



Identification, phylogenetic analysis and expression profiling of ABC transporter family of *Crocus sativus* L: A step towards understanding apocarotenoid transport

Tabasum Mohiuddin^{1,2}, Shoib Ahmad Baba^{1,2}, Nasheeman Ashraf^{1,2*}

¹Plant Biotechnology Division, CSIR- Indian Institute of Integrative Medicine,

Sanat Nagar, Srinagar, J&K-190005

²Academy of Scientific and Innovative Research, CSIR-Indian Institute of Integrative Medicine,

Canal Road, Jammu Tawi 180 001, India

ABSTRACT

Crocus sativus has recently become focus of research because it is the only plant species which produces apocarotenoids like crocin, picrocrocin and safranal in significant amounts. The compounds are synthesized only in stigma part of the flower, the dried form of which forms commercial saffron. These compounds impart organoleptic properties to saffron making it world's costliest spice. The *Crocus* apocarotenoids are synthesized in plastoglobules and are later transported to vacuole for storage. They also undergo long distance transport from the site of their synthesis to that of their action. Till so far, no information is available regarding the mechanism of their transport. In this context, the present study involves identification, phylogenetic analysis and expression profiling of ATP-binding cassette (ABC) genes from *Crocus* with the aim of gaining information about the genes involved in apocarotenoid transport. ABC proteins represent one of the largest protein families in plants and are known to play role in a number of biological processes. Here we identified 77 ABC transporter genes from *Crocus* transcriptome. Phylogenetic analysis of *Crocus* ABC genes with those of *Arabidopsis* divided them into 8 subfamilies among which ABCB and ABCG were most predominant. Expression analysis of one member from each subfamily was performed which demonstrated that the genes showed tissue specific expression. Further ABC genes belonging to different subfamilies were induced in response to different stress and hormone treatments suggesting their role in diverse biological processes. These results would facilitate further investigation into their involvement in *Crocus* apocarotenoid metabolism and transport.

Key words: Apocarotenoids, *Crocus*, ABC transporters, stress, phytohormones.