International Journal of Advance Research in Science and Engineering
Vol. No.6, Issue No. 04, April 2017
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

SOLASODINE ALKALOID EXTRACTION FROM LEAVES OF SOLANUM XANTHOCARPUM

Sindhu Tayade [1] and Deepika Patil [2]

[1-3] *Department of Engineering sciences and Humanities Saraswati College of Engineering Kharghar, Navi Mumbai Maharashtra (India)*

ABSTRACT

More than thousands of different alkaloids have been discovered throughout the plant kingdom .Solanum xanthocarpum is one of them . It is prinkly herb is also called as yellow berried night shade. It has great medicinal importance from ancient time .It is one of the member of Dasmula in Ayurveda .It possess various potential due to its medicinal properties .Every part of the plant has a great medicinal importance because of alkaloids are present in this plant. Its fruit contains the different types of alkaloids .These alkaloids are extracted by using solvent, soxhlet and some other methods . This plant is well-known for its medicinal properties. Alkaloid like solasodine was extracted by using ethylene di amine acetic acid with sonication and without sonication. The yield of alkaloid was found greater at 2.5 hrs with the use of EDTA solution at room temperature. The extracted alkaloid was determine by UV ,IR and melting point .Such type of research creates awareness of importance of medicinal plant and their conservation. It is very important to select such a weed land for research work and to increase the economic growth of our nation.

Keywords: Alkaloids,Kantkari, medicinal plant ,solasodine .

.

I. INTRODUCTION

The Solanaceae is a cosmopolitan family and derived from the genus Solanum. It is worldwide distributed throughout tropical and moderate regions. The diversity centers are in some part of Australia and America. This family consists of around 98 genera and 2700 species .Solanaceae is derived from solanum Latin word means nightshade plant. Its origin is from solari Latin verb.The meaning of solari word is soothe. Some soothing pharmacological properties have been found in the solanaceae family. It has beautiful coloured flowers and fruits. The solanaceae family contains various types of the plants which are economical and flowering plants .The range of the plants is from annual to perennial .The herbs, shrub and trees, vines epiphytes and lianas are present in solanaceae family. In agriculture various types of the crops are from the same family .The weeds, spices, ornamentals plants and medicinal plants are also included in this family. The number of the members of the solanaceae family grows climbing or in erect position and shrubs are not found commonly. Dasmula has great importance in Ayurveda, *solanum xanthocarpum* is one of them .This herb is a spiny diffuse with zigzag branches and found in different regions of India. .It is up to 1.5 m in height. Different parts of this herb are very beneficial .In sore throat treatment the juice of berries is very useful. The paste of green leaves is applied to get relief from pain and snake bite. The aerial parts like fruits, leaves and stem are bitter in taste .They are very

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

carminative .The purple colour flowers are very attractive and used for decoration also. As this plant is very useful because of its medicinal properties but its cultivation is not done in systematic way. It has great applications in Ayurveda. Solanumxanthocarpum alkaloids- solanine,solamargine[1],sapogenins[2] and solasodine[3-4]are also responsible for medicinal effect. Solanumxanthocarpum have an irritant activity[5], larvicidal defect[6-7] ,hypoglycemic activity[8] immunomodulatory activity[9]bronchitis and antitusive response. The Solanum xanthocarpum having many therapeutic activities like Pain relief property, Aphrodisiac property, Anti-pyretic property, swelling reducing property, sweating increasing, cough reliever property, purgative property and blood purifier property.Solanum *xanthocarpum* is commonly called as kantkari in sanskit .Some other synonyms are nidigadhika, dhavani, duhsparsha, kantalika, kantakarika and vyaghri.

Local Names: The regional name of solanum xanthocarpum in India .The local name is very important for the identification of the medicinal plants which are present in different region.

Assam : Katvaedana, Kantakar

Bengali : Kantakari

Malayam : Kantakari Chunda

Marathi : Bhauringani, Kataringani

Orissa : Ankarati, Chakada Bhaji Bhejiaugana, Ankarati, Chakada Bhaji

Gujarati : Bhoringani

Punjabi : Kandiari

Tamil : Kandangatri, Kandan Katri, Kandanghathiri

Telugu: - Pinnamulaka, Mulaka, Chinnamulaka Nelamulaka, , Vakudu

English : Febrifuge Plant

Kannad : Nelagulla, Kiragulla

Hindi :, Bhatakataiya, Chhotikateri Katai, Katali, Ringani

II. METHODS AND MATERIALS

The plant Solanum *xanthocarpum* material was collected from the Saraswati college of Engineering Kharghar Navi Mumbai.The plant material was washed with distilled water and dried in sunlight .The leaves were separated and ground in to fine powder. The powder of leaves was used for the extraction of alkaloids.Natural product are extracted by conventional methods such as soxhlet and room temperature solvent extraction [10] or by ultrasound[11],microwaves, supercritical solvents or other methods[12] but in the present study ,natural product extracted by using surfactant EDTA.

A sample of 10 g of powdered dry plant material was suspended in 400 ml of 0.3 % (m/v) EDTA surfactant solution in glass beaker. It was sonicated for 120 min in an ultrasonic bath at a constant temperature. The extract was separated by simple filtration. The residual material washed with 20 ml of pure water and acidified with sulphuric acd solution to pH 3-4. The alkaloids were precipitated with 15 ml of Mayer reagent. The precipitate was dissolved in an alkaline solution of sodium carbonate (5%; m/m) and extracted with $CHCl_3$. In that extract two layers were formed, one was organic and other was aqueous layer. These two layers were separated by

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

separation funnel. Then the organic layer was washed with water to neutral pH, dried with Na_2SO_4 and concentrated to dryness under reduced pressure to obtain alkaloids .The process was repeated thrice.

Extraction of alkaloid from the leaves of solanum xanthocarpum with EDTA:

Ethylene diamine tetra acetic acid was used for the extraction of alkaloids ..EDTA is acts as a chelating agent which binds to metals via four carboxylate and two amine groups. It prevents joining of cadherins between cells and cell clumping. In the field of agriculture and pharmaceutical it is very useful.

Effect of various concentration of EDTA:

Different concentrations of EDTA r in the range of 0.1 to 0.3% (m/v) were prepared for the experimental work. For the experimental work 10 g air dried powder of *Solanum xanthocarpum* leaves was used .The Mayer's reagent was used for the extraction of alkaloid from the plant.

The same experiment was carried out without addition of EDTA as a control. After this extraction the TLC analysis and UV of sample was carried out.

Effect of sonication with varying time on extraction of alkaloids:

The concentration of EDTA was 0.3 % (m/v) kept constant for extraction of alkaloid .The above reaction mixture was kept for sonication from zero min to 120 min. The same experiment was carried out with 0.3% (m/v) of EDTA at varying time without sonication as a control.

Effect of varying time on extraction of alkaloids (without sonication): The extraction was carried by EDTA for comparison of the amount of alkaloid precipitated from *Solanum Xanthocarpum leaves*.

TLC Identification:

1) Stationary Phase: Silica gel was applied on the glass plate.

2) Mobile Phase: Various mobile phases were tried and finally butanol was selected for the separation of sample.

3) Test Solution:

The test solution used for the determination of thin layer chromatography. The extraction samples of various concentrations were used.

Extraction sample of *Solanum xanthocarum leaves* containing different concentration of EDTA 0.1 % (m/v) 2.2 % (m/v) and 0.3% (m/v) was applied on the TLC plate by capillary.

Ethylene diamine tetra acetic acid	Time	Percentage of alkaloids With sonication	Percentage of alkaloids without sonication
	120 min	0.702	0.449

Table No.1 yield of alkaloids with sonication and without sonication

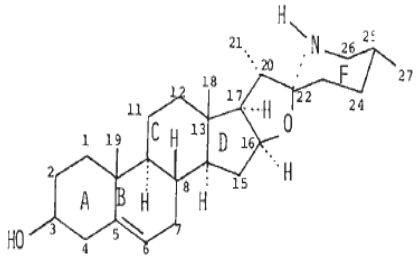
TLC of fraction Five: fraction five was used for the TLC determination .This fraction was used on TLC plate and the rf value was found 0.78. Glycoside solasodine was separated by silica gel TLC plate. The obtained Rf value was matches with the standard alkaloids of solasodine..

I.R. (KBr) of fraction five: characteristics peaks at wave number in cm^{-1}.were taken . IR of fractions five shows the peak at 666.9 cm^{-1} region spectra .It indicates that -N-H wagging out of plane.1522.4 cm^{-1}and1254.7

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

cm^{-1} shows simple open secondary amides absorbs near 1580cm^{-1}shows competition between the ring and C-O for non bonded electron pairs of nitrogen. 1610 cm^{-1}, 1630 cm^{-1}and1660 cm^{-1} peaks confirmes -C-H and N-H stretching with benzene ring. 2380 cm^{-1} region shows that strong absorption band results from superimposed –OH and NH_3^+ stretching band which characterized multiple fine structure. 3360 cm^{-1} (NH stretching) 3700 cm^{-1}to3584cm^{-1}(superimposed OH and NH_3^+stretching bands) .From the above study, fraction five contains Solasodine was analysed by UV IR and Physical Constant. The structure of Solasodine isshown in figure no 1 .

Fig No.1 Structure of solasodine



Solasodine (1)

III. CONCLUSION

From the above experimental work it was concluded that solasodine alkaloid was present in leaves of solanum xanthocaprum which was extracted by using EDTA .The molecular formula of solasodine is $C_{27}H_{29}NO_2$ .From the IR data the values are found 1580 and 1610 cm^{-1} 3360(N-H) stretching found .1630,1660 also observed.and IR λmax (KBr)cm^{-1} .The UV λmax (Methyl alcohol) in nm are measured like 283,shoulders at 208 and 240.The mass m/e was found : 409.2981.The melting point of solasodine was measured and it was in between the range of 200-202 ^oC.On hydrolysis of solasodine the needle like crystal were formed .This alkaloids is very importance in medicine because of its medicinal properties .

REFERENCES

[1] Kuok W, Hsu SH, Li YP, Lin WL, Liu LF, Chang LC et al.; Anticancer activity evaluation of the solanumglycoalkaloidsolamargine: Triggering apoptosis in human hepatoma cells. BiochemPharmacol, 2000; 60:1865-1873.

[2]. Erdogrul OT. Antibacterial activities of some plant extracts used in folk medicine. Pharm.Biol. (2002)

[3]. Dixit VP and Gupta RS Antispematogenic /antiandrogenic properties of Solasodine obtained from Solanumxanthocarpum berries the male genetical tract of dog (carisfamiliaris).A histophysiologicalapproach,IntJ.Androl ,(1982),,5;295- 307.

[4]. Dixit VP and Gupta RS , Antispematogenic /antiandrogenic properties of Solasodine obtained from Solanumxanthocarpum berries on the male rats and dogs,J steroids Biochem(1986),25 ;275.

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

[5] M.Usman,;GhaniM.UmarFarooq.;M.T.J.Khan. Phytochemical Investigations and Evaluation of Antibacterial and Irritant Potential of Different Extracts of Whole Plant of SolanumxanthocarpumSchrad and Wendl J of Chinese Society, (2010),57,1257-1262

[6] . Mohan L, Sharma P, Srivastava CN;) Evaluation of Solanumxanthocarpum extract as a synergist for cypermethrin against larvae of the filarial vector Culexquinquefasciatus(Say). Entomol (2006)Res.,; 36(4): 220– 225.

[7] 33. Rajkumar S, Repellency of volatile oils from Moschosmapolystachyum and Solanumxanthocarpum against filarial vector Culexquinquefasciatus Say. Tropical Biomedicine (2005). 22(2):139–142.

[8] Kar, D. Maharana,L. Pattnaik,S. and Dash,G. Studies on hypoglycemic activity of Solanum xanthocarpum fruit extract in rats. Journal of Ethnopharmacology, (2006). 108(2): 251-256.

[9] . Rokeya Sultana,; Salma Khanam ,; Kshama Devi , Evaluation of Immunomodulatory activity of Solanumxanthocarpum fruits aqueous extract Scholars Research Library , Der Pharmacia Lettre, (2011), 3(1): 247-253.

[10] Yu, B.-W; Chen, J.Y.: Wang Y-P; Cheng, K-F.; Li, X-Y; Qin, G.-W; (2002)Photochemistry 61,43

[11] Sargenti,S.and Vichnewski ,WSonication an liquid chromatography as a ripid techniques for extraction of fractionisation of plant material.Phytochem.Anal, .(2000).11:69-73

[12] Teixeira, D.M.; Teixeira da Costa C; J Chromatogr., A 2005, 1062, 175.