Development of Food Poisoning Resistant Lettuce Using Endophytes in Petasites Japonicus Leaves

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Recently, the number of patients suffering from food poisoning is increasing. The best way to decrease food poisoning is to eliminate its causes. To do this, we have tried to develop edible plants which have resistance from food poisoning bacteria using endophytes. Endophytes improve resistance against pathogens and serve to synthesize various physiological active substances. We tried to make food poisoning-resistance-lettuce with antimicrobial endophytes from Petasites japonicus. We collected P. japonicus from three places in South Korea, and isolated endophytes from them. Then, we tested the antimicrobial activity of the endophytes against 4 food poisoning bacteria using dual culture method, and analyzed MIC of them. Next, we inoculated lettuce with those antimicrobial endophytes. We used 3 inoculation methods: culturing seeds in endophytes-mixed soil, culturing seeds germinated in endophytes agar plate, and spraying endophytes on seedling of lettuce. Then, we made the extraction from each lettuce inoculated with those 3 methods, and tested their antimicrobial activity against 2 food poisoning bacteria. As a result, 27 species of endophytes belonging to 20 genera were identified from P. japonicus. Among them, only 4 endophytes showed antimicrobial activities. I. lacteus showed the lowest MIC against 2 bacteria. Using DNA cloning of inoculated lettuce, we identified that DNA of inoculated endophytes existed in lettuce. The weight of dried lettuce showed no significant difference between inoculated and non-inoculated lettuce. In conclusion, we identified that plants can get useful properties by being inoculated with endophytes. We also ascertained the possibility of developing functional plants like food poisoning-resistance-lettuce.

Awards Won:
Second Award of $1,500
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