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Gravistimulation on Different Orientations to Check the Growth Pattern, Amino Acid Profile and Expression of OsPIN Genes Encoding Auxin Efflux Facilitator in the *Oryza Sativa* cv. Nagdong Seedling

Muhammad Farooq¹, Kyung-Min Kim^{1*}

¹School of Applied Biosciences, College of Agriculture & Life Science, Kyungpook National University, Daegu, 41566, Korea.

[Introduction]

Scientists investigated that clinostat has the power of ability to simulate the growth of plants, to eliminate a set direction for gravity clinostat rotate plants continually through 360° and it also prevent the accumulation of hormone (auxin) on one side of the roots or stem. Clinorotation effects on plant physiology such as cytoskeletal function has been described in several reports (Hilaire et al. 1995), calcium distribution (Hilaire et al. 1995b), the cell cycle (Legue et al.1992), carbohydrates metabolism (Brown and Piastuch 1994, Obenland and Brown 1994), and the protein expression (Piastuch and Brown 1995). UV radiations have more energy than other rays they can damage DNA, prevent photosynthesis in plants and also affecting damage in a wide variety of lipids and proteins (Cockkell.C.S.et al,1998). Auxin transportation is carry out by the auxin efflux and influx carrier proteins is strictly directional (Muday and DeLong 2001). Phenyl-acetic acid (PAA) previously found in seaweeds and vascular plants it is a naturally occurring auxin (Krasick et al. 2013).

[Materials and Methods]

The rice (*Oryza sativa* subsp. japonica) cultivar Nagdong seeds, large size petri dishes (150×20mm) and plant agar (Duchefa Biochemie) were used as the plant material for the experiments described herein. Agar media was prepared by dissolving agar (15g/L) in double distilled water mix it well with magnet stirer and autoclaved at 121°C for 40 min after autoclaved when the mixture was cooled up to 60°C we fill the replicates of petri- dishes and mixture was kept until solidified at 37°C, then the half germinated rice seeds cultivar Nagdong were subjected to gravistimulation and days after seven we measured the root shoot length, amino acid analysis and relative expression of OsPIN genes.

[Results and Discussion]

Under the effect of gravity stimulation the amino acid concentration found to be different on various orientations along with clinostat, vertical orientation, clinostat, and 90° rotated petri-dish plates seedling showed higher amino acid contents as compared to control (plants grown on horizontal orientations). Result revealed higher proportion of aspartic acid, glutamic acid, leucine, alanine and proline amino acids under the effect of gravistimulation on various orientations as compared to other amino acids. The amino acids such as threonine, serine, Glycine, cysteine, valine, methionine, isoleucine, tyrosine, phenylalanine, lysine, ammonia, histidine, arginine were recorded to be in lower proportion on gravity stimulation. Previous studies highlighted that clinostat rotation affected the concentration of amino acids positively under MS supplementation (RaghadS et al., 2016). In present study we observed that each hormones have differentially regulated the root and shoot growth on gravistimulation. Phytohormones are considered important biotic factors that maintain root and shoot growth, among seven different kinds of Phytohormones auxin (IAA) and gibberellin (GA) are strong accelerators of shoot growth, but decelerator for root growth (Tanimoto, 2015). In present study we observed that UV radiation generally stimulate the root and shoot growth of rice under the treatment of plant hormones on different gravity conditions. We also reported the OsPIN gene up and down regulation by using plant hormones and as well as UV radiation, result revealed that OsPIN1 gene is responsible for root and shoot growth while the OsPIN2 and OsPIN3a genes up regulated when the plant in stress condition.

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*Corresponding author: Tel. +82-10-2650-5414, E-mail, kkm@knu.ac.kr