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Alleviating Heat Stress of Oriental Melon(*Cucumis melo* var. *makuwa*) Through Microbe with ROS Scavenging Ability

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[Introduction]

Heat stress destabilizes membrane proteins, inhibits photosynthesis and cell respiration, produces ROS(Reactive Oxygen Species), and eventually leads to cell death. Oxygen radical accumulation is the main cause of various disorders in crops. Therefore, this study was performed to reduce heat stress by selecting and using ROS scavenging microbe(*Bacillus aryabhattai* YG112, *Brevibacillus laterosporus* CAT1).

[Materials and Methods]

ROS scavenging microbe *Bacillus aryabhattai* YG112 and *Brevibacillus laterosporus* CAT1 were isolated from the soil under heat stress. Phytohormones(IAA, ABA), SOD(Superoxide Dismutase) and Catalase contents of YG112, CAT1 were analyzed. A total of 8 treatment groups were treated with 30 ml of distilled water, LBbroth, YG112, and CAT1 for 3 days at optimum temperature(25°C/20°C) and high temperature(38°C/30°C). The growth investigation was conducted after 0h, 24h, 48h and 72h intervals. After the sample was taken and freeze-dried, the ABA content was analyzed using GC-MS. In addition, the scanning electron microscope(SEM) was used to examine bacterial colonies in the rhizosphere and stomatal opening and closing in plant leaf.

[Results and Discussion]

B. aryabhattai YG112 and *B. laterosporus* CAT1 produced 107.17ng/ml and 4.5ng/ml of IAA and 0.066ng/ml, 0.766ng/ml of ABA respectively. Also, they produced 20mU/ml, 93.3mU/ml of catalase, and 50.77 and 62.3(inhibition rate%) of SOD, respectively. In optimum temperature condition, there were no significant differences in height, leaf length and width in treatment of control, LB broth, YG112. However in CAT1 treatment, they were increased by 12.8%, 4.7%, and 10.8%, respectively, compared to the control treatment. At high temperature condition, there was no significant difference between treatment of control and LB broth, but YG112 treatment increased 37.1%, 23.0%, and 27.4% and CAT1 treatment increased 27.2%, 21.5%, 27.4% respectively. In scanning electron microscopy, CAT1 treatment group confirmed that microbe colonies were settled. In addition, it was confirmed that the stomata of the control group with heat stress were completely closed, but it was opened in CAT1 group.

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