

**USE OF ETHANOLIC EXTRACT OF *COSMOS SULPHUREUS* (SULFUR COSMOS) FLOWERS AS PH INDICATOR**

Prasad S. Kshirsagar\* and Shriniwas P. Patil

SCES's Indira College of Pharmacy, Tathawade, 411033, Pune, India.

\*Corresponding Author: Prasad S. Kshirsagar

Department of Pharmacognosy, SCES's Indira College of Pharmacy, Pune- 411 038, India.

Article Received on 28/08/2020

Article Revised on 18/09/2020

Article Accepted on 08/10/2020

**ABSTRACT**

**Objective:** *Cosmos sulphureus* is ornamental plant. Present study was carried out for evaluation of ethanolic extract of its petals acts as pH indicator. **Material & Methods:** The previously dried and powdered flower petals of *C.Sulphureus* was extracted with 0.5% Acetic acid in ethanol then extract was studied preliminary for phytochemicals present and added to of buffer of different pH to note in change in colour. **Result & Conclusion:** on phytochemical screening pH sensitive anthocyanins which is present in extract used as pH indicator.

**KEYWORDS:** *Cosmos sulphureus*, Ethanolic extract, Anthocyanins, pH indicator.

**INTRODUCTION**

Anthocyanins are coloured water soluble pigments which are found in glycosylated form. They are responsible for the red, purple, blue and in fruits, vegetables. (Hock eng Khoo et al 2017). There are some anthocyanins found in plants cyanidin, peonidin, malvidin, delphinidin, pelargonidin, petunidin. (Liliana et al 2012). The word Anthocyanins are generally derived from two Greek words; Anthos means flowers and cyanos means dark blue. (Horbowicz et al 2008). Chemically anthocyanins are flavonoid derivatives favylum nucleus attach to one or more sugar residue which may be D-galactose, L-rhamnose, D-xylose and D-arabinose. (Miguel, 2011). *Cosmo Sulphurus* is ornamental plant belonging to family Asteraceae. It is cultivated as ornamental plant and found growing as a wild weed along roadside other undisturbed area. (Shailaja Kumari et al). The flavonoids of *Cosmos* species have been reported from the petals two anthocyanins cyanidin 3-O-glucoside and 3-O-rutinoside. The former two anthocyanins and chalcone burtein-4-O-glycoside and aurone sulfuretin -6-O-glucoside were reported from *C-sulphureus*. The use of natural dye as the acid base indicator was first reported in 1664 by Sir Robert Buyle in collection of essays experimental colour of history. Synthetic chemical indicators have disadvantages like high cost, availability and pollutions so the considering availability of *Cosmos sulphureus*. Present study are performed to checking feasibility of anthocyanin rich extract of *Cosmos sulphureus* used as a pH indicator in Acid-Base Titrations.

**MATERIAL AND METHODS****Collection of *C.Sulphureus* Flowers & Preparation Of Anthocyanins Rich Extract**

Flowers of *C.Sulphureus* were collected from Katraj ghat mountains pass located on the southern outskirts of the city of Pune in Maharashtra India. Plant was identified by previously reported study on same plant (T.K.Lim). Flowers were washed by purified water & dried in shadow & forms of powder. About 50gm of powder was extracted with 200ml of ethanol with the presence of 0.5% acetic acid using soxhlet apparatus for 6 hours. alcoholic extract collected then filtered, concentrated on rotary evaporator at temperature less than 35<sup>0</sup> C then aqueous extract was obtained.

**Phytochemical Evaluation of Extract**

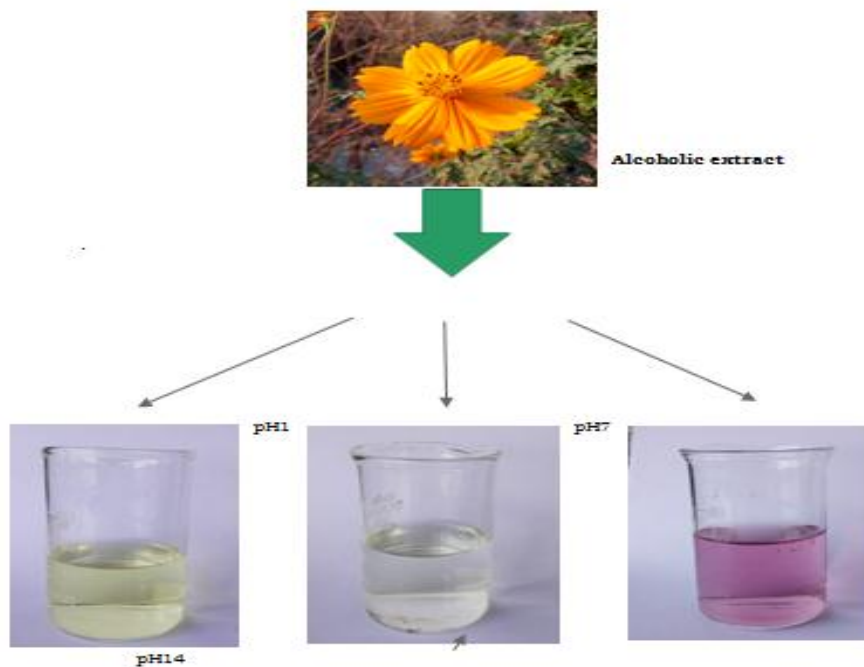
Physical evaluation of extract included checking of Appearance, odour like organoleptic properties while phytochemical analysis included testing for presence of different secondary metabolites {alkaloids, terpene, tannins and flavonoids} then U.V visible spectrum was noted on shimadzu UV 1700 pharma spec. UV visible spectrophotometer further extract analysed by paper chromatographic technique where extract is spotted and run through mobile phase BAW 4:1:5 and R<sub>f</sub> values of different coloured bands are noted (Horbone 1998).

**Evaluation of Extract as pH Indicator in Acidic & Basic Solution**

The alcoholic extract tested in various solution with different pH (1,7 & 14) for the solutions of pH 1 & pH 14 0.1 N Solution of Hydrochloric Acid and Sodium hydroxide was prepared respectively. For neutral pH sterile water for injections which is double distilled are used. To which about 0.5 ml of 10 % solution was added

and stirred observed the colours change further UV spectrum of extract exhibited different colours in

extreme pH values (pH 1 & 14) was noted for detection change in structure of anthocyanins in extract.

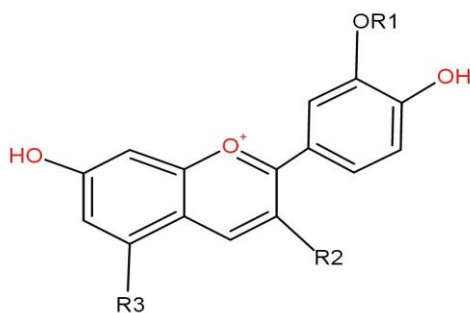


**Different colours exhibited by extract in various pH.**

## RESULT AND DISCUSSION

The alcoholic extract of cosmos sulphureus was slightly viscous orange-red coloured. The preliminary analysis of extract shows presence of flavonoids. UV Visible spectrum of extract showed absorption maxima at wavelength 270nm. The paper chromatographic analysis revealed considerable separation of different colouring pigment. Observation of two different coloured band having different  $R_f$  values 0.54 (dark pink), 0.70(red), 0.84(yellow) with phytochemical analysis. It could be concluded that the acidified ethanolic extract is rich in flavonoids(Anthocyanins) The former two anthocyanins (**cyanidin-3-o-glucoside and 3-o-rutinoside**) and chalcone (butein-4-o-glucoside) and aurnone (sulfuretin-

6-o-glucoside) [Kotarou Anamiya et al]. However no spot was found at higher  $R_f$  values. On addition of 1ml of solution of extract colour get changed as per change in pH of the solution. In strong acidic pH 1 extract took yellowish colour while in strong basic pH 14 extract gives pinkish red colour. At neutral pH 7 solution extract is colourless. Some researches on anthocyanin shows intramolecular rearrangement in the anthocyanin structure take place on change in  $H^+$  ion concentration pH. Generally anthocyanins are biosynthesized in flower using aromatic amino acid from phenylalanine. During the development of plant anthocyanins shows specific colour present work explains that change in colour is because of change in the pH.

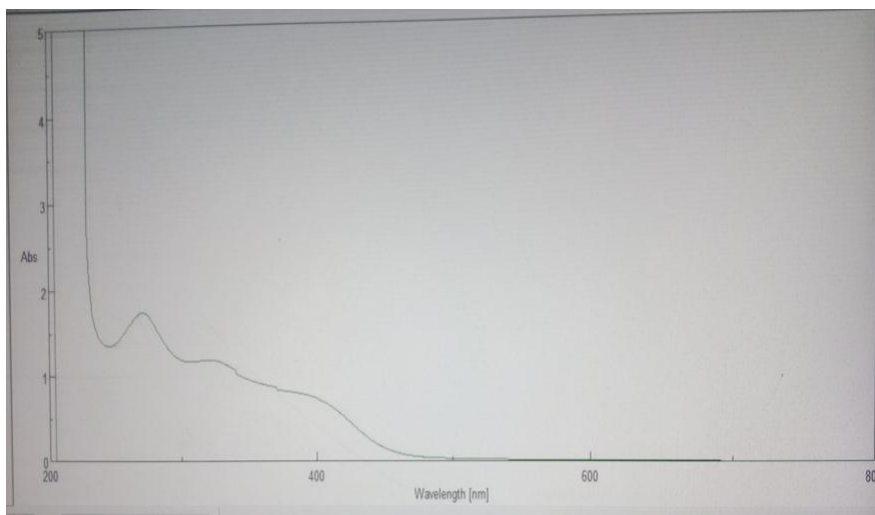


KingDraw

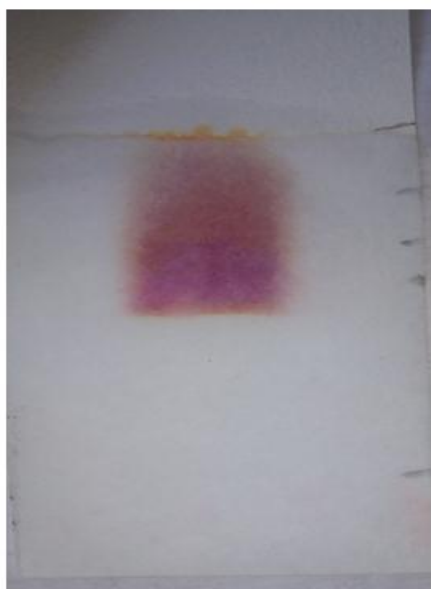
**Structure of basic anthocyanidin nucleus.**

### Anthocyanidins present in cosmos sulphureus flowers.

Sr. no.	Compound	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>
1)	Cyanidin - 3-glucoside.	H	Glucose	OH
2)	3-o-rutinoside	H	Rutinoside	OH



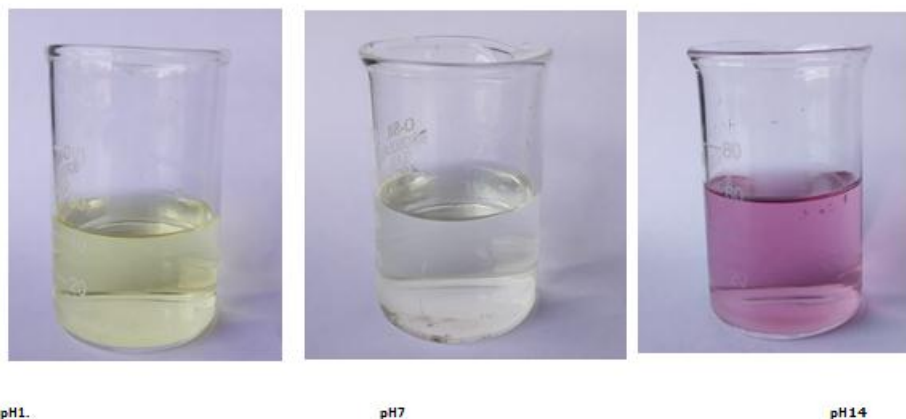
UV-visible spectrum of extract.



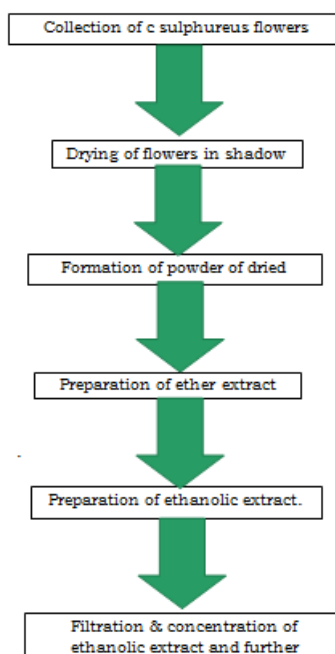
Paper chromatographic profiling of ethanolic extract of *Cosmos sulphureus* flowers.



*Cosmos sulphureus* flowers.



Colour variation exhibited by extract in solution of different pH.



#### Preparation of anthocyanins rich extract.

#### CONCLUSION

Colouring matter of flower consists of anthocyanins which are pH dependent sensitive and gets solubilized in ethanol, on the phytochemical analysis it was found that *Cosmos sulphureus* flower consists of anthocyanins. Therefore, the ethanolic extract exerted different colours in different pH solutions. So *cosmos sulphureus* is an ornamental plant and its extract of flowers taken for further studies and used as a pH indicator in Acid-Base titrations.

#### ACKNOWLEDGEMENT

We authors are thankful to Dr. (Mrs) Anagha M. Joshi, Principal, SCES'S Indira College Of Pharmacy, Tathawade, Pune for providing laboratory facilities and other consumable to carry out this research work.

#### CONFLICT OF INTEREST

We authors declare no conflict of interest.

#### REFERENCES

1. Hock eng khoo, Azrina Azian, Sou Teng Tang et al, Anthocyanidins and anthocyanins: coloured pigments as Food Pharmaceutical ingredients and the potential health benefits, food & Nutrition research, ISSN, 2017; 1654-6628.
2. Liliana S, José GC, Ovidio A, Coralia O. Anthocyanin Composition of Wild Colombian Fruits and Antioxidant Capacity Measurement by Electron Paramagnetic Resonance Spectroscopy. Journal of Agricultural and Food Chemistry, 2012; 60: 1397–1404.
3. Marcin Horbowicz, Ryszard Kosson et al. Anthocyanins of fruits and vegetables their occurrence analysis and role in human nutrition, vegetable crops research bulletin, 2008.
4. Miguel MG. Anthocyanins: Antioxidant and/or anti-inflammatory activities. Journal of Applied Pharmaceutical Sciences, 2011; 01(06): 07-15.

5. Shailaja kumari and M.C sidhu, meiotic studies in cosmos sulphureus cav, Internation society of chromosome Botany, 2017.
6. T. K. Lim, Edible medicinal and non medicinal plant, springer publication.
7. Horbone JB. Phytochemical Methods: A guide to modern techniques of plant analysis, 3 Edition, Chapman & Hall, London, 1998.
8. Kotarou Anamiya, Tsukasa, Iwashina, Quantitative and Quantitative Analysis of flower pigments in chocolate Cosmos atrasanguineus and its hybrids, 2016; 2: 77-78.