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### Physio-morphological and mineral contents (iron and zinc) analysis in PAU201×Palman579 derived BC<sub>1</sub>F<sub>5</sub> population in rice (*Oryza sativa* L.)

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Rice (*Oryza sativa* L.), one of the most important food crops in the world, forms the staple diet of more than half of the world population. Micronutrient malnutrition, particularly Fe and Zn deficiency affect over three billion people worldwide mostly in developing countries. Micronutrient enrichment of plants/crops with high bioavailable micronutrient content using conventional breeding and genetic engineering approaches is being used to improve the nutritional quality of major crops. In the present study, variability for physio-morphological traits and mineral (iron and zinc) content analysis in dehusked rice grains was assessed in a collection of 213 BC<sub>1</sub>F<sub>4</sub> rice plants of cross PAU201×Palman579 rice genotypes. BC<sub>1</sub>F<sub>4</sub> population displayed large variation for various physio-morphological traits including plant height (60-120 cm, PAU201-92.0±0.51 cm; Palman579-102.0±1.15 cm), effective number of tillers per plant (4-22, PAU201-12.3±1.95; Palman579-9.6±1.06), panicle length (11-29.3 cm, PAU201-21.9±0.24 cm; Palman579-23.2±0.53 cm) and grain yield per plant (3.26-54.79 g, PAU201-20.01±0.71 g; Palman579-15.69±0.99 g). Dehusked rice grain samples harvested from the BC<sub>1</sub>F<sub>4</sub> population also demonstrated huge variation in iron content (3.9-86.4 µg/g, PAU201-44.6±0.77 µg/g; Palman579-335.0±1.93 µg/g) and zinc content (1.6-140.7 µg/g, PAU201-19.6±1.29 µg/g; Palman579-15.2±1.19 µg/g). Although rice is not considered a major mineral source in the diet, any increase in its mineral concentration could significantly help in reducing iron and zinc deficiency in humans

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### Rapid callus induction and culturing of *Allium sativum* using different phyto-hormonal combinations

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*Allium sativum* or garlic belongs to the family Liliaceae. It has been used by the humans for the past 7,000 years. Central Asia is referred to as its native country. It serves as a perfect seasoning for the addition of taste, aroma and various added nutrients to different recipes. It also consists of a large number of 'sulfur-containing' compounds: Sulfoxides (e.g., alliin), thiosulfonates (e.g., allicin) and dithiols (e.g., ajoene) that possess various important health benefits. Garlic cloves are known to have anti-clotting, anti-arthritis, anti-viral, anti-bacterial, anti-fungal, anti-cancerous, anti-anemic, anti-oxidative and anti-aging properties. This is the reason that it has been used in the Ayurvedic medicine since times immemorial. Conventionally, garlic is grown by means of asexual propagation. But this method has some problems associated with it like variance in irregular or inadequate irrigation, imbalanced soil nutrients, seasonal weather variations, pests, viruses, fungi and insects. These parameters can adversely affect the bulb and clove size, thus affecting the yield. Tissue culture techniques are a solution to all these problems. The aim of this research is to carry out rapid callus induction and culturing of garlic using MS media supplemented with different phyto-hormonal concentrations. 0.1 mg/L 2, 4-D+0.5 mg/L TDZ gave the most prominent callus (induction in 21 days) which was sub-cultured in the same media composition after 21 days of its induction. 0.02 mg/L NAA+0.5 mg/L TDZ and 0.03 mg/L 2, 4-D+0.5 mg/L TDZ also resulted in better callus induction (in 11 and 14 days respectively).

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