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Analysis of bioactive pigments in coloured callus of Azadirachta indica for possible use as functional natural colourants

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Purpose The purpose of this study is to evaluate the content of bioactive pigments in coloured callus of *Azadirachta indica* and to understand the correlation between the callus colours with their bioactive constituents, antioxidant properties and cytotoxicity. These assessments will yield valuable insight into the use of in vitro-derived pigments for possible use as functional natural colourants. **Design/methodology/approach** In this study, the authors have successfully developed a protocol to produce leaf-derived callus of various colours with enhanced content of bioactive pigments in *A. indica* through plant tissue culture. Comparative analysis of the pigments content (chlorophyll, carotenoid, phenolics and anthocyanins) in the coloured callus was conducted, followed by evaluation of its bioactive properties. The antioxidant properties against 2,2-diphenyl-1-picrylhydrazyl and 2,2'-azinobis(3-ethylbenzothiazoline-6-sulfonic acid) radicals, ferric reducing antioxidant power and cytotox activities of the coloured callus extracts were also reported. Findings Callus of various colours were successfully produced in *A. indica* through plant tissue culture, and their valuable pigment content and bioactivity were evaluated. The green callus contained the highest amount of anthocyanin, followed by brown and cream callus. The total anthocyanin contents in both the green and brown callus was more than two-fold higher than that in cream callus. Contrasting observation was obtained for total phenolic content (TPC), where the TPC of cream callus was significantly higher than that in brown callus. Nevertheless, the green callus also exhibited the highest TPC. Green callus also contained the highest amount of total chlorophyll and carotenoid, as well as exhibited the highest antioxidant potential, and was found to be the only extract with active cytotox activity against SKOV-3 cells. Correlation analysis revealed that the excellent bioactivity exhibited by the coloured extracts was strongly correlated with the bioactive pigments present in the callus.

Keywords

Author Keywords: *Azadirachta indica*; Coloured callus; 24-Dichlorophenoxyacetic acid; Bioactive pigments; Functional colourant; Thiadiazuron

KeyWords Plus: ANTIOXIDANT ACTIVITY; BETA-CAROTENE; IN-VITRO; ANTHOCYANINS; BIOSYNTHESIS; EXTRACTION; CULTURES; GROWTH; TISSUE; PLANTS

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