

Determination of total flavonoids in various developmental stages of an ethno medicinal plant *Caesalpinia bonducella* (L.) Roxb.

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Abstract :

Caesalpinia bonducella (L.) Roxb. is a perennial prickly climber belonging to the family Caesalpniaceae. The present study deals with the preliminary phytochemical analysis and determination of total flavonoid content in various developmental stages of *Caesalpinia bonducella* by Aluminum chloride colorimetric method .The total flavonoid content of seedlings of 30 ,60,90 and 120 days and the entire shoot of plant before flowering ,at flowering and after flowering were found to be 2.6µg, 0.9 µg, 0.3 µg,0.2 µg ,0.4 µg,0.6 µg and 1.6 µg respectively. This study reveals the suitable developmental stages to be used for the extraction of flavonoids which imparts many pharmacological activities of the plant.

Key words : *Caesalpinia bonducella* (L.) Roxb., flavanoids, developmental stages.

Introduction :

Plants and human beings are interrelated to each other for centuries. It provides us food , fodder, shelter, ornaments and medicine [1-3]. Traditional knowledge of medicine is passed on to generations after generations orally [4]. Ancient days biology was concerned with only taxonomy and morphology but recently studies are focused on the specific bioactive constituent which imparts specific therapeutic property to the plant [5-7]. The cost, side effects and unavailability of modern drugs made herbal medicines more popular in undeveloped and developing countries[9-10].India is blessed with unmatched biodiversity, which includes rare medicinal and aromatic plants. *Caesalpinia bonducella* (L.) Roxb. is one of the most important critically endangered medicinal plant indigenous to our country.

Caesalpinia bonducella (L.) Roxb is distributed all over the world specially in Benin[11], Brazil,Philippines [12],Africa ,India ,West Indies, Andaman and Nicobar Islands and Sri Lanka [13]. This plant is reported as endangered in Malasia [15,16] and threatened in the deciduous forest of western Ghats of India [17]. *C.bonducella* is used in all systems of medicines like Ayurveda, Unani, Siddha and Homeopathy [18].The phytoconstituents of the plant are used to synthesize drugs to cure dreadful diseases which includes proteins, alkaloids, phytosterols, phenolic compounds, tannins and flavonoids. The plant consists of antioxidants which are useful to treat

cancer and liver ailments [19]. It is reported to have antidiuretic, anthelmintic, antipyretic, anti anaphylactic and anti diarrheal activities. Hence the present study is carried out to find the total amount of flavonoids in various developmental stages of the plant which will help us to know the proper developmental stages which are to be used for the extraction of flavonoid. Hence prevent the over exploitation of the plant.

Methodology:

C. bonducella found in Mulla river bank of Manjri was collected authenticated in BSI ,Pune. (BSI/WRC/Cert./ 2015). The collected materials were shade dried ,pulverized and preserved in air tight containers. The seedlings of 30 ,60,90 and 120 days and the entire shoot of plant before flowering ,at flowering and after flowering were used for the experiment. All chemicals used for the phytochemical analysis were obtained from Merk. The extraction was carried out with ethanol through cold maceration. The extract was centrifuged and supernatant obtained was used to perform quantitative tests .Preliminary phytochemical analysis was carried out using the extract using standard reagents and procedures [20].

The amount of flavonoids in the extract was determined using Aluminum chloride colorimetric method. The extract was dissolved in ethanol (1mg/ml) and mixed with 0.1 ml of 1M potassium acetate ,1.5 ml of methanol ,0.1 ml of 10% Aluminum chloride and 2.8 ml of distilled water. This was maintained in room temperature for 30 minutes. The absorbance was measured at 415 nm. Standard quercitin was prepared and a calibration curve for the standard was obtained by taking 0.2, 0.4 ,0.6 ,0.8 1,1.2 ml in ethanol. A plot of absorbance versus concentration was plotted and the total flavonoid contents were calculated as quercitin equivalent.

Results and conclusion:

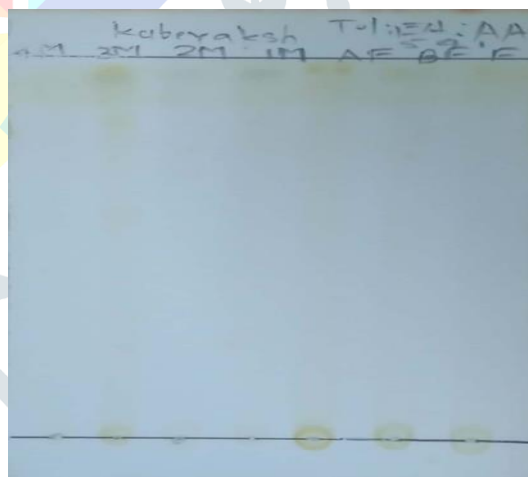
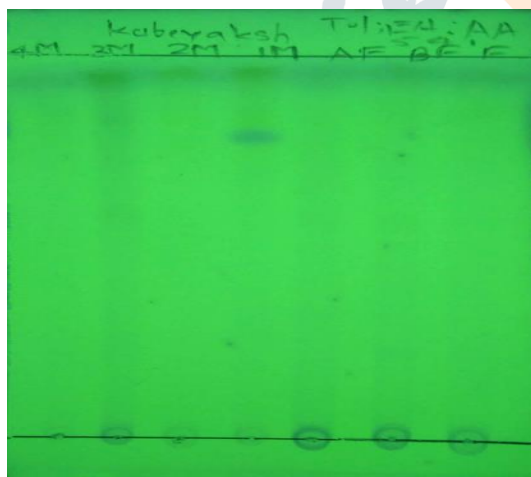
The preliminary phytochemical analysis showed the presence of sterols, tri terpenes, alkaloids, carbohydrates, tannins and flavonoids (table -1). The total flavonoid content of seedlings of 30 ,60, 90 and 120 days and the entire shoot of plant before flowering ,at flowering and after flowering were found to be 2.6 μ g, 0.9 μ g, 0.3 μ g,0.2 μ g ,0.4 μ g,0.6 μ g and 1.6 μ g respectively. The seedling of 30 days old and the shoot after flowering produced highest amount of flavonoids compared to other developmental stages.Flavanoids reported to show various activities like antidiabetic,antioxidant, antimicrobial, anti inflammatory etc. Hence the quantification of flavonoid in various developmental stages of *Caesalpinia bonducella* (L) Roxb. is significant as it provide information of the exact developmental stages of the plant to be used for the extraction of maximum amount of flavonoid.

Table – 1: Data showing the preliminary phytochemical analysis of different developmental stages of *Caesalpinia bonducella*(L)Roxb.

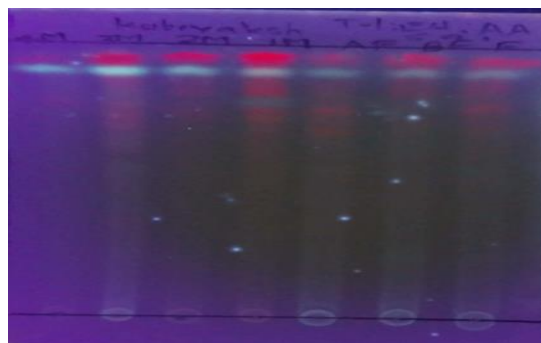
Sr. No.	Constituents	BF	AF	F	1M	2M	3M	4M
1	Sterols	+	+	+	-	-	-	-
2	Tri terpenes	+	-	-	-	+	-	-
3	Saponins	-	-		-	-	-	-
4	Alkaloids	+	+	+	+	+	+	+
5	Carbohydrates	+	+	+	+	+	-	
6	Tanins & Phenols	-	+	+	-	+	+	-
7	Flavonoids	+	+	+	+	+	+	+
8	Aminoacids/ Proteins	-	-	-	-	-	-	
9	Resins	-	-	-	-	-	-	
10	Starch	-	-	-	-	-	-	-
11	Gums & Mucilages	-	-	-	-	-	-	-

UV Light 254 nm

Visible Light



UV Light 365 nm



The result obtained from present study showed that one month old seedling and the whole plant after flowering should be used to procure maximum amount of flavonoids. If we prefer one month old seedling for the extraction of flavonoids as it yields highest amount of flavonoids among the two developmental stages it will reduce the devastation of *C.bonducella* habitat for supporting pharmaceutical industry.

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