IDENTIFICATION OF CAROTENOIDS FROM *IN VITRO* CULTURE OF *TAGETES LUCIDA* AND *TAGETES PATULA*

Angeles Rocha-Mendoza, Israel Benítez-García, Leticia Ríos-Salome, Enrique Macedo-Orellana, Pablo Vanegas-Espinoza, Alma Del Villar-Martínez. Centro de Desarrollo de Productos Bióticos, Instituto Politécnico Nacional (CEPROBI-IPN). Departamento de Biotecnología, Yautepec, Mor. Tel (735) 394-2020, C.P. 62731. mrocham1000@alumno.ipn.mx

Key words: Tagetes lucida, Tagetes patula, pigments

Introduction. Carotenoids derived the dried of the *Tagetes* flower, mainly used as colorant for food stuffs (1). In recent years, numerous studies have focused on the biological and pharmaceutical properties of carotenoids, having proven its effectiveness in the treatment of various diseases (2). *T. lucida* and *T. patula* which are species to the *Tagetes* genus, only blooms once year and harvesting is for ornamental purposes, on the other hand could be utilized to compete in the industry of natural pigments. The aim of this study was to analyses the presence of carotenoids from *in vitro* culture of *T. lucida* and *T. patula* compared with ligule tissue.

Methods. Extraction from callus and ligules of *T. lucida* and *T. patula* from fresh biomass was performed as reported (3). Absorbance of each sample was determined, reading in a range of 400 to 700 nm in spectrophotometer. Quantification of total carotenoids was determined by X=Ay*100/2500.

Results. In order to study carotenoid content within callus of *T. lucida* and *T. patula,* the carotenoid profile of each type of callus and ligule was analyzed by absorption spectrum (Fig. 1 and 2). The profile of the *T. lucida* callus showed one main peak (Fig. 1A). 13-cis-lutein was detected at 421.5 nm (7.53 µg/g of fresh weight (fw)). The profile of the *T. patula* callus showed a main peak at 445.5 nm corresponding to lutein and minor peaks at 411.5 and 424.0 nm which corresponding to 13-cis-lutein respectively (Fig. 1B) (12.7853 µg/g of fw).

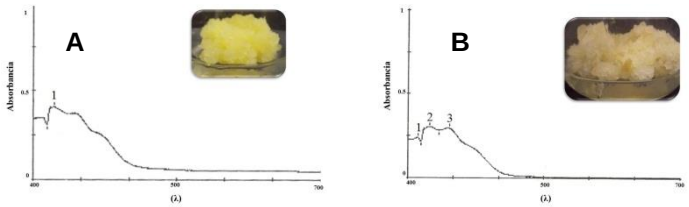

Fig.1. Spectrophotometric profile of callus extract. A) *T. lucida* 1= 13-cis-lutein; B) *T. patula* 1 y 2 =13-cis-lutein, 3= Lutein.

The profile of the *T. lucida* ligule showed one peak (Fig. 2A), was detected at 445.1 nm corresponding lutein, (25.3453 µg/g of fw). The profile of the *T. patula* ligule showed a main peak at 445.5 nm corresponding to lutein and minor peaks at 411.5 and 424.0 nm which corresponding to 13-cis-lutein and 9,9-cis-lutein respectively (Fig. 2B) (26.40 53 µg/g of fw).

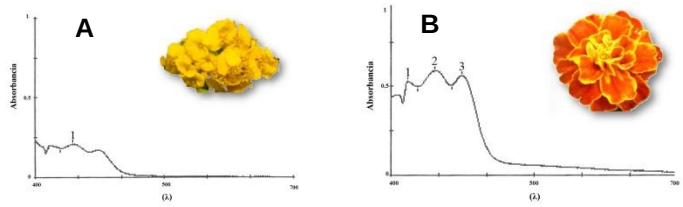

Fig.2 Spectrophotometric profile of ligule extracts. A) *T. lucida* 1= Lutein; B) *T. patula*. 1= 13-cis-lutein, 2=Lutein y 3= 9,9-cis-lutein.

Conclusion. Total carotenoid content was more twice in ligule than callus for both species, likewise is observed that the content is higher at ligule of *T. patula*. By spectrophotometric analysis was detected the presence of lutein isomers as lead compounds, and the presence of lutein. Quantification of total carotenoids showed that in the ligules is presented more than twice that in undifferentiated tissue.

Acknowledgements. This work was done with financial support of SIP 20120452 and by the Consejo Nacional de Ciencia y Tecnología (Conacyt).

References.

1. Gustavo-Provesi J., C. Odebrecht-Dias, E. Regina-Amante (2011). Food. Chem. 128: 195-202.
2. Hsin-Chung C., H. Chien, C. Liao, Y. Yang, S. Huang (2007). Journ of Nut. Bioch. 18:667-675.
3. Delgado-Vargas F., O. Paredes-López (1996). Journ. of the Scien. of Food and Agric. 72:283-290.