

Correlations among Attributes of Senescence and Antioxidant Status of Leaf Discs during Epiphyllous Bud Differentiation in *Kalanchoe pinnata* Lam. (Pers.)

Sarita Jaiswal^{1a,b,*}, Raman Chawla^c, and Sudhir Sawhney^a

^a Department of Botany, University of Delhi, Delhi - 110 007, India

^b Department of Plant Sciences, 51 Campus Drive, College of Agriculture and Bioresources University of Saskatchewan, Saskatoon, Saskatchewan - S7N 5A8, Canada.
E-mail: sarita782000@gmail.com

^c Division of CBRN Defence, Institute of Nuclear Medicine and Allied Sciences, Brig SK Mazumdar Marg, Delhi - 110 054, India

* Author for correspondence and reprint requests

Z. Naturforsch. **67c**, 418–428 (2012); received September 3, 2011/March 21, 2012

Leaf detachment is a common signal that triggers both the differentiation of dormant epiphyllous buds as well as the onset of foliar senescence in *Kalanchoe pinnata* Lam. (Pers.). The present study looked for any probable correlations among selected attributes of foliar senescence, e.g. soluble proteins, chlorophylls a and b (Chl_{a+b}), and membrane stability index (MSI), and the antioxidative status, e.g. phenolics, ferric reducing ability in plasma equivalence (FRAP_{eq}), and membrane protection index (MPI), during epiphyllous bud differentiation. The experimental system comprised 0.75-cm leaf discs, with or without a dormant epiphyllous bud, cultured *in vitro* and exposed for ten days to continuous light or dark. A steady depletion of soluble proteins and Chl_{a+b} , and lowering of MSI in the leaf discs were observed, the decline being relatively faster and of higher magnitude in discs exposed to dark rather than to light. The pigment loss in discs with differentiating epiphyllous buds was greater and faster than in those lacking buds, a somewhat reverse situation was observed in case of soluble proteins. Simultaneously, a time-dependent decrease in the level of phenolics was also observed. Their content was found to be lower in discs exposed to dark as compared to light, pointing to a relationship with a higher rate of senescence-related degradative processes in the dark. The change in the content of Chl_{a+b} was found to be significantly correlated with the variation in the level of phenolics. The average FRAP_{eq} after ten days was one half that of the initial level, which could be correlated with the decreasing levels of phenolics (intra-correlation) and maximally correlated with variations in Chl_{a+b} and protein contents (inter-correlation). Aqueous alcohol foliar extracts significantly ($p < 0.05$) protected membranes against peroxidative stress, although the pattern was not found to be in line with that of the phenolics content or FRAP_{eq} . The diminishing Chl_{a+b} content was found to be maximally correlated with alterations in the membrane protection.

Key words: Epiphyllous Bud Differentiation, Leaf Senescence, Antioxidant Potential