



## **Study on Yield of Plant Extracts Using Different Solvents and Methods**

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### **ABSTRACT**

*Present study was aimed at investigating the effect of different solvents and different extraction methods on the yield of plant extracts. Selection of a suitable extraction technique is also important for the standardization of herbal finish as it is utilized in the removal of desirable soluble constituents, leaving out those not required with the aid of the accurate solvents. Further, selection of suitable extraction process and optimization of various parameters are critical for upscaling purposes i.e. from bench scale to pilot plant level. Various extraction techniques most commonly used include conventional techniques such as maceration, percolation, infusion, decoction, hot continuous extraction etc. In present study four plant sources namely curry, jamun, litchi leaves and by product of catechu (also known as black cutch) was taken plant extracts were extracted. Effect of methanol and ethanol solvents were seen on the percentage yield of the extract using two extraction technique namely, maceration and hot extraction.*

*Key words: extraction, curry leaves, jamun leaves, litchi leaves, black cutch soxlet, maceration,*

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### **INTRODUCTION**

Extraction involves the separation of medicinally active portions of plant from the inactive or inert components by using selective solvents in standard extraction procedures. The products which are obtained from plants are relatively impure liquids, semisolids or powders intended only for oral or external use. The extract thus obtained may be ready for use as a medicinal agent in the form of tinctures and fluid extracts. [2]. Maceration and Soxhlet extraction are commonly used methods for small research setting or at small manufacturing enterprise (SME) level. At present time many significant advancement have been made in the extraction methods; such as microwave-assisted (MAE), ultrasound-assisted extraction (UAE) and supercritical fluid extraction (SFE) [1]. With the advancement of science, the process of extraction developed into a distinct area and contributes significantly to the development of phytochemistry. In general, however, the first step of phytochemical analysis is extraction, a method to separate the compounds that are being studied from the mixture of solid bodies or liquids by a suitable solvent. In Latin the word *extraho* means to draw out. A good extraction procedure should bring all the group of materials we are looking for into solution and causes little or no change in the nature of compounds and easy for further analysis.

### **MATERIALS AND METHODS**

Fresh plant leaves of jamun, curry, litchi and black cutch a byproduct of catechu. Methanol (100%) and ethanol (100%) were used for extracting the extract from plant source.

#### **Methods**

##### **Preparation of Extract**

The collected plant material was thoroughly washed under tap water, rinsed in distilled water; shade dried and was ground in powder form by using an electric grinder.

##### **Methods of extraction [3]**

**Hot method of extraction-** Extraction was done using soxlet apparatus. Methanol (100%) and ethanol (100%) were used as solvent for the extraction.

Hot extract was prepared by using soxhlet extraction process. About 20 g powder was extracted with 200 ml of solvent (methanol and ethanol) at 40°C for 24 hours. The solvent containing active constituents was transferred to rota vapour to evaporate the solvent and to get solid extract. The extract was kept in deep freeze at -4°C, to be used for further study.

**Cold method of extraction-** Methanol (100%) and ethanol (100%) were used for cold extraction. Cold extract was prepared by taking the 20 g powder in 200 ml of solvent (methanol and ethanol) and kept at room temperature for 72 hours. Stirring of solution was done after each 4 to 5 hour.

After that solution was filtered using whatman filter paper. Finally filtrate was transferred to rota vapour to evaporate the solvent and to get solid extract. The extract was kept in refrigerator at -4°C, to be used for further study.

Yield of the extract was calculated in grams and converted into percentage. Data on yield of extracts were subjected to the statistical analysis using two factor randomized block design.

## RESULTS AND DISCUSSION

Extracts of jamun, curry, litichi leaves and catechu (by product) were prepared using methanol and ethanol solvents. Two different extraction methods namely hot extraction and cold extraction methods were employed for extraction.



**Fig.1 Processed plant parts**

**Table 1: Yield of extracts**

S.No.	Solvent	Method of extraction	Yield of extracts							
			Jamun		Curry		Litchi		Black cutch	
			g	%	g	%	G	%	G	%
1.	Methanol	Hot extraction	5.5	22.50	2.50	12.50	3.44	17.20	9.50	47.50
2.	Methanol	Cold extraction	1.85	9.25	2.00	10.00	1.86	9.30	6.30	31.50
3.	Ethanol	Hot extraction	4.00	20.00	2.20	11.00	2.18	10.90	4.00	20.00
4.	Ethanol	Cold extraction	1.15	5.75	1.55	7.55	1.48	7.44	4.10	20.50

**Table 2: Two factor randomized block design**

Factors	CD (1%)	CD (5%)	SEM
I Factor (leaf extracts)	0.756	0.56	0.1954
II Factor (solvent )	0.756	0.56	0.1954
Interaction ( Factor I x Factor II)	1.51	1.51	0.390

Yield of jamun leaf extract was found to be the highest (22.50) in methanol solvent with hot extraction method, followed by ethanol solvent using hot extraction method (20.00). Difference between these two was significant. When cold method of extraction was used 9.25% and 5.75% yield was obtained for methanol and ethanol solvent respectively.

In case of curry leaf extract 12.50% yield was obtained using soxlet extraction with methanol solvent 11% yield was observed with the use of ethanol solvent using soxlet extraction method. The difference in the value of the extracts was found to be at par. It is clear from the table that curry leaves extracts had 10% yields while using methanol solvent in hot extraction method. Ethanol solvent with cold extraction method had shown lowest (7.55%) extract yield and difference was found to be significant among all the values of the percentage yield of the curry leaves extract.

Hot extraction method with methanol solvent has shown maximum yield that is 17.20% for litchi leaf extract. This was followed by hot extraction method using ethanol solvent and the recorded value was 10.90% which was significantly lower than the former. Cold extraction method with methanol solvent gave 9.30% yield whereas 7.44% yield was observed for ethanol solvent. All the values have significant difference.

Recorded yield of black cutch extract was 47.5% with soxlet extraction using methanol solvent this was followed by cold extraction method using methanol solvent (31.5%). No significant difference was noticed in the hot and cold extraction method using ethanol solvent and recorded values were 20.00% and 20.50%.

## CONCLUSION

Results of the study revealed that black cutch powder hot extraction method with methanol solvent fetched maximum extraction followed by cold extraction method with methanol solvent. Yield of *jamun* leaves extracts was recorded lowest in ethanol solvent using cold extraction method. Choices of solvent and extraction method play important roles on maximizing extract yield. From the above results it can be concluded that methanol was better medium than ethanol for extraction. Hot extraction method was found more suitable than the cold method of extraction. Among all plant sources yield of extraction was maximum for black cutch powder.

## REFERENCES

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