Research Paper Ayurveda

Pharmacognostic Studies of Amalaki (Emblica officinalis Gaertn.)

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ABSTRACT

Amalaki or Indian goose berry is also known as King of all medicinal plants. It is most important drug in Indian traditional system, especially Ayurveda. It has occupied major place in Ayurvedic medicines. It is a small medium size tree. The leaves are feathery with small oblong pinnately arranged leaflets. The tree is characteristic greenish grey with smooth bark. Amalaki possesses the highest level of heat and storage stable vitamin C known to man. The study includes macroscopy, microscopy, preliminary phytochemical screening and physic-chemical evaluation.

INTRODUCTION:

Amalaki (fresh fruit pulp)[1]:

Amalaki consists of fresh fruit pulp of Emblica officinalis Gaertn. (Fam. Euphorbiaceae); a small or medium sized tree, found in mixed deciduous forests, ascending to 1300 m on hills and cultivated in gardens and home yards.

Description

a. Macroscopic:

Fruit, globose, 2.5-3.5 cm in diameter, fleshy, smooth with six prominant lines; greenish when tender, changing to light yellowish or pinkish colour when mature, with a Few dark specks: taste, sour and astringent followed by delicately sweet taste.

Image 1: Collection of Amalaki

b. Microscopic[2]:

Transverse section of mature fruit shows an epicarp consisting of single layer of epidermis and 2-4 layers of hypodermis; epidermal cell, tabular In shape, covered externally with a thick cuticle and appear in surface view as polygonal; hypodermal cells tangentially elongated, thick-walled, smaller in dimension than epidermal cells; mesocarp forms bulk of fruit, consisting of thin-walled parenchymatous cells with intercellular spaces, peripheral 6-9 layers smaller, ovoid or tangentially elongated while rest of cells larger in size, isodiametric and radially elongated; several collateral fibrovascular bundles scattered throughout mesocarp consisting of xylem and phloem; xylem composed of tracheal elements, fibre tracheids and xylem fibres; tracheal elements show reticulate scalariform and spiral thickenings; xylem fibres elongated with narrow lumen and pointed end; mesocarp contains large aggregates of numerous irregular silica crystals.

Image 2: Transverse section of fresh Amalaki fruit (Emblica officinalis Gaertn.)

Image 3: Microscopic view of Amalaki

Identity, purity and strength:
Foreign matter: Not more than 2 per cent.
Total Ash: Not more than 7 per cent.
Acid-insoluble ash: Not more than 2 per cent.
Alcohol-soluble extractive (On dried basis): Not less than 40 per cent.
Water-soluble extractive: Not less than 50 per cent.
Moisture content: Not less than 80 per cent.

Constituents: Ascorbic acid and tannins.
Dose: 10-20 g of the drug 5-10 ml of fresh juice

Amalaki (dried fruit)[3]:
AMALAKI consists of pericarp of dried mature fruits of Emblica officinalis Gaertn. Syn. Phyllanthus emblica Linn. (Fam. Euphorbiaceae); mostly collected in winter season after ripening and in Kashmir in summer, a small or medium sized tree, found both in natural state in mixed deciduous forests of the country ascending to 1300 m on hills; cultivated in gardens, homeyards or grown as a road side tree.

a) Macroscopic:
Drug consists of curled pieces of pericarp of dried fruit occuring either as separated single segment; 1-2 cm long or united as 3 or 4 segments; bulk colour grey to black, pieces showing, a broad, highly shrivelled and wrinkled external convex surface to somewhat concave, transversely wrinkled lateral surface, external surface shows a few whitish specks, occasionally some pieces show a portion of stony testa (which should be removed before processing); texture rough, cartilaginous, tough; taste, sour and astringent.

b) Microscopic:
Transverse section of fruit shows epicarp consisting of a single layered epidermis, cell appearing tabular and poygonal in surface view; cuticle present; mesocarp cells tangentially elongated parenchymatous and crushed, differentiated roughly into peripheral 8 or 9 layers of tangentially elongated smaller cells, rest consisting of mostly isodiametric larger cells with walls showing irregular thickenings; ramified vascular elements occasionally present; stone cells present either isolated or in small groups towards endocarp ; pitted vascular fibres, walls appearing serrated due to the pit canals, leading into lumen.

Powder: Fine powder shows epidermis with uniformly thickened straight walled, isodiametric parenchyma cells with irregular thickened walls, occasionally short fibres and tracheids.

Identity, purity and strength

Foreign matter (Including seed and seed coat): Not more than 3 per cent.

- Total Ash: Not more than 7 per cent.
- Acid-insoluble ash: Not more than 2 per cent.
- Alcohol-soluble extractive: Not less than 40 per cent.
- Water-soluble extractive: Not less than 50 per cent.

Constituents: Ascorbic acid and gallotannins
Dose: 3-6 g of the drug in powder form
Results of analysis of Amalaki:
Organoleptic characters of Amalaki:
Qualitative evaluation based on sensory profile by observation of color, odor, taste and Consistency was done. The results are tabulated below in Table no: 1

Table no 1: Represents the Organoleptic characters of Amalaki

Sr.No.	Parameters	Amalaki
1	Colour	Yellowish green
2	Odour	Aromatic
3	Taste	Sour followed by astringent
4	Consistency	Hard

Microbial limit test of Amalaki
Table no 2: Illustrates results of Microbial Results

Sr. No	Microbial limit test	Result
1	S. Aureus	Absent
2	P. Aeroginose	Absent
3	E. Coli	Absent
4	Salmonella Abony	Absent

Microbial Load Test:
Table no 3: Illustrates results of Microbial load test:

Description macroscopic	Limits (As per IP)	Results
Total bacterial count	30-300cfu/ml	106cfu/ml
Total fungal count	10-100cfu/ml	48cfu/ml

Physicochemical Properties of Amalaki
The standard protocols available for various procedures were adopted. The results obtained are tabulated below in Table no: 4

Table no 4: Illustrates the results of physicochemical analysis of Amalaki

Sr. No.	Parameters	Amalaki
1	pH at 5% aqueous solution	3.37
2	Loss on Drying at 110^0C (% w/w)	3.4%
3	Total Ash (% w/w)	5.33%
4	Acid Insoluble Ash (% w/w)	1.901%
5	Water Soluble Extractive (%w/w)	41.30%
6	Alcohol Soluble Ex tractive (%w/w)	15.5%
7	Powder microscopic	15-20 micro
8	Hardness test	6.9kg/m^2
9	Disintegration time	39mins

Qualitative Parameters of Amalaki
Test for Inorganic Components:
Prepared ash of the drug material was added with 50% of v/v HCl. The filtrate was then subjected to analyse the inorganic elements. The results are tabulated in Table no.5

Table No 5: Illustrates the inorganic components present in Amalaki

Sr. No.	Parameters	Amalaki
1	Carbonate	-
2	Calcium	-
3	Magnesium	-
4	Potassium	-
5	Iron	+
6	Sulphate	-
7	Chloride	-
8	Nitrate	-
9	Sodium	-

Preliminary Phytochemical Screening:
Aqueous and Alcoholic extracts of Amalaki were prepared with cold maceration technique. They were further subjected for qualitative phytochemical screening. The results are mentioned below in Table no: 6

Table no 6: Illustrates the results of phytochemicals in Amalaki aqueous and alcoholic extract

Sr. No 1.	Parameters		Amalaki	
			Aqueous	Alcoholic
2.	Carbohydrates	Molish	-	-
3.	Reducing Sugar	Benedicts	-	-
4.	Monosaccharides	Barfords	-	-
5.	Pentose	Bails	-	-
6.	Hexose	Selwinoffs	-	-
7.	Non-reducing sugar	Benedicts	+	+
8.	Polysaccharide	Iodine test	-	-
9.	Proteins	Millons test	-	-
10.	Amino Acids	Ninhydrin test	-	-
11.	Steroids		-	-
12.	Glycosides	Cardiac Glycosides	-	-
		Coumarin	-	-
		Anthraquinie	-	-
13.	Saponins		-	-
14.	Flavonoids		+	-
15.	Alkaloids	Dragandroff's	+	+
16.	Tannins & phenolic		+	-
17.	Test for vitamins Vitamin A Vitamin B Vitamin C		 - - +	 - - +
18.	Test for organic acid Oxalic acid Citric acid Tartaric acid		 - + -	 - + -

Fluorescence Analysis of Amalaki

The powder of the Amalaki was made and subjected to various reagents. It was then observed under normal light, 254nm and 366nm.The results are mentioned below in table no: 7

Table no 7: Illustrates the results of Fluorescence analysis of Amalaki

Sr. No.	Materials	Amalaki		
		DL	UV 254nm	UV 366nm
1	Powder As such	B	G	G
2	P + 1N. NaOH	B	BR	BR
3	P + Picric Acid	B	G	Y
4	P + Acetic Acid	BR	G	Y
5	P + 1N. HCL	BR	B	BR
6	P + 1N. HNO_3	B	G	Y
7	P + Iodine 5%	B	BR	B
8	P + 5% $FeCL_3$	B	B	B
9	P + 50% HNO_2	B	G	Y
10	P + Methanol	B	G	BR
11	P + Methanol + NaOH	B	G	BR

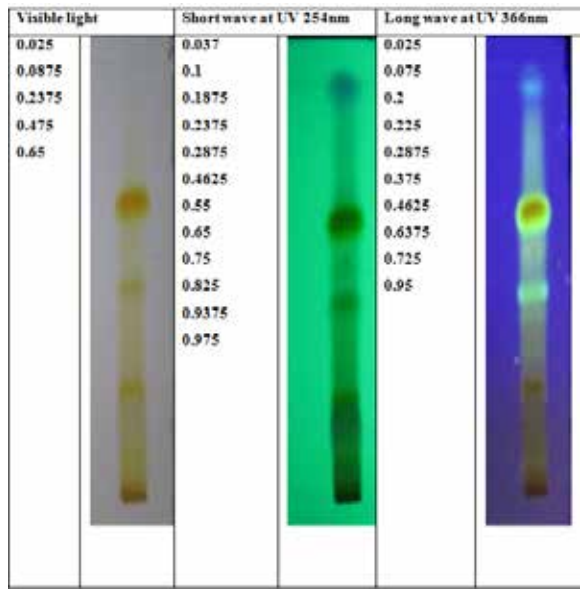
B: black BR : brown G: green Y: yellow

TLC – Profile of Amalaki

Table no 8: Illustrates Rf values of phytochemicals separated during TLC from alcoholic extract of Amalaki With solvent system Methanolic Extract: Ethyl Acetate : Toluene : Acetone (4.5:4.5:1)

Images of TLC of Amalaki:

TLC: Methanolic Ext. : Ethyl Acetate : Toulene: Acetone (4.5:4.5:1)



RESULT AND CONCLUSION:

The physico-chemical results i.e. ash value, acid insoluble ash, alcohol and water-soluble extractive values are within limits of Ayurvedic pharmacopoeia. The preliminary phyto-chemical screening of ethanol and water extract show the presence of alkaloids, flavonoids and traces of glycosides. In phytochemical analysis Vitamin C and Citric acid was present in the study.TLC possesses some common Rf values found in ethanol, extract sample which represents similar compounds in both extracts. Thus one part can be substituted in absence of the other. Here Rf values which are similar, matches with the peak areas denoted in the graph and spectrum also.

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