken}} \times 100 \quad \ldots(1)$$

2) Determination of acidic solubility

One gram of sample of leaves and stem taken in a two different round bottom flask to which 100 ml of freshly prepared 1% HCl solution were added and reflux for 2 Hrs at 100^{o}C then cool and filter. The residue obtained after filtration was kept in oven for drying at 120^{o}C and weigh. The following formula is used for the calculation of percentage of 1% HCl solubility in leaves and stem.

$$Percentage\ of\ 1\%\ HCl\ solubility = \frac{\text{weight of sample after drying in oven}}{\text{weight of sample taken}} \times 100 \quad ..(2)$$

3) Determination of alkaline solubility

One gram of sample of leaves and stem taken in a two different round bottom flask to which 100 ml of freshly prepared 1% NaOH solution were added and reflux for 2 Hrs at 100^{o}C then cool and filter. The residue obtained after filtration was kept in oven for drying at 120^{o}C and weigh. The following formula is used for the calculation of percentage of 1% HCl solubility in leaves and stem.

$$Percentage\ of\ 1\%NaOH\ solubility = \frac{\text{weight of sample after drying in oven}}{\text{weight of sample taken}} \times 100 \quad ..(3)$$

4) Determination of cold water solubility

One gram of sample of leaves and stem taken in a two different reagent bottles to which 100 ml of distilled water were added and kept in rotary shaker for 2 Hrs then filter. The residue obtained after filtration was kept in oven for drying at 120^{o}C and weigh. The following formula is used for the calculation of percentage of 1% HCl solubility in leaves and stem.

$$Percentage\ of\ cold\ water\ solubility = \frac{\text{weight of sample after drying in oven}}{\text{weight of sample taken}} \times 100 \quad ..(4)$$

5) Determination of hot water solubility

One gram of sample of leaves and stem taken in a two different round bottom flask to which 100 ml of distilled water were added and stir at 1000 rpm at 90^{o}C for 2 Hrs then filter. The residue obtained after filtration was kept in oven for drying at 120^{o}C and weigh. The following formula is used for the calculation of percentage of 1% HCl solubility in leaves and stem.

$$Percentage\ of\ hot\ water\ solubility = \frac{\text{weight of sample after drying in oven}}{\text{weight of sample taken}} \times 100 \quad ..(5)$$

6) Determination of organic matter content

Organic matter content in both leaves and stem powder samples was determined using Association of the Official Analytical Chemists methods [7]. First crucibles were dried at 100°C for 2 hours in an oven and placed in desiccators, cooled and recorded their weights. 1 g of sample was placed into the crucible. The samples were then placed in a furnace for 8 hours at 550 °C until all carbon was removed. Percentage of organic matter content was measured by the resulting inorganic residue in percentage as follows.

$$Percentage\ of\ hot\ water\ solubility = \frac{\text{weight of sample after drying in oven}}{\text{weight of sample taken}} \times 100 \quad ..(6)$$

7) Crude fiber

One gram of leaves and stem sample were digested with 100 ml of 0.1 m H_2SO_4 solution for 1 Hr then filter by using Whatmann filter paper number 41 on Buckner funnel and rinsed with hot water to remove acids. The obtained residue was boiled with 100 ml of 0.3 M KOH solution for 1 Hr and rinsed with boiled distilled water and methanol. The residue was dried in an oven at 120 °C for 48 hours and weigh then transfer in muffle furnace at 480 °C for 2 hours. The loss of weight represented the crude fiber. Percentage of organic matter content was measured by the resulting inorganic residue in percentage as follows.

$$Percentage\ of\ crude\ fiber = \frac{\text{weight of sample after drying in muffle furnase}}{\text{weight of sample taken}} \times 100 \quad ..(7)$$

3. RESULTS

Table 1: Percentage of moisture content

Sr. No.	Part Taken	Weight of sample before analysis	Weight of sample after analysis	Loss of weight of sample	% of moisture content
1	Leaves	1 gm	0.95 gm	0.5 gm	95%
2	Stem	1 gm	0.95 gm	0.5 gm	95%

Table 2: Percentage of acid solubility

Sr. No.	Part Taken	Weight of sample before analysis	Weight of sample after analysis	Loss of weight of sample	% of acid solubility
1	Leaves	1 gm	0.41 gm	0.59 gm	41%
2	Stem	1 gm	0.40 gm	0.60 gm	40%

Table 3: Percentage of alkaline solubility

Sr. No.	Part Taken	Weight of sample before analysis	Weight of sample after analysis	Loss of weight of sample	% of alkaline solubility
1	Leaves	1 gm	0.11 gm	0.89 gm	11%
2	Stem	1 gm	0.19 gm	0.81 gm	19%

Table 4: Percentage of cold water solubility

Sr. No.	Part Taken	Weight of sample before analysis	Weight of sample after analysis	Loss of weight of sample	% of cold water solubility
1	Leaves	1 gm	0.45 gm	0.55 gm	45%
2	Stem	1 gm	0.46 gm	0.54 gm	46%

Table 5: Percentage of hot water solubility

Sr. No.	Part Taken	Weight of sample before analysis	Weight of sample after analysis	Loss of weight of sample	% of hot water solubility
1	Leaves	1 gm	0.70 gm	0.30 gm	70%
2	Stem	1 gm	0.63 gm	0.37 gm	63%

Table 6: Percentage of organic matter content

Sr. No.	Part Taken	Weight of sample before analysis	Weight of sample after analysis	Loss of weight of sample	% of organic matter
1	Leaves	1 gm	0.32 gm	0.68 gm	32%
2	Stem	1 gm	0.19 gm	0.81 gm	19%

Table 7: Percentage of crude fiber

Sr. No.	Part Taken	Weight of sample before analysis	Weight of sample after analysis	Loss of weight of sample	% of crude fiber
1	Leaves	1 gm	0.17 gm	0.83 gm	17%
2	Stem	1 gm	0.26 gm	0.74 gm	26%

4. DISCUSSION

Moisture plays an important role in determining the absorption in organisms. The storability and plant quality depends upon the moisture contents in the plant parts. In this study the moisture content in leaves and stem of *Delonix regia* plant was found to be 95% and 95% respectively. Acid causes reactions that reduce or enhance nutrients ability to move and hence acid solubility parameter is important. The present study shows percentage of acid solubility of leaves and stem of *Delonix regia* plant was 41% and 40% respectively and alkaline solubility 11% and 19% respectively. Depending upon the nature of solute the solubility may be increases or decreases with temperature. Result shows that cold water solubility of leaves and stem of *Delonix regia* plant was 45% and 46% respectively and hot water solubility 70% and 63% respectively. Value of organic matter indicates the presence of mineral and elements. The result shows that high value of organic matter in leaves compared to stem. This indicates that stem is rich in mineral constituents than leaves. *Delonix regia* stem is rich in crude fat compared to leaves. Plant having high amount of fiber are used for the treatment of obesity, diabetes, cancer and gastrointestinal disorders prevent coronary heart disease, hypertension, constipation, diabetes. Result shows that crude fiber in leaves and stem of *Delonix regia* plant was 17% and 26% respectively.

5. CONCLUSION

The present study revealed that leaves and stem of *Delonix regia* shows effective nutritive values for human and animal nutrition. The result indicates that the leaves are nutritionally important as compared to stem. Since their consumption provides essential nutrients for human and animal body health development. Therefore the leaves could be recommended as a constituent of human diet in combinational with pharmaceutical potentials and health benefits to consumers.

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