

### 刺梨果实主要抗氧化组分对机械伤及 UV-B 胁迫的响应

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#### Response of Main Antioxidant Compositions to Mechanical Wounding and UV-B Stress in *Rosa roxburghii* Fruit

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摘要 以‘贵农5号’刺梨为材料,研究了果实发育过程中主要抗氧化组分对机械伤及UV-B胁迫的响应。结果表明:机械伤和UV-B处理均可诱导刺梨果实中H<sub>2</sub>O<sub>2</sub>等自由基的产生,并促使膜脂过氧化水平增加;但抗氧化系统对两种胁迫的响应模式不尽相同:机械伤胁迫下抗氧化酶POD、SOD以及非酶组分AsA、GSH均受快速产生的H<sub>2</sub>O<sub>2</sub>等自由基诱导,表现出快速应激响应;之后这两种抗氧化酶呈现出逐渐降低的趋势,而AsA和GSH则一直保持在较高水平。在UV-B处理中,需要较长时间额外增加UV-B辐射才会有效增加成熟果实中SOD、AsA及GSH等组分的活性或积累;而在减弱紫外处理时,SOD、POD和GSH的变化均表现出前期升高后期回落的趋势。机械伤和UV-B胁迫下,CAT和APX等酶只是间或根本无法检测到活性。总体上看,POD+SOD以及AsA+GSH的共同作用是刺梨果实在这两种胁迫下抗氧化反应的主要机制。

关键词: 刺梨 机械伤 UV-B 抗氧化系统

Abstract: *Rosa roxburghii* Tratt ‘Guinong 5’ was used to investigate the response of antioxidant system to mechanical wounding and UV-B stress during fruit development. The results showed that the reactive oxygen species and membrane lipid peroxidation were all induced by the both stress treatments, but different defense response patterns of antioxidant system were observed. In wounded fruits, the antioxidant enzymes such as POD, SOD and some antioxidant substances of AsA or GSH were provoked immediately led by H<sub>2</sub>O<sub>2</sub> production. Then, with the redox prolonged, the enzyme activities decreased gradually while the contents of AsA and GSH still maintained a high level. Longer-term supplement of UV-B radiation would contribute to SOD activity or AsA and GSH accumulation, and then to the nutritional values in the fruit. In the condition of weakened UV-B treatment (-UV), activities of SOD and POD and content of GSH increased in early development stage but decreased in ripening fruit. POD, but not CAT or APX plays a role of sensitive factor to these kinds of stress. These data reveal that cooperation of antioxidases of POD and SOD with antioxidants of AsA and GSH should be the main ROS-scavenging mechanisms to sense the environment stress and react appropriately by keeping the cellular redox balance in the fruits.

Keywords: *Rosa roxburghii*, mechanical wounding, UV-B radiation, antioxidant system

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