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EXTRACTION OF NATURAL PRODUCTS FROM FLOWERS OF *SPATHODEA CAMPANULATA* PLANT BY MACERATION TECHNIQUE

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ABSTRACT:
The extraction of the bio-molecules is very important as far as the pharmaceutical, agrochemical and cosmetic industries are considered. It is the process for the separation of natural products from various parts of the plans. The extraction process depends on the constituent occurring in the plant. Thus, for qualitative and quantitative estimation of natural products (phytochemicals) present in the plant material, the extraction and isolation is the first and essential step. There are different methods of extraction. Among them Maceration is efficient method.It is widely accepted and low cost method to obtain natural products from the plants. It is proper for thermo-labile constituents of the plants. In this process, the powdered material is taken into stoppage container and mixed with suitable solvent. It is kept at room temperature for proper time with intermittent shaking till the constituents dissolve in the solvent. Simple Maceration, Multiple Maceration and Vacuum Maceration are the three types of maceration processes. Simple maceration involves mixing of material with specific solvent and shaking/stirring at room temperature.In multiple maceration process, the menstrum is repeatedly extracted for maximum extraction of the constituents or natural products. The vacuum maceration process involves application of vacuum for effective separation. The maceration is easy, energy saving and non-complicated process. It does not require presence of skilled person. This method is suitable for inexpensive and low potent drugs. It is slow, time consuming process and needs more amount of solvent.It is ornamental tree, the flowers bloom with great profusion, and at that time the tree can be seen from great distances. The flowers are tulip-shaped up to 10 cm (4 in) long. They are wide, commonly red-orange or flame-coloured though a yellow flowering variety. They bloom on and off throughout the year with peaks in the dry and winter season in seasonally dry areas and in large clusters of up to twelve. Mostly above the crown, they create a striking visual display. The plant has many medicinal uses. Taking into consideration, researchers performed extraction of natural products from flowers of *Spathodeacampanulata*

Keywords:- *Spathodeacampanulata*, extraction, maceration, phytochemicals, Microwave Assisted Extraction, menstrum, natural products, marc.

INTRODUCTION :

Spathodea is a genus in the plant familyBignoniaceae. Spathodeacampanulata, commonly called African tulip tree is a large, fast-growing tree. It is native of tropical African forests where it typically grows to as much as 80' tall. It is an evergreen or semi-deciduous tree with a dense, bushy, oval crown. It is a flame of the forest with a spectacular flowering tree. This tree is planted extensively as an ornamental tree throughout the tropics and is much appreciated for its very showy reddish-orange or crimson (rarely yellow), campanulataflowers. It is ornamental tree, the flowers bloom with great profusion, and at that time the tree can be seen from great distances. The tree is harvested for food, medicines and various commodities that are used locally. The flowers are tulip-shaped up to 10 cm (4 in) long. They are wide, commonly red-orange or flame-colored though a yellow flowering variety. They bloom on and off throughout the year with peaks in the dry and winter season in seasonally dry areas and in large clusters of up to twelve. Mostly above the crown, they create a striking visual display.

The plant has many medicinal uses. Extracts of the bark, leaves and flowers are used to treat malaria, HIV, diabetes mellitus, oedema, dysentery, constipation, gastrointestinal disorders, ulcers, skin diseases, wounds, fever,

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urethral inflammation, liver complaints and as a poison antidote.

The dye is extracted by immersing the petals in an alkaline sodium hydroxide solution at 85°C (185 °F) for one hour. This produces a dye with fair to good colour fastness. However, it is improved by adding a mordant or color-fixing substance. The tree produces creamy-brown, lightweight heartwood averaging around 250 kg per cubic meter (15 lbs per cubic ft). It has a low natural resistance to rot and decay, making it non-durable softwood. Although not widely used, the sawn timber is reportedly suitable for making boxes, crates, and cement forms. The round wood can be pulped for making particleboard.

The plant organs such as seed, root, stem, bark, leaves, flower, fruit, and seed contain active natural products. These active natural products include alkaloids, glycosides, tannins, resins, steroids, oils, phenols, and flavonoids. Extraction is a technique which is used for separation of the chemical components from the various parts/organs of the plant. The chemical component is dissolved into specifically selected solvent or mixture of solvents called as menstrum. The other un-dissolved material is known as marc. Extraction is essential for obtaining remedial portion of dosage form from the plant raw material. The bioactive component is obtained in its pure form i. e. it must be free from unwanted inert content. The extraction is performed to determine qualitative composition of the contents and to find each component quantitatively. The bioavailability and pharmacological activities of the components extracted is also determined. Drying, grinding, screening, selection of solvent and extraction are the steps in the process. The efficiency of the extraction process depends on various factors such as Nature of the solvent, Particle size, Temperature, P^H, Solvent-solute ratio, and Time of Extraction. There are different methods of extraction. These methods include Percolation, Infusion, Maceration, Soxhlet Extraction, Supercritical Fluid Extraction (SCFE), Counter Current Extraction (CCE), Ultrasonic Assisted Extraction (UAE) and Microwave Assisted Extraction (MAE). Among these methods researchers have selected the effective maceration method for extraction of natural products from Flowers of *Spathodeacampanulata.*

MATERIALS AND METHODS

For this research study, Fresh flowers of *S. campanulata* were collected from Jogger's park-Althino and Campbell garden, Panaji in the month of October November, 2020. Collected fresh flowers were cleaned properly and they were dried at room temperature without use of sunlight. Herbarium was prepared and it was authenticated by the experts in the Department of Botany, Dhempe College of Arts and Science, Miramar, Punjim, Goa. After complete drying, they were subjected to grinding to convert into powder form. Then the material in powdered form was screened with the help of sieves having mesh number of 44, 30, 18, and 10. Powder from each sieve was isolated from one another and was stored in the well labelled dry plastic container. Then 10 g of sample was added into iodine flask of 250 cm^3 capacity. This was mixed with methanol solvent as per solvent/solute ratio (ml/g) i.e. 50 cm^3 (I), 100 cm^3 (II), and250 cm^3 (III). The flask was shaken for every 10 minutes. Time of extraction was scheduled for 30, 60 and 120 minutes, later, extract was filtered and marc was pressed. It was kept for drying at room temperature. Then whole extract was scrapped off and stored in pre-weighed glass vials.

RESULTS AND DISCUSSION :

In this method, at 30 minutes schedule, SC/MAC/C/III/3Ohas shown maximum percentage yield that is 11.11 %w/w and SC/MAC/B/I/30 has shown minimum percentage yield of 2.89% w/w. At 60 minutes, SC/MAC/C/III/60 has shown highest percentage yield of 14.81 % w/w and

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SC/MAC/B/I/60 has shown minimum yield of 3.42 %w/w. At 120 minutes, SC/MAC/C/III/120 has shown highest percentage yield of 17.22 % w/w while 17.22 has shown 3.76 % w/w. Thus from the results, it is found that, for effective extraction, the time should be 60 minute duration for extraction with methanol solvent.

CONCLUSION

Thus, for effective extraction of natural products FROM Fresh flowers of *S. campanulata*, this Maceration Technique is effective and can be used safely.

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Batch No.	Batch Code	Particle Size	Solvent /solute ratio	Extraction Time	Yield (Grams)	Percentage Yield
1	SC/MAC/A/I/30	44	5:1	30	0.3420	3.42
2	SC/MAC/B/I/30	30	5:1	30	0.2897	2.89
3	SC/MAC/C/I/30	18	5:1	30	0.2789	2.78
4	SC/MAC/D/I/30	10	5:1	30	0.4620	4.62
5	SC/MAC/A/II/30	44	10:1	30	0.5012	5.01
6	SC/MAC/B/II/30	30	10:1	30	0.6497	6.49
7	SC/MAC/C/II/30	18	10:1	30	0.6310	6.31
8	SC/MAC/D/II/30	10	10:1	30	0.8410	8.41
9	SC/MAC/A/III/30	44	25:1	30	1.0498	10.49
10	SC/MAC/B/III/30	30	25:1	30	1.2342	12.34
11	SC/MAC/C/III/30	18	25:1	30	1.4112	14.11
12	SC/MAC/D/III/30	10	25:1	30	1.1110	11.11
13	SC/MAC/A/I/60	44	5:1	60	0.3489	3.89
14	SC/MAC/B/I/60	30	5:1	60	0.3422	3.42
15	SC/MAC/C/I/60	18	5:1	60	0.6812	6.81
16	SC/MAC/D/I/60	10	5:1	60	0.6900	6.90
17	SC/MAC/A/II/60	44	10:1	60	0.7612	7.61
18	SC/MAC/B/II/60	30	10:1	60	0.7862	7.86
19	SC/MAC/C/II/60	18	10:1	60	1.0897	10.89
20	SC/MAC/D/II/60	10	10:1	60	1.1298	11.29
21	SC/MAC/A/III/60	44	25:1	60	1.1800	1.80
22	SC/MAC/B/III/60	30	25:1	60	1.2512	12.51
23	SC/MAC/C/III/60	18	25:1	60	1.4810	14.81
24	SC/MAC/D/III/60	10	25:1	60	1.1897	11.89
25	SC/MAC/A/I/120	44	5:1	120	0.3412	3.41
26	SC/MAC/B/I/120	30	5:1	120	0.3762	3.76
27	SC/MAC/C/I/120	18	5:1	120	0.8412	8.41
28	SC/MAC/D/I/120	10	5:1	120	0.9012	9.01
29	SC/MAC/A/II/120	44	10:1	120	0.9810	9,81
30	SC/MAC/B/II/120	30	10:1	120	1.0793	10.79
31	SC/MAC/C/II/120	18	10:1	120	1.3789	13.78
32	SC/MAC/D/II/120	10	10:1	120	1.2210	12,21
33	SC/MAC/A/III/120	44	25:1	120	1.2190	12.19
34	SC/MAC/B/III/120	30	25:1	120	1.3698	13.69
35	SC/MAC/C/III/120	18	25:1	120	1.7220	17.22
36	SC/MAC/D/III/120	10	25:1	120	1.3521	13.52

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