

Hot water dipping stimulated wound healing of potato tubers

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Abstract

This study examines the effects of hot water dipping on wound healing of harvested potato tubers and to explore partial mechanisms. The potato 'cv. Longshu No. 7' was used as materials, which were artificially wounded and then dipped into 45 °C hot water for 10 min. The wounded tubers were stored at ambient temperature (20–25 °C, RH 70–80%) in dark for wound healing. The weight loss of wounded tubers and the disease index of wounded tubers inoculated with *Fusarium sulphureum* were determined. The accumulation of suberin poly phenolic, suberin poly aliphatic and lignin at wound sites were observed. The activity of phenylalanine ammonia lyase, peroxidase activity, the content of H₂O₂, total phenols, flavonoids and lignin were also measured. We found that hot water dipping effectively reduced the weight loss and the disease index of wounded potato tubers. The weight loss of treated tubers was 45.1% lower than the control on the 14 d of healing, and the disease index of treated tubers was 18.2% lower than the control on the 21 d of healing. Hot water dipping significantly stimulated the accumulation of suberin poly phenolic, suberin poly aliphatic and lignin at wound sites. The thickness of suberin poly phenolic, suberin poly aliphatic and lignin cell layers of treated tubers were 28.9%, 23.2% and 18.9% higher than the control on the 21 d of healing, respectively. Moreover, hot water dipping significantly enhanced the activity of phenylalanine ammonia lyase and peroxidase. Meanwhile, the H₂O₂ content, total phenols, flavonoids and lignin were also significantly promoted at wound sites by hot water dipping treatment during healing. These results suggested that hot water dipping promotes wound healing of potato tubers by activating phenylpropanoid metabolism, increasing H₂O₂ content and peroxidase activity, promoting the suberin and lignin accumulation at wound sites and decreasing the weight loss and the disease index of tubers during healing.