Research Article

Extraction of plant pigments

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ABSTRACT

Introduction: Pigments obtained from herbal sources have used as an essential alternative to chemical pigments. Here, badam fruit peel and two several species of chrysanthemum were used and pigments were isolated. **Materials and Methods:** The qualitative study of pigments was carried out using thin-layer chromatography (TLC) technique. The TLC chromatograms were evaluated by retention factor (R_f). **Results:** The retention factor value for individual metabolites is the ratio of length it traveled and the length solvent it traveled. **Conclusion:** The different retention factor values indicate different secondary metabolites.

KEY WORDS: Badam fruit, Chrysanthemum, Pigments, Thin-layer chromatography

INTRODUCTION

Since the 20th century, more research concern has been found in the utilization of herbal pigments and an inadequate variety of marketable pigments, and small industries have initiated to notice at the usefulness of plant pigments for dying of profitable pigments.[1] Herbal pigments have enhanced biodegradable and commonly have more compatibility with the surroundings.[2] Chrysanthemum is one of the flowering plants grown in pilot scale in India for the garden show. It belongs to the Asteraceae family and is usually known as the "Queen of the East."[3] Badam fruit is one of the fruits belonging to Prunus species, family Prunoideae and subfamily Rosaceae. Clinically and nutritionally, badam is an important food product.[4,5] Chromatographic techniques are an investigative tool that is broadly utilized for isolation, extraction, identification, and quantification of the individual components in a concoction. Thin-layer chromatography (TLC) was selected among the other chromatographic techniques due to its simplicity and less-expensive quality. The expression retention factor (R_f) that is generally used to depict the chromatographic performance of solute sample.[6] In the present investigation, natural pigments were isolated from badam fruit peel and purple and red petal of chrysanthemum flower and separated by TLC method.

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MATERIALS AND METHODS

Collection of Plant Material

In this work, pigments were isolated from plant sources. Three different plant resources were used. The badam fruit peel and petals of flower from different colors of chrysanthemum flower were utilized. A strong red and purple range chrysanthemum flowers were procured from local flower shop of Chennai, and badam fruits were taken from university campus.

Pigment Extraction

About 5 g of each plant material was homogenized using different solvents with a combination of distilled water and acetone in the 1:1 ratio. Then, the extracted pigments were procured by filtration and used for further studies.

Separation of Pigments by TLC Technique

The TLC plate was prepared using homogeneous slurry of silica gel. 1 mm thickness of layer was maintained with moderate pore size. Thin and consistent film of silica was set. The glass plate was induced in a hot air oven. A light mark was marked on the activate plate about 1.5 cm from the bottom. A single mark of the pigments was positioned on the line and permitted to dried up. The glass plate was put in the glass chamber containing acetone:distilled water – 2:5 as mobile phase in such a means that the ending close to the dye application should contact the movable phase. The chromatogram was permitted to run about 30 min. Finally, the R_f value

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Table 1: Evaluation of retention factor from TLC plate

Plant resources	Retention factor
Badam fruit: Peel pink	0.85
Chrysanthemum: Petals red	0.75
Chrysanthemum: Petals dark purple	0.82

TLC: Thin-layer chromatographic

of individual was determined using the following equation:

$$R_f = \frac{\text{distance moved by component}}{\text{distance moved by solvent}}$$

RESULTS AND DISCUSSION

TLC glass plate exhibits the chromatogram of herbal pigments. It can validate that individual pigment is each color because only single spot was found on the developed TLC plate. Table 1 shows the evaluation of retention factor values for all the pigments. The separation of natural pigments by TLC provides R_f values for individuals. The pigment for dark purple traveled and color of the spot became purple. For the badam fruit, the pink dye changed to dark pink and the retention factor value was determined as 0.85. The retention factor value for the traversed dark purple pigment is 0.82 which might be carotene. The red dye color changed to yellow and the retention factor value was calculated as 0.75 which may be responsible for xanthophylls.

CONCLUSION

The current investigation exhibited that plant pigments can be effectively separated from the badam fruit peel and chrysanthemum flowers. TLC tool can be an efficient technique for the separating plant pigments from different plant sources.

REFERENCES

1. Kannadasan A, Gnanaprakasam R, Harikrishnan, Nganyeikonyak A. Rajkumar. Dye industry effluent treatment using cactus (Opuntia) and water hyacinth (*Eichhornia crassipes*) IOSR, J. Environ. Sci. Toxicol. Food Technol 2013;4:48–50.
2. Baishya D, Talukdar J, Sandhya S. Cotton dying with natural dye extracted from flower of bottlebrush (*Callistemon citrinus*). Universal J Envir Res and Tech 2012; 2:377-382.
3. Sharma G, Shrivastava A, Dhakre DS, Singh DP. Effect of weed management practices in chrysanthemum (*Dendranthema grandiflora T*) under Chhattisgarh plains agro-climatic condition. International J Bio-resource and Stress Management, 2014;5:400-403.
4. Sarwar S, Anwar F, Raziq S, Nadeem M, Zreen Z, Ceci F. Antioxidant characteristics of different solvent extracts from almond (*Prunus dulcis* L.) shell. J Med Plants Res 2012;6:3311-6.
5. Fried B, Sherma J. Thin-layer Chromatography: Techniques and Applications, Chromatographic Science Series 66. New York, USA: Marcel Dekker, Inc.; 1994. p. 451.
6. Fritz J, Schenk G. Quatitative Analytical Chemistry. Boston-London-Sydney-Toronto: Allyn and Bacon, Inc.; 1987. p. 690.

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