



Quantitative estimation of Carthamin and Carthamidin from the Florets *C. tinctorius* L., (Safflower Florets)

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Natural colorants derived from plant materials have gained increasing popularity due to their non-toxic nature. Pigment extraction from the florets is normally done by Soxhlet extraction, maceration, and hydro distillation are conventional methods that have been widely used in industry and laboratory. Phytochemical analysis of safflower florets revealed the plant presence of high amount of Carthamin and carthamidin.

Keywords: Safflower florets; quantitative analysis; carthamin and carthamidin.

1. INTRODUCTION

Plants are the rich source of secondary metabolites which play very important role in

treatment of different ailments such as cardiovascular, diseases, diabeteses, meningitis, cancer, hypertension etc.. Safflower flowers are used for the treatment of many illnesses as well

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as in the preparation of “tonic tea”. In India, florets of safflower processes medicinal important properties such as stimulant, sedative and as a promoter of menstrual discharge.

2. MATERIALS AND METHODS

Quantitative analysis and Spectrophotometric Measurements of Carthamin and Carthamidin from petals of Safflower Florets [1].

2.1 Materials

For the analysis of the pigments ten Genotypes were screened namely they are A1, Bhīma, Jsi-97, CO-1, Manjra, a1, Pbn-12, Nari-6, Nari-28, Sharada, SSF- 658. florets were collected from the field of CPMB, Department of Genetics, Osmania University Hyderabad.

2.1.1 Extraction of carthamin

Dry fine powder (1gr) of safflower florets was suspended in 20ml of methanol, acetone, ethyl acetate and hexane 0.5% WV -1 sodium carbonate .stirred at room temperature for 30mints . after centrifugation at 3500rpm for 15mintutes the floating pieces were re moved

and the supernatant Was retained at $5\pm 1^{\circ}\text{C}$.this process repeat for one more time.The cooled extracts were mixed together and acidified .Adsorption of carthamin from acid extract was measure at 380nm (described by (Kulkarni et al. 1997) [2-6].

2.1.2 Extraction of carthamidin (safflower yellow)

One gram of fine safflower floral powder was suspended in 20ml distilled water and stirred for 30min. after centrifugation the supernatant was retained at $5\pm 1^{\circ}\text{C}$. The resulting suspension was added to fresh 20ml 0.5% sodium Carbonate and stirred for further 30mint and centrifuged and this process was repeated for one more time .The cooled extracts were mixed together and was basified and measure the absorption of carthamidin at 450 nm (described by (Kulkarni et al. 1997) [7-9].

2.1.3 Thin layer chromatography

Thin-layer chromatographic identification for carthamin and carthamidin based on Rf values which were examined on silica gel G shown in pictures.



Fig. 1. Thin-layer chromatographic identification

3. RESULTS

Quantification of the yellow and red pigments in the florets of *C.tinctorius* bioactive components from ten different genotypes of safflower (namely they are Manjra, Co-1, Pbns-12, SSf-658, Sharada, Nari-6, Nari-28, A1, JSI-97, Bhīma) has been done by acid and alkali methods by using different polar and non-polar solvent systems such as methanol, ethyl acetate, acetone, hexane and aqueous. After extraction quantification of these bioactive compounds has been done. The result revealed that methanol

and aqueous extracts showing more bioactive compounds when compared to others. Among the ten genotypes the maximum quantification is observed in Manjra, Pbns-12, Nari-6, SSf-658, A1, CO-1 when compared to Bhīma, Nari-28, Sharada and Jsi-97. In both methanol and aqueous extracts Manjra shows highest percentage of quantification i.e. 2.350mg/gr followed by Pbns-12 and Nari-6 2.21mg/gr SSf-658-1.921mg/gr A1-1.869mg/gr co-1-1.834mg/gr respectively which is shown in it at Figs. 2 A -E.

The results are summarized in Fig. 2A.



Image 1. Field study

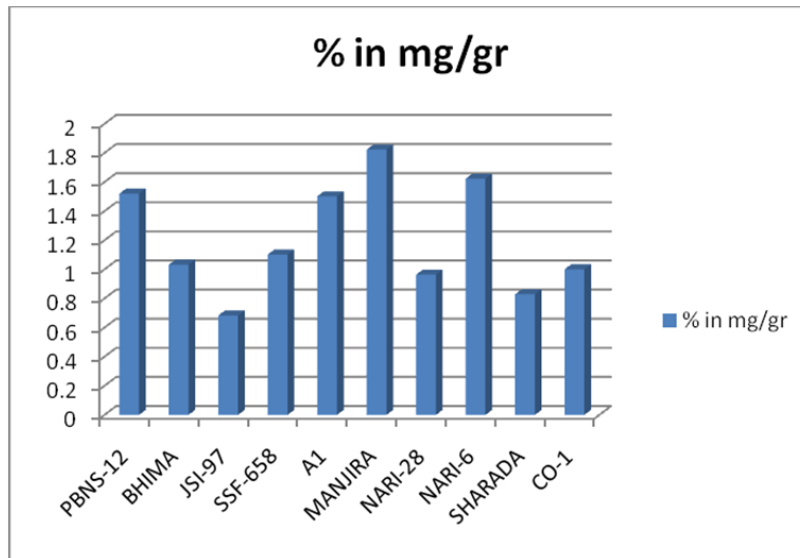


Fig. 2A. Quantitative analysis of Carthamin with ethyl acetate extraction

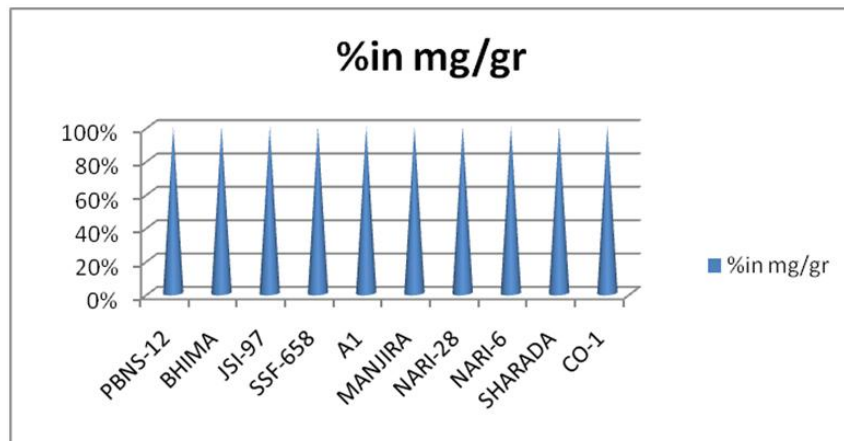


Fig. 2B. Quantitative analysis of carthamin with methanol extraction

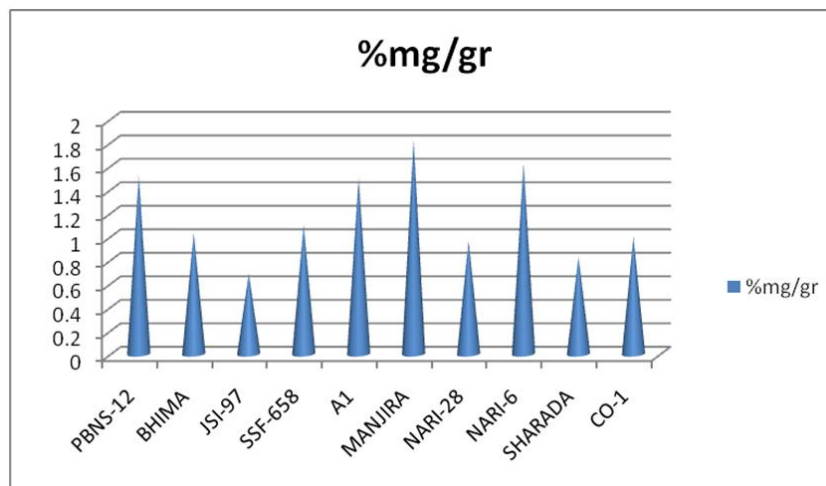


Fig. 2C. Quantitative analysis of carthamin with hexane extraction

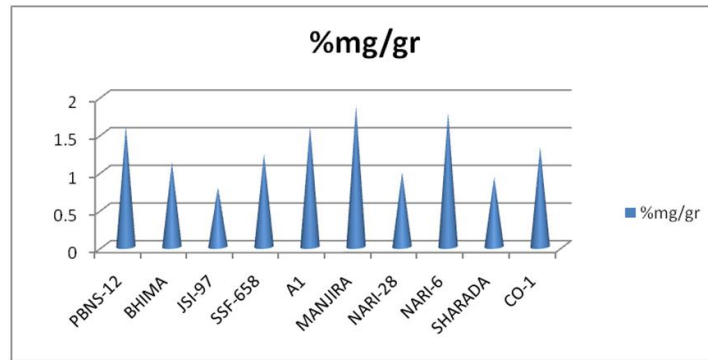


Fig. 2D. Quantitative analysis of carthamin with acetone extraction

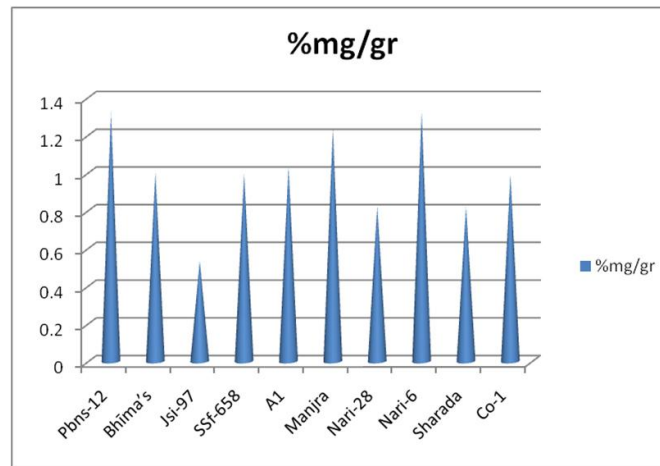


Fig. 2E. Quantitative analysis of carthamidin with aqueous extraction



Image 2. Study analysis and protocol

4. DISCUSSION

The quantification of Carthamin and carthamidin has been done from the petals of safflower florets by aqueous and methanolic extraction. The yellow and red pigments can be especially utilized in the pharmaceutical as well as food industries due to their non toxic nature when compared to the synthetic dyes used in the food colorants.

5. CONCLUSION

Screening of different genotypes of *C. tinctorius* for the pigments analysis (safflower florets) clearly reveals that the presence of different two bioactive pigments (phytoconstituents) in petals of safflower floral extracts.. The qualitative and quantitative analyses of these phytoconstituents will be an interesting area for further study in the food as well as in pharmaceutical industries.

CONSENT AND ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Macroscopic, biochemicals and pigments analysis of fresh flower of five solanum species (s. lycopersion I, melongena SI, nigrum SI, S Torvum sw. and *S. trilobatum* L.) of Solanaceae by Ramani K. IJCRT. 202210(6):2320-2882.
2. Quantitative improvement in the estimate of NDVI values from remotely sensed data

- by correcting thin cirrus scattering effects, Remote Sens. Akihisa et al., 1994 B-C. Gao and R-R Li "Environ. 2000;74: 494-502.
3. Quantitative analysis of bio-active compound in Hibiscus sabdariffa L. Extracts: Quantitative analysis of flavonoids, Kanehira et al. Suhad and Viorica 2008., Suhad S.H. and Viorica I. (2008), Farmacia. 2003;6:699-706.
 4. Phytochemical screening Qualitative and Quantitative Determination of Phytochemical Contents of Indigenous Nigerian Softwoods. new journal of science 2016. Chukwuma S. Ezeonu' and Chigozie M. Ejikeme' Guimiao and Yili; 1985.
 5. Phytochemical screening to validate the ethnobotanical importance of root tubers of *Dioscorea* species of Meghalaya, North East India, N. Sheikh, Y. Kumar, A. K. Misra, and L. Pfoze, Journal of Medicinal Plants Studies. 2013;1(6): 62–69.
 6. Antioxidant activities of some selected medicinal plants used for malaria therapy in south western Nigeria Trop. Chun, 1990 Ayoola et al. Ayoola GA, Coker HB, Adesegun SA, AA and J. Pharm. Res. 2008;7:1019–1024 .
 7. Phytochemical survey of Malaya III. Alkaloids and saponins. Wenyu. Amarasingham RD, Bisset NG, Millard AH, Woods MC. Econ Bot. 1986;18: 270–278.
 8. Qualitative and Quantitative Analysis of Flower Pigments in Chocolate Cosmos, *Cosmos atrosanguineus*, and its Hybrids Kotarou Amamiya, Tsukasa Iwashina. PMID: 26996024. Nat Prod Commun. 2016;11(1):77-8.
 9. Analysis of Various Floral Components at Different Developmental Stages of the Flower S.P. Adhikary* Department of Botany, Aska Science College, Aska, Odisha, India. Int. J. Curr. Microbiol. App. Sci. 2017;6(7):2053-2068.

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