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Gravistimulation Effects on *Oryza sativa* Amino Acid Profile, Growth Pattern and Expression of *OsPIN* Genes

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[Introduction]

Microgravity conditions impact on biological processes, graviperception and graviresponses. These processes, however, are still far from being understood. Although microgravity conditions can be generated by free-fall or parabolic flight, these methods do not provide sufficient time for researchers to study most morphogenetic and growth phenomena of plants. In this context, ground-based clinostats are instrumental. Continuous 360° rotation of plants on a clinostat eliminates a set direction of gravity and simulates plant growth under microgravity environments, which is useful to predict potential spaceflight effects on biological specimens1.

[Materials and Methods]

We used three orientations of Petri dishes that were subjected to normal gravity conditions: horizontal, vertical and 90°-rotated orientation, while, for artificial gravity simulation, to generate the microgravity effect, a one-axis clinostat was used. The rotating clinostat rotated continuously anti-clockwise at a speed of 10rpm, and the distance from *O. sativa* seedling to the rotating center was kept approximately 5cm. Thus, the seedlings were subjected to a modeled microgravity of about 5.59 × 10-3g. Horizontal (control), vertical and 90°-rotated Petri dishes were kept under 1 g.

[Results and Discussion]

The results of the present study showed that the amino acid concentrations under microgravity, and as well as in different orientations under normal gravity, are significantly enhanced in the plants that were grow in agar media. The vertical-oriented rice seedlings under normal gravity condition had higher proportions of Thr, Glu, Gly, Ala, Met, Iso, Leu, Tyr, Phe, Lys, His, Arg and Pro when compared to the control, 90°-rotated and clinostat rotation. We also concluded that *OsPIN1* genes are highly induced by clinorotation and exogenously applied IAA and PAA plant hormones that are responsible for enhancing the plant growth.

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