Title: Impact of humic acid on growth of Amaranth under salted soil

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As the use of chemical fertilizers and organic synthetic pesticides increases soil and water pollution, safe food production is threatened. It is, therefore, necessary to provide safe food to consumers through organic cultivation. Current organic agricultural technique is not applied from the seedling process but has been applied after the transplanting. It is often found to use plant growth inhibitor for seedlings to prevent physiological disorder under high temperature. This study was aimed to investigate and analyze effects of organic humic acid as an alternative growth regulator on germination rate, seedling growth and tolerance under salt-collected soil of amaranth plant.

Ten organic seeds of Amaranthus (Amaranthus caudatus) were sown in each hole of tray (105 holes) containing organic horticulture media. After germination, one sprout per each hole was left, and the rest seedlings were removed. The seedlings were grown under the fluorescent lamps. On the 15t days after sowing, the 41 seedlings were selected and transplanted to pots in a plant factory facilitated with a 150 μmol of white LED at 25°C of temperature and 50% of relative humidity. After sowing, the tray was submerged in a container containing organically certified humic acid at 0, 0.2, 0.4 and 1.0%. Seedlings treated with 0.2% humic acid or treated with distilled water (control) were transplanted to the organic horticulture media containing 0, 25, or 50mM NaCl. Also the seedlings were transplanted to the organic horticulture media, and then 0, 50, 100 or 200mM of NaCl solution were drenched three times a week.

Germination rate, leaf number, leaf length and width, fresh and dry weights of shoot and root of seedlings were greater when the seedlings were treated with humic acid at the concentration of both 0.2 and 0.4% in the sowing stage, compared to the seedlings with distilled water (control). There was no significant growth when the seedlings treated with 0.2% of humic acid at the germination stage were transplanted to the organic horticulture media containing 0, 25, or 50mM NaCl. When the 50, 100 or 200mM of NaCl solution were drenched three times a week, salt accumulation symptoms occurred in the treatment of NaCl higher than 100mM. The plant height treated with 0.2% of humic acid at the germination stage was 6~20% higher in all the NaCl treatments than the control. In the NaCl 0mM treatment, the root dry weight was twice of plants under the control. The root dry weight was 35% higher when the 0.2% of humic acid was treated at the sowing stage than the control.

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