OMICS Group Conferences
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International Conference on
Agricultural & Horticultural Sciences

September 14-15, 2012 Hyderabad International Convention Centre, India

Physiological, biochemical and molecular changes associated with seed priming in Cucumber (Cucumis sativus L.)

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It is a known fact that priming results in improved germination but, our fundamental understanding of physiology and biochemistry of seed priming remains obscure. Therefore, an attempt has been made to know the physiological, biochemical and molecular changes that may contribute for seed enhancement through priming. The physiological parameters such as first and final count germination, bartlett rate index (BRI) as an indicative of speed of germination, coefficient of velocity (CV) of germination, germination energy (GE), mean seedling length (MSL), mean seedling dry weight (MSDW), SVI-I (seedling vigour index) and SVI- II were significantly higher (89.90 %, 94.14 %, 0.542, 70.41%, 83.76 %, 28.95cm, 20.78 cm, 10.56 mg, 2734 and 998, respectively) in high vigour seeds compared to low vigour seeds. However, the low vigour seeds have recorded 33.85 per cent higher final count germination in contrast to 8.84 per cent increase in high vigour seeds due to priming when compared to unprimed seeds. The total dehydrogenase (TDH) activity and total soluble protein (TSP) was higher (2.535 & 320.30µg/g) in high vigour seeds as well as in seeds primed with KNO3 (2.556 & 349.97µg/g). Total soluble sugars (TSS) of seed leachate was significantly lower (117.50µg/ml) in high vigour seeds and also in KNO3 (119.51µg/ml) treated seeds. The amylase, catalase (CAT) and peroxidase (POX) activities were significantly higher in high vigour seeds as well as in KNO_3 primed seeds. Further, the seed DNA content was significantly superior (35.29 µg/g of seed) in high vigour seeds and it was on par with KNO_3 (35.07 µg/g of seed). Therefore, the study clearly proved that the initial stimulus in terms of increased biochemical activities might have resulted in enhanced germination and establishment of vigarous seedlings upon priming in cucumber.

Biography

Sowmya, K.J has completed her Ph.D in Seed Science and Technology from University of Agricultural Sciences, Bangalore, in 2011. She has awarded "INSPIRE (Innovation in Science Pursuit for Inspired Research) Fellowship" for Ph.D research by Government of India, Ministry of Science and Technology, Department of Science and Technology, New Delhi. She has received UAS, Bangalore 'General Merit Gold Medal' for highest merit in Ph.D. She is working as Research Associate in NSP, UAS, Bangalore, under Mega Seed Project of ICAR, New Delhi.

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