Comparative Study of Different Surfactant For Extraction of Alkaloids from Solanum *xanthocarpum* Leaves.

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Abstract : Thousands of different alkaloids have been discovered from throughout the plant kingdom .Solanum *xanthocarpum* is one of them .It contains alkaloids like solasodine ,solanine ,salamargine and solanine which were extracted by using surfactants like SDS and EDTA with sonocation. EDTA is sufacting agent was more useful than SDS.Highest yield of alkaloids obtained at 2.5 hrs when 0.3%(m/v) EDTA surfactant used at room temperature.

Key Word:, **Alkaloids, sonication, *Solanum xanthocarpum* surfactant, Mayer reagent**

1.INTRODUCTION

Solanum xanthocarpum plant belongs the solanaceae family .It is widely distributed over the large area of Maharashtra. It is a prickly herb, spreading or diffused perennial, woody at base. The young branches are densely covered with minute star-shaped hairs. The branches zigzag, spread close to the ground are covered with yellow, sharp, shining prickles, about 1.5 cm long. The leaves are up to 10 cm in length, their midribs and other nerves with sharp yellow prickles. As the herb is a stimulant to the heart and is a blood purifier, it is extremely beneficial in the treatment of cardiac diseases

associated with edema. It is useful in the diseases like bronchial asthma, cough. The whole plant is used for medicinal purpose. Externally, the instillation of vyaghritaila into nostrils is effective in chronic sinusitis. Nasal administration of *Solanum xanthocarpum* is beneficial in migraine, asthma and headache. The dried fruits are smoked in the form of cigarette and the smoke held up in the mouth cavity for some time ameliorates the dental infections. The fumigation of *Solanum xanthocarpum* is helpful in piles. The paste applied on swollen and painful joints in arthritis, reduces the pain and swelling effectively. The fruit is useful as an aphrodisiac in males and the seeds, in women for irregular menstruation and dysmenorrheal. Solanum xanthocarpum is the key material for production of cortisone and sex hormone. so growing interest in secondary metabolites of plants has directed attention to methods for alkaloids extraction. Natural products are extracted by conventional methods such as Soxhlet and room temperature solvent extraction[1-7] or by ultrasound [8-14] microwaves[15-18] supercritical[19-30] solvents or other methods[31-34.] A new method[35]was developed to extract alkaloids ,which were among the most important groups of secondary metabolites. The proposed method was combining ultrasound with surfactants, where properties of wetting, dispersion, solubilisation and emulsification[36-37] were reduced the solvent. In this paper the alkaloids were extracted by using surfactant agent like SDS and EDTA variable concentration with sonication.The time factor and concentration of surfactant affected on the yield of alkaloids.Alkaoids such as solasodine solamargine ,solanine and solacarpine were obtained by using SDS and EDTA.[38]

2.Material and Method

2.1Chemicals:

Mercuric Chloride, Silica gel , Cerric Sulphate from Loba Chemicals (Mumbai), Potassium Permagnate was used from Paul laboratory. Ethanol– A.R. 99.9%, Sodium nitrate, β-Naphthol,

Iodine crystals, Picric acid, Phenol, Sulphuric acid were obtained locally. All solvents and chemicals are analytically pure grade from S.D.Fine Chemicals. Glass distilled water used throughout the study.

2.2 Plant material-

Solanum xanthocarpum was collected from Ambernath in April 2007. Aerial part (leaves) of the plants was air dried in the shade for several days at room temperature .Ground and stored in glass jar to protect it from humidity and light.. The colour of the powder was green. It was observed that there was no seasonal change in colour of powder. In present study the extraction of alkaloids from Solanum xanthocarpum leaves were carried out by using SDS and EDTA surfactants..Extraction of alkaloids was done by using Mayer's reagent.

Extraction of alklaoids with SDS

i) Effect of various concentration of SDS on alkaloids:

Various concentration of of SDS ranging from 0.1 to 0.3 %(m/v) with 5gm of powder of solanum *xanthcarpum* leaves followed by Mayers reagent[16] was used for the extraction .The total alkaloids are same as compared to concentration of SDS increases. It was 0.6 gm as compare to control.0.1%(m/v) of SDS was selected for time and wave factor.

ii) Effect of sonication with varying time on extraction of alkaloids:

A concentration of 0.1%(m/v) of SDS kept constant for extraction of alkaloids from Solanum *xathocarpum* leaves with varying time 0 to 150 min. with the sonication. It is shown in figure no.1.The same experiment was carried out without sonication as a control.

Extraction of alklaoids with EDTA

EDTA surfactant act as chelating agent.it binds to metal via four carboxylates and two amine groups.

i) Effect of various concentration of EDTA on alkaloids:

Various concentrations of EDTA ranging from 0.1 to 0.3% (m/v) with 5g dry powder of *Solanum xanthocarpum* leaves followed mayer reagent was used for the extraction of alkaloid. The same experiment was carried out without addition of EDTA as control.The TLC analysis and UV of sample was carried out.

ii)Effect of sonication with varying time on extraction of alkaloids:

0.3 % (m/v) of EDTA kept constant for extraction of *Solanum xanthocarpum* leaves alkaloids. The above reaction mixture was kept for sonication from zero min to 120 min.It is shown in figure no.2. The same experiment was carried out with 0.3% (m/v) of EDTA at varying time without sonication as a control.

iii) Effect of varying time on extraction of alkaloids (without sonication):

The same above experiment was carried out with 0.1% (m/v) of SDS at varying time without sonication**.**

Extraction of alkaloids was carried out by without sonication . Total alkaloids are increase up to 120 min. Its concentration of it falls down after 150min. and onward hrs.

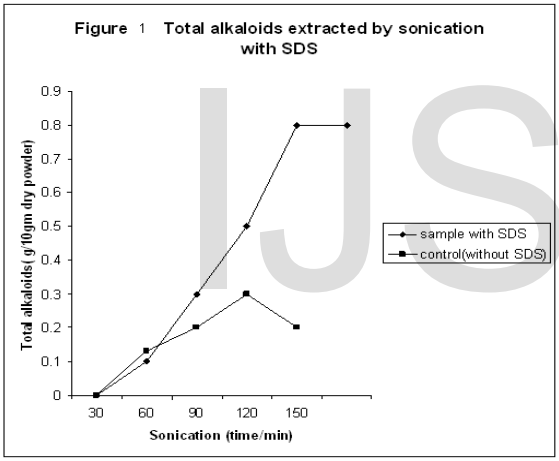
Study of *Solanum xanthocarpum leaves* alkaloids with 0.1% (m/v) of SDS was selected with varying time. The percentage of alkaloid precipitated and U.V. spectra of 30 to 120 min shows different pattern.

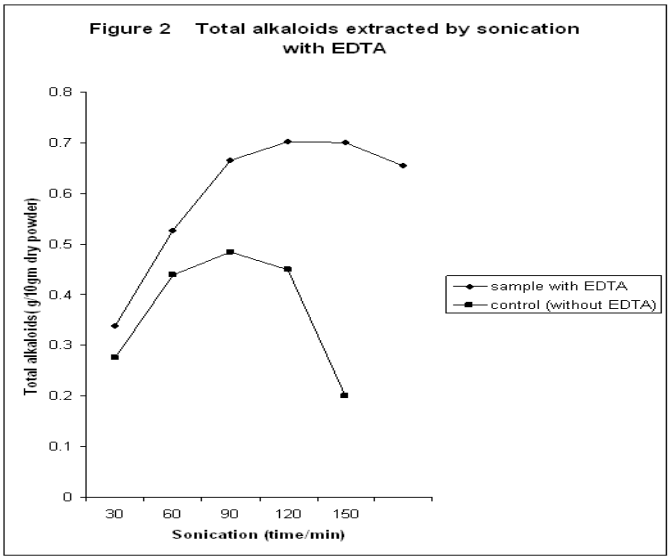
In the extraction of alkaloids with EDTA concentration ranging from 0.1- 0.3% (m/v) with dry powdered of leaves was sonicated. The process was carried out as per the extraction of alkaloids with SDS.It is shown in table No.1

In the present study extraction of alkaloids from *Solanum xanthocarpum* leaves carried out by Solvent extraction method, Soxhlet method and new method (Modern method)

Time	*Wavelength*			
In min	*λ Minima nm*	*Absorbance*	*λ Maxima nm*	*Absorbance*
30	*210.2*	*0.249*	*225.8*	*0.373*
60	*213.8*	*0.877*	*256*	*0.558*

Table No.1 UV of *Solanum xanthocarpum* leaves crude alkaloids for various time interval sonications with 0.3 %(m/v).





Abbreviations :

SDS: Sodium dodesyl sulphate
EDTA:Ethylene diamine tetracetic acid

3. RESULT AND DISCUSSION

Experiments set were performed without sonication and with sonication of powdered leaves of Solanum Xanthocarpum in 0.3 % (m/v) solution of sodium dodesyl sulphate at room temperature to determine the optimum extraction time.

Experiment data showed that the highest yield was achieved by this method after 2h. All experiment sets were carried out triplicate and confirmed the 2 h. for sonication for the extraction of alkaloids.

The same experiment was carried out with the surfactant 0.1% (m/v) of EDTA with sonication and without sonication of powdered leaves of Solanum Xanthocarpum at room temperature to determine the optimum extraction time.

Experimental data showed that the highest yield was achieved by this method after1.5 to 2h. All experiments were triplicate and confirmed 2 h. sonication as a standard time for extraction of alkaloids. The effect of EDTA and SDS on solanum xanthocarpum leaves study was carried out .The result showed that the presence of surfactant enhances the amount total alkaloids

.Higher the concentration of surfactant required extracting it in high yield. It is shown in Table no.2

Surfactant	Time	Percentage of alkaloids With sonication	Percentage of alkaloids without sonication
SDS	2h	0.690	0.300
EDTA	2h	0.702	0.449

TABLE -2 Comparative Study**:** effect of SDS and EDTA concentration on *solanum Xanthocarpum leaves alkaloids*

4.CONCLUSION

According to the SDS study it was observe that, the solanum *xanthocarpum* leaves sample shows four types of alkaloids like Solasodine, Solanine , Solanidine solamargine . It was very difficult to isolate the alkaloids from the plant material when SDS was use as surfactant. SDS form foam interform of phenols & chlorophyll , which make the process tedious . The colour & texture of sample was dark colour, sticky & thick. It required time to remove stickiness property of sample & interference of colour. It was not possible to separate precipitate alkaloids in our laboratory condition so further study was carried out by using EDTA . When EDTA was used for extraction ,four alkaloids were separated that was confirmed by TLC , UV and IR.

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