Some Physico–Chemical Properties of *Bassia longifolia* Seed Oil (Kanzaw)

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Abstract

Bassia longifolia seed oil is the rich source of protein and other essential acids. IT is easily available in Myanmar market as well as usable in various applications and so it is popular. In this research, the preliminary phytochemical screening of *Bassia longifolia* seed was examined to find out the chemical constituents. The quantitative analysis of extracted seeds oil is done by the determination of moisture, acid value, iodine value and saponification value by IUPAC (International Union of Apply Chemistry) method respectively.

Key words: *Bassia longifolia,* acid value, saponification value, iodine value.

Introduction

Natural plants are an effective source of traditional and modern medicines. They are really useful for primary healthcare. The medicinal plants produce a wide range of bioactive molecules and rich source of medicinal properties. The secondary metabolites are important components responsible for the main medicinal qualities in the crude drugs. *Bassia longifolia* belongs to the family sapotaceae. *Bassia longifolia* are commonly known as mahua or madhua *longifolia*. *Bassia longifolia* is a medium to large sized deciduous tree distributed in northern, central and southern part of peninsular India, Sri Lanka, Myanmar and Nepal (Trees India, 2016). *B.longifolia* is a multipurpose tree mainly cultivated its edible flowers and extraction of oil from seeds. The other common names of *B.longifolia* are honey tree, Bassia, butter– nut tree, illpe nut, Indian butter tree, mahua indica nut. *Bassia longifolia* seeds are economically important as they are good source of edible fats and oil. Seeds are used as laxative in habitual constipation and piles, gummy juice is used for rheumatism and skin affection, seeds oil applied directly treatment in skin diseases. It has been used to treat infections wounds, heart disease, diabetes and many other disorders. The seed fat has emuluscent property, headache, and sometimes as galactogogue (Journal of Food Science, May, 2016). Preliminary phyochemical screening of the plants is primarily an important aspect in finding the chemical constituents in plant material. Therefore, the present investigation is carried out to find out the phyochemical components present in the seeds powder and characterization of *Bassia longifolia* seeds oil.

Botanical Description

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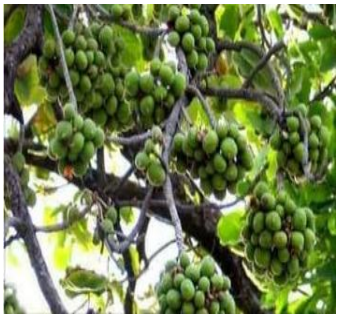
A


B


C


D

Figure 1. A. Habit of *Bassia longifolia* L.
B. Fruit of *Bassia longifolia* L.
C. Seeds of *Bassia longifolia* L.
D. *Bassia longifolia* seeds oil

Family – Sapotaceae
Botanical name – *Bassia longifolia* L.
Common name – Mahua ,Madhuca *longifolia*
English name – Honey tree, Butter tree
Myanmar name – Kanzaw

Materials and Methods

Materials

The seeds powder and oil of *Bassia longifolia* was purchased from Myanmar Tradition Medicine Shop, Zaycho Market, Mandalay, Myanmar. All reagents used in this study were of analytical grades with high purity. The seeds powder was extracted successively with ethanol (95%), water and HCl respectively. Extract were obtained and used for further phytochemical analysis.

Methodology

Freshly prepared extracts were subjected to phytochemical evaluation for the detection of various phytochemical constituents using conventional protocol (Harbone, 1992). Using standard titration procedure the oil was analyzed for acid value, iodine value, saponification value. The results obtained were recorded.

Test for alkaloid

Crude extract was mixed with 2mL of 1% HCl and heated gently. Mayer's and Wager's reagents were then added to the mixture. Precipitate was not observed. It indicated that the absent of alkaloid.

Test for Saponins

Extract 2 mL was mixed with 8 ml of distilled water, shaken vigorously. Formation of foam was taken as an indication for the presence of saponins.

Test for Tannins

A small amount of extract was treated with lead acetate and observed for the formation of greenish blue color which shows presence of tannins.

Test for polyphenols

Crude extract was mixed with 2mL of 1% $FeCl_3$. A blue green coloration indicated the presence of polyphenols.

Test for Steroid

Crude extract was mixed with 2mL of chloroform and concentrated H_2SO_4 was added sidewise. A red color produced in the lower chloroform layer indicated the presence of steroid.

Test for Carbohydrates

Crude extract when mixed with 2mL of Bebedict's reagent and boiled, a pale brown precipitate formed which indicate the presence of carbohydrate.

Test for Flavonoid

Aqueous extracts1ml was treated with 3 pieces of magnesium turning and a few drops of concentrated HCl. The formation of pink color indicated the positive test for flavonoids.

Test for lipophilic

Aqueous extracts 1ml was tested with 0.5N KOH and 4 drops of NaOH solution. The deep color solution was observed. It indicated the presence of lipophilic in the sample.

Test for Glycoside

Aqueous extracts 1ml was tested with 10% lead acetate solution. The cream color precipitate was appeared. It indicated the presence of glycoside.

Test for Terpene

Pet–ether extract sample was treated with acetic anhydride. Then a few drops of chloroform was added and mixed gently. After the addition of a concentrated sulphuric acid and being heated gently for about 30 minutes, red purple colored was observed.

Quantitative determination of *Bassia longifolia* seeds oil

Determination of Moisture content of *Bassia longifolia* seeds oil

Moisture in a weighed sample is removed by heating in an oven. The weight loss is calculated as moisture. Moisture content was determined by using A.O.C.S Ca–2c.25 method.

Calculation: Moisture % = $\frac{W1 \times 100}{W}$

Where,

W1 = loss in gm of the material on drying

W = Weight in gm of the material taken for test

Determination of acid value

Acid value is determined by directly titration the oil/ fat in an alcoholic medium against standard potassium hydroxide/ sodium hydroxide solution. Acid value was determined by using I.U.P.A.C.2.201method. Calculations are as follows:

Acid value (AV) = $\frac{56.1VN}{W}$

Where,

V = Volume in ml of standard potassium hydroxide or sodium hydroxide used

N = Normality of potassium hydroxide solution or sodium hydroxide solution

W = weight in gm of the sample

Determination of iodine value

The oil/ fat sample taken in carbon–tetrachloride is treated with a known excess of iodine monochloride solution in glacial acetic (Wijs solution). The excess of iodine monochloride is treated with potassium iodide and the librated iodine estimated by titration with sodium thiosulfate solution. Iodine value was determined as I.U.P.A.C.2.205 method. Calculations are as follows:

Iodine value (I V) = $\frac{12.69(B-S)N}{W}$

Where, W = weight in gm of the sample

B= volume in ml of standard sodium thiosulpahte solution required for the blank

S = Normality of the standard sodium thiosulpahte solution

Determination of saponification value

The oil sample is saponified by refluxing with a known excess of alcoholic potassium hydroxide solution. The alkali required for saponification is determined by titration of the excess potassium hydroxide with standard hydrochloric acid. Saponification value was determined by using I.U.P.A.C.2.202 method.

Calculation: saponification value = $\frac{(B-S)\times 28.05}{W}$

Where, W = weight in gm of the oil/fat taken for the test

B = volume in mL of standard hydrochloric acid required for blank

S = volume in mL of standard hydrochloric acid required for sample

Determination of Rancidity

It is a physico–chemical change in the natural properties of the fat leading to the development of unpleasant odor or taste or abnormal color particularly on aging after exposure to atmospheric oxygen, light, moisture, bacteria or fungal contamination and /or heat. Saturated fats resist rancidity more than unsaturated fats that have unsaturated double bonds. Rancidity is determined by Kerist method.

Qualitative determination of *Bassia longifolia* seeds oil

The following tests were performed to confirm the presence of unsaturated fatty acid and other active compound in the oil sample.

Meyer's Reaction (R.M.C. Dawson *et al*, 1974)

The sample was made soluble in ethanol and then heated the sample for 3 min. To that 20% HNO_3 was added. The orange solution was observed.

Test for Oleic acid: (Indian pharmacopoeia(A–O), 1996)

The 1mL of *Bassia longifolia* seeds oil and 1mL of ethanol (95%) was mixed, then to that 0.1 ml of methyl orange solution was added. The red coloration was observed in the test tube.

Results and Discussion

The phytochemical analysis of *Bassia longifolia* seeds were done by Harbone method which gave rise to polyphenol, steroid, terpene, lipophilic, glycoside, saponin, tannin, phenolic, flavonoid and carbohydrate. The phytochemical compounds determined are known to have importance in medicinal sciences. Saponins possess hypocholester olemic and antidiabetic properties (Rupasinghe *et al*., 2003). Saponins also proved the inhibitory effect on inflamed cells (just *et al*., 1998). The terpenoids have also been exhibited to decrease blood sugar level (Liu, 2003). The scientific evidence of phytochemical constituents of *Bassia longifolia* support the Myanmar traditional medicine uses for the treatment of various diseases as anticancer, antidiabete and many skin diseases.

Acid value, iodine value, saponification value and moisture content are shown in table (2). The presence of α, β, γ tocophenol or β– tocotriethanol was confirmed since red coloration was observed in the test tube after heating by Meyer reaction.

Oleic acid tested result shows that the solution turns orange on addition of methyl orange solution. Test confirms the presence of oleic acid in the *Bassia longifolia* seeds oil.

Table (1) Results of Phytochemical Test for *Bassia longifolia* seeds

No	Test	Reagent Used	Observation	Inference
1.	Alkaloid	(i) Wagner's (ii) Dragendroff's	brown pale orange ppt	– –
2.	Flavonoid	Conc: HCl + Mg	reddish pink	+
3.	Phenolic	10 % $FeCl_3$	purplish color	+
4.	Terpene	Acetic anhydride $CHCl_3$, Con:H_2SO_4	red purple	+
5.	Steroid	$(CH_3CO)_2O$, con: H_2SO_4	blueish blue	+
6.	Glycoside	10% lead acetate	yellow ppt	+
7.	Polyphenol	1% $FeCl_3$ + 1 % $K_3Fe(CN)_6$	blue green	+
8.	Saponin	Conc:H_2SO_4	froth	+
9.	Lipophilic	0.5 M KOH	deep colour	+
10	Carbohydrate	Benedict's solution	Red coloration	+
11	Tanin	lead acetate	blue green	+

(+) = presence (–) = absence

The results in table (1) show that the alkaloid compound is absent in seeds of *B.longifolia*.

Table 2. Characterization of *Bassia longifolia* seeds oil

Experiment	Parameters	Results	Methods
1	Moisture & Volatile Matter	0.52 %	A.O.C.O.Ca–2c 25
2	Acid value	19.37	I.U.P.A.C 2.201
3	Iodine value	48.02	I.U.P.A.C 2.205
4	Saponification value	259.33	I.U.P.A.C 2.202
5	Rancidity	negative	Kerist

The results in table (2) indicate that the moisture content was found to be a little high. The acid value and saponification value were also found to be high, due to the more amount of saponify compounds. But, the value of iodine was found to be 48.02 in low content by comparing of literature value (53–60). However, it was found to be within the prescribe range. Therefore, *B.longifolia* seeds oil complies as the standard norms. So, the oil of *B.longifolia* seeds may be used for edible and treatment in many diseases. Oils and fats can be rancid due to contamination, prolonged use or long time storage (Oxford Biomedical Research, 2010). So, measuring the rancidity of oil is the best indicator of oil quality and may be used but not continuously.

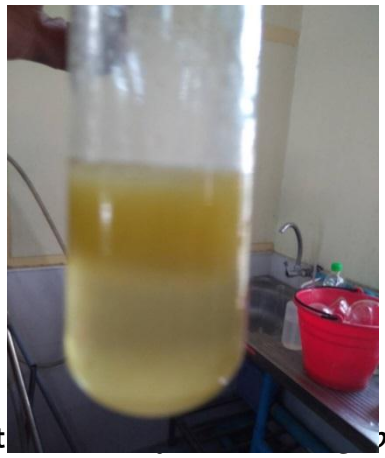


Figure 2. Test *olia* seeds oil

Conclusion

The phytochemical analysis of *Bassia longifolia* seeds was done by Harbone method which gave rise to flavonoid, phenolic compound, terpene, steroid, glycoside, polyphenol, saponin, lipophilic, carbohydrate and tannin. It was found that the alkaloid is absent in this sample. Commercial *Bassia longifolia* seeds oil was analyzed for its moisture content, acid value, saponification value, iodine value and physic–change in the natural properties of the fat. Among them, the acid values and saponification value were found to be high. But, the value of iodine was found to be 48.02. Its value was less than the literature value of iodine (53–60). However, it was found in the permissible range. Therefore, *B. longifolia* seeds oil complies as a standard norms and further biological study is required to investigate their potential therapeutic activities.

Acknowledgements

We would like to express our profound gratitude to Dr Si Si Khin (Prorector, Yadanabon University), Dr Tint Moe Thu Zar (Prorector, Yadanabon University), and Dr Hlaing Hlaing Myat, (Professor and Head of Chemistry Department, Yadanabon University), Dr Htay Haty Win (Professor, Chemistry Department, Yadanabon University) for their suggestion and permission. We also convey special gratitude to Ethical Research Committee and members of Yadanabon University.

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