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Optimization and quantification of solvent, volume and time for extraction of aryl naphthalene lignan from *Cleistanthus collinus*

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Abstract
Cleistanthus collinus is a poisonous plant as they required special treatment for their safety measure for collection and preservation by herbarium specimen. Aryl naphthalene has numerous physiological activities and it is present in plant. The present investigations focus for solid-liquid extraction of plant which extract derivative of lignan by soxhlet extractor method. Optimization of types of solvents with respect to polarity alcoholic extract and defated petroleum ether has effective solvent. Quantification of solvent volume for extracting compounds from plant (1gm per 15 ml). Determination of effective time for respective solvent for extraction.

Keywords: *Cleistanthus collinus*, Aryl Naphthalene, solid-liquid extraction, optimization and quantification of solvent volume

1. Introduction
Cleistanthus collinus is toxic and highly poisonous plant whose leaves have been used for homicidal or suicidal purposes. Since the toxic effects include muscle cramps and weakness, the effect of the leaf extract on the electrical and mechanical responses to nerve and muscle stimulation [1]. To prepare a herbarium specimen of plant in carefully precaution and authenticate by Department of botany RTM Nagpur University, Nagpur (Ref. No. 10057) [2] see in fig. no. 1. Leaching of compounds from plant is an older process so on behalf of that we use soxhlet assembly for extraction. Its alcoholic extract has been reported there is a significant amount of aryl naphthalene lingans such as diphyllin, collinusin and many other related compounds present in the plant C. collinus. On defated condition we use solvent like petrolium ether for extraction. Cleistanthin A and B produce DNA strand breaks in vitro studies by reducing the viability of the cells. These cleistanthins have been accounted for to have anticancer property in vitro and in vivo and may have the plausible to lead mixes to treat malignancy [3, 5]. Hence, the present investigations focus is planned to identify the number of compounds present in plant optimization for the proper extraction of aryl naphthalene and quantification of solvent volume nodal segments as explants. The study also determines the appropriate Time for the extraction from plant at constant temperature conditions and *in vitro* conversion under aseptic conditions [6, 7].

Fig 1: Herbarium specimen of Leaves of *Cleistanthus collinus* authenticate by RTM Nagpur University

2. Experimental

2.1 Material and Methods

Cleistanthus collinus plant leaves were collected from region of Maharashtra, India. The selected region was a field of a small town named isapur, post- pipla (D.B.) which is situated near koradi in Nagpur district, vidarbha (Maharashtra), India on 15 March 2017 in morning at 8.00 AM and author authenticated from Department of Botany, Rastrasant Tuukadoji Maharaj Nagpur University Nagpur (MH), India where a voucher specimen is 10057 preserved.

2.2 Methods

Extraction of compounds by using sox let extraction method. Solvent used with respective polarity, and their optimization.

2.3 Extraction

2.3.1. Preparation Sample Solution

The plant leaves of Cleistanthus collinus were taken for extraction of aryl naphthalene compounds. The shade dried sample was converted into a finely powdered form by crushing, grinding at room temperature.

2.3.2 Soxhlet Extraction of Leaves powder of C. Collinus:

2.3.2.1Preparation of dried powder from leaves of C. collinus

Every time take 50 gm powdered sample of leaves of c. collinus was then stuffed appropriately in the thimble and rushed into soxhlet apparatus and extraction was carried out according to optimized condition different solvent was methanol (15 ml) and extraction carried out for 1 to 15 hours. After the extraction, the extra solvent was distilled off. The concentrated extract was dried naturally and was collected in amber shaded glass bottle. The methanolic extract was obtained 16.32 gms.

2.3.2.2 Optimization of extraction conditions:

The extraction of a drug involves the isolation of a solid by physical or chemical means. Normally when this operation is performed with solvents for extracting the plant material, which is one of the most common practices, it is called as the solid-liquid extraction. Earlier, it was the practitioner only who used to collect the plant, process it and prepare the extraction from plant. Optimization of solvents like water, methanol, ethanol, chloroform, dichloromethane, mixture of methanol and dichloromethane ethyl acetate acetone, toluene and dry ether. Quantification of volume of solvent for extraction from 5 to 30 ml. Determination of time from 1 to 15 hours. It is necessary to standardize extraction conditions for leaf extract of plant.

3. Result and discussion

3.1 Optimization of extractive values for various solvents

In the extraction process, the ratio of the concentration of the substances extracted and that remain back is always constant. So, we should know the value of this constant before deciding the time of extraction needed to extract the leaf of plant material. In the present research work, the details of the various solvent, volume required and time of extraction were optimized. The solvents used were water, methanol, ethanol, dichloromethane, mixture of methanol and dichloromethane, chloroform, ethyl acetate, toluene, pet. Ether.

Table 1: Optimization of extractive values for various solvents

S. No.	Solvent	% Extraction
1	Water	8.0
2	Methanol	23.5
3	Ethanol	17.7
4	Chloroform	12.4
5	Dicholoromethane	14.9
6	Mixture of Methanol and Dicholoromethane	18.5
7	Ethyl acetate	13.4
8	Acetone	7.2
9	Toluene	14.1
10	Pet. Ether	19.7

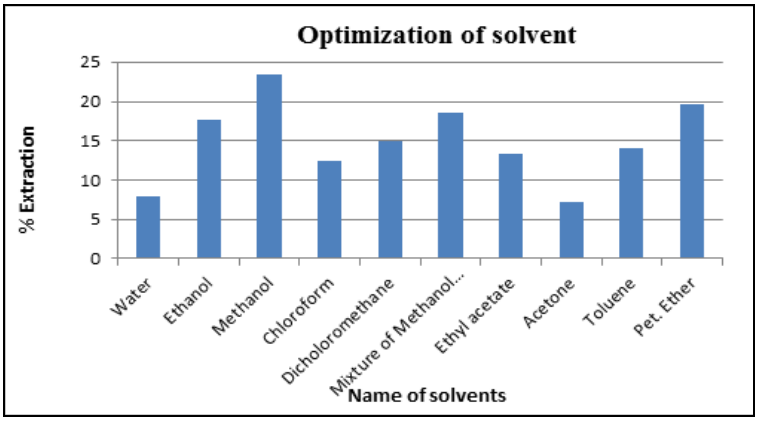

Fig 2: Optimization of extractive values for various solvents

3.2 Optimization of solvent volume

Optimization for the volume of solvent for the extraction was carried out in the following manner. The weight of the sample (1 gm) and the contact time of one hour as a function of the volume of the solvent was kept fixed. The volume was initially kept at 10 ml and an increment of 5ml was done in subsequent experiments. The volume was varied a constant weight of extract was obtained which is shown in table No. 2

Table 2: Optimization of solvent volume for extraction of *Cleistanthus collinus*

S.N.	Weight of leaves (gm)	Volume of solvent (ml)	% Extraction
1	1	5	13.23
2	1	10	20.12
3	1	15	24.30
4	1	20	24.73
5	1	25	24.91

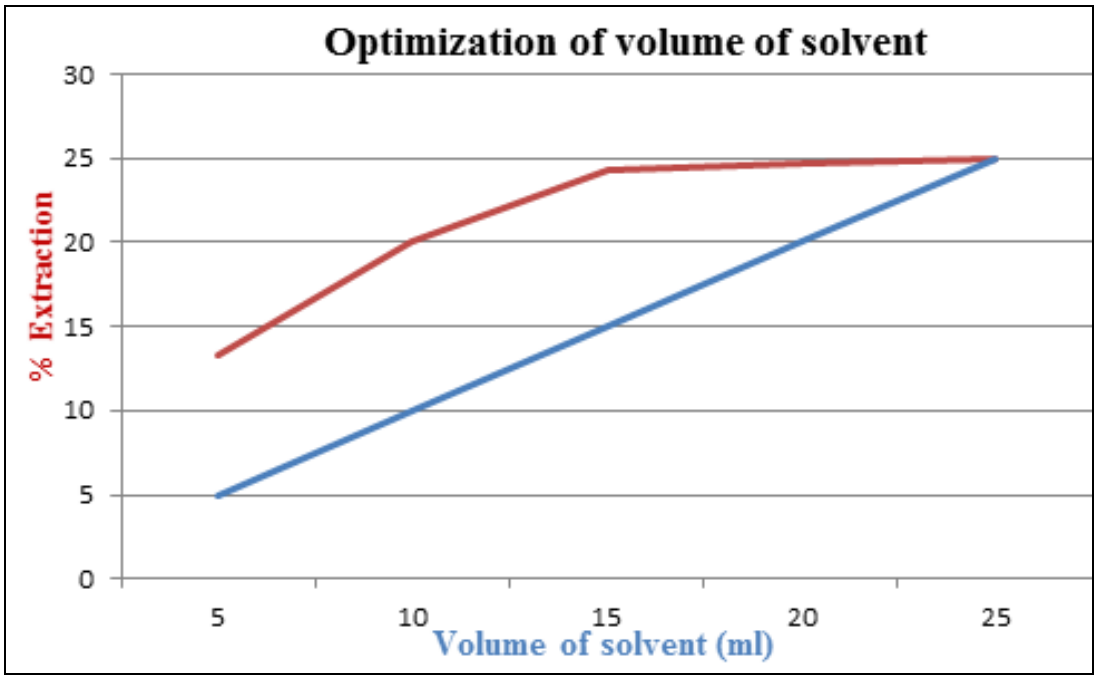

Fig 3: Optimization of solvent volume for extraction of *Cleistanthus collinus*

3.3 Determination of effective time for extraction:

The optimized volume and the weight of the powder 1.0 gm was fixed and extraction was carried as a function of equilibrium time i.e. 1,2,3,4,5,6,,8,10,12,15 hours. The time at which there was no further extraction was selected as the optimized time**.**

Table 3: Determination of effective time for extraction of *Cleistanthus collinus*

Obs. No.	Weight of leaves (gm)	Time (Hrs.)	% Extraction
1	1	1	12.23
2	1	2	17.36
3	1	3	20.76
4	1	4	22.34
5	1	5	23.81
6	**1**	**6**	**24.01**
7	1	8	24.34
8	1	10	24.73
9	1	12	24.81
10	1	15	24.93

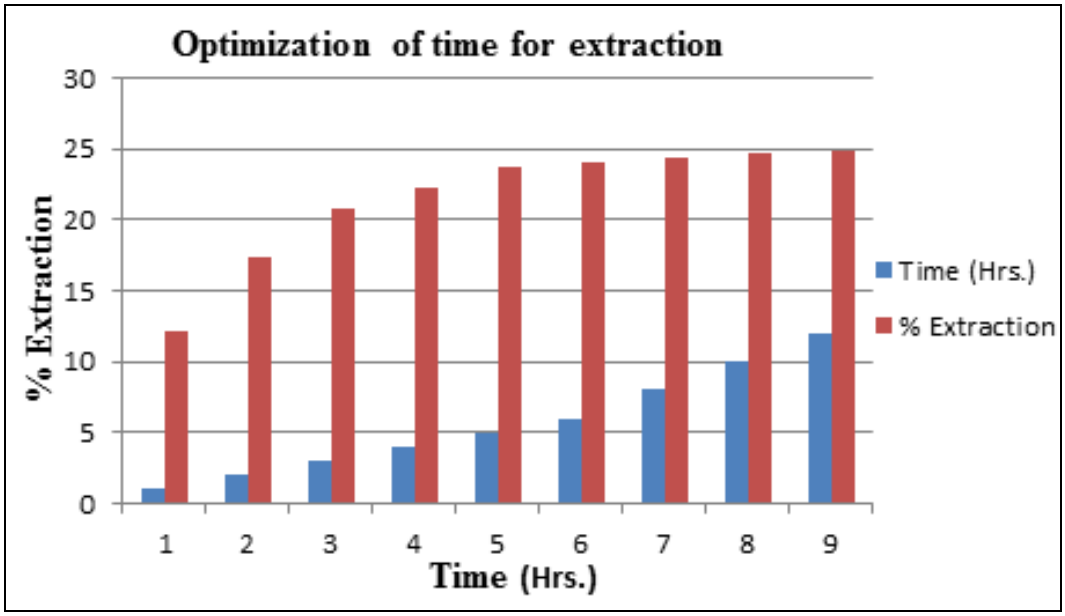

Fig 4: Determination of effective time for extraction of *Cleistanthus collinus*

4. Conclusion

Extraction of aryl naphthalene compounds is successfully extracted from leaves *Cleistanthus collinus* plant. In optimization of various solvent for extraction compounds, in which methanol extract shows 23.5 % and pet. Ether shows 19.7 %. Quantification of solvent volume is an effective at 15 ml. Determination of effective time for extraction is 6 hours.

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6. References

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