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## AN EFFECTIVE SYSTEM FOR POLYPLOIDY INDUCTION, SCREENING AND CHARACTERIZATION OF GENOMIC AND METABOLIC CHANGES IN ORCHIDS

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Orchids are well known for their high economical value as ornamentals, but they also produce some metabolites with antioxidant and anti-tumoral activities of relevant worldwide interest. We have focused our efforts to the genus Dendrobium for manipulating ploidy levels to develop new varieties with increased ornamental value and a higher production of secondary metabolites. Dendrobium plants (e.g. Dendrobium loddigesii ssp.) do not grow well in vitro, and are mostly collected in the wild with large endangers of extinction. Here we present an efficient flow cytometry approach to obtain and select Dendrobium loddigesii polyploids, through an early in vitro screening on Protocorm Like Bodies (PLBs) after antimitotic treatment. PLBs are a typical orchid vegetative reproductive organs, allowing for fast propagation of tru-to-type individuals. Our approach permits the identification of the best treatment procedure to modify cell cycle and for the assessment of effective conditions for polyploid recovery. Just one month after treatments, and by using Cycle Value, we were able to discard about the two-third of the unchanged material (no DNA content variations) by drastically reducing both the number of explants to work with and labour costs. The antimitotic compounds colchicine or amiprophos-methyl (APM) were tested for concentrations and explant exposition timings. A high polyploids recovery, up to 80%, was obtained with both antimitotic agents, and those explants were further characterized by liquid chromatography coupled to high resolution mass spectrometry (LC-HRMS), to characterize explants showing an increased levels in high-value molecules such as shihunidine and hircinol.