

Detection and quantification of natural pigments extracted from callus of *Echinocereus cinerascens*

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Abstract

Purpose – This paper aims to study the effect of different organic solvents on the extraction of pigments present in callus cultures of *E. cinerascens*.

Design/methodology/approach – Attempts have been made to extract pigments from callus cultures through tissue culture system as an alternative replacement for conventional plant cultivation as tissue culture provides unlimited supplies of plant samples. Callus of *E. cinerascens* was induced from stem explant cultured in Murashige and Skoog medium supplemented with combination of 0.5 mg/L 6-benzylaminopurine and 0.5 mg/L α -naphthaleneacetic acid maintained under photoperiod of 16 h light and 8 h dark. Fresh samples of the callus were harvested and dissolved in various types and concentrations of solvents such as 100 per cent acetone, 80 per cent acetone, 95 per cent ethanol, 100 per cent methanol and 90 per cent methanol. Each of the mixtures was directly centrifuged to get clear supernatant containing pigments of interest. The pigments were detected and subsequently quantified via two simple techniques, ultraviolet-visible (UV-Vis) spectrophotometer and thin layer chromatography (TLC).

Findings – UV-Vis spectrophotometer detected two families of pigments present in the callus cultures, namely, carotenoids (carotene and xanthophyll) and tetrapyrroles (chlorophyll *a* and *b*). Pigment contents in various solvent extractions were estimated using spectroscopic quantification equations established. Through TLC, spots were seen on the plates, and R_f values of each spots were assessed to indicate the possible existence of carotenoids and tetrapyrroles.

Originality/value – This preliminary study offers significant finding for further advance research related on natural pigments extracted from *E. cinerascens* that would provide profits in the future applications, especially in food industry, medicine, agriculture, etc.

Keywords Pigments, Carotenoids, Chlorophylls, Thin layer chromatography (TLC), UV-Vis spectrophotometer

Paper type Research paper

Introduction

Pigments are molecules or chemical compounds that absorb specific wavelengths of light and reflect only certain wavelengths of visible light. In plants, pigments are essential to

undergo photosynthesis, one of the earliest biological processes to evolve, which provided evidence for the significance of pigments in plant functions (Ustin *et al.*, 2009). Pigments can be grouped in a few different classes (Mortensen, 2006; Schoefs, 2004; Hasni *et al.*, 2011; Schoefs, 2002), namely, tetrapyrroles (e.g. chlorophylls), carotenoids (e.g. carotenes),

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The authors would like to thank University of Malaya for the financial support (PV25/2011B) and the facilities provided.



Pigment & Resin Technology
47/6 (2018) 464–469
© Emerald Publishing Limited [ISSN 0369-9420]
[DOI 10.1108/PRT-11-2016-0103]

Received 5 November 2016

Revised 22 December 2016

Accepted 28 February 2017