

# INTERNATIONAL CONFERENCE ON ADVANCES IN PLANT BIOCHEMISTRY AND BIOTECHNOLOGY

*"Empowering Urban Agriculture"*

9 & 10 December 2014

Main Lecture Hall,  
Biotech 1,  
Faculty Biotechnology and Biomolecular Sciences,  
Universiti Putra Malaysia



UPM  
UNIVERSITI PUTRA MALAYSIA  
BERILMU BERKHIDMAT

Co-organized with

**NIBM**  
NATIONAL INSTITUTES OF  
BIOTECHNOLOGY MALAYSIA

## Oral B2

### Classical Strategies and Novel Achievements in Plant Biochemistry: A Case Study on the Medicinal Plant “*Andrographis paniculata*”

Valdiani A.<sup>1\*</sup>, Talei D.<sup>2</sup>, Maziah M.<sup>1,3,4</sup>, Abiri R.<sup>1</sup> and Atabaki N.<sup>5</sup>

<sup>1</sup> Department of Biochemistry, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor DE, Malaysia.

<sup>2</sup> Medicinal Plants Research Center, Shahed University, Tehran, 3319118651, Iran.

<sup>3</sup> Institute of Tropical Agriculture, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor DE, Malaysia.

<sup>4</sup> Institute of Bioscience, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor DE, Malaysia.

<sup>5</sup> IAU of Tehran Science and Research Branch, Tehran, Iran

\*Corresponding author: alireza.valdiani@gmail.com

Inter and intra-specific hybridizations have typically been used as a tool in plant breeding. The recent advances in modern genetics have mainly tended to employ genetic transformation programs. Seemingly, the mentioned trend has eased the importance of the classical breeding techniques at the present time. Our observations on *Andrographis paniculata* (AP) that has been stated as a low-diverse and endangered plant species showed that out-crossing of the plant's accessions could still be employed as an efficient strategy not only for breeding the herb but also to protect its biodiversity. To this end, seven AP accessions were outcrossed manually in all 21 possible combinations. Three types of different markers, including morphological, phytochemical and DNA markers were employed to evaluate the level of the derived heterosis and diversity amongst the F<sub>1</sub> progenies. The results revealed that the out-crossing led to heterosis of the F<sub>1</sub> plants in terms of the bioactive compounds and morphological characteristics. The results of this exploration proved that out-crossing could increase the level of diversification in AP as it is a classical breeding technique, simultaneously. Despite, a part of the obtained genetic variation could also be attributed to the negative heterosis. As an evolutionary point, the occurrence of population bottlenecks in the Malaysian accessions of AP was confirmed due to detecting a low additive genetic variance ( $V_A$ ) for the studied bioactive compounds.

*Keywords: Biochemistry; Terpenoids; Biodiversity*