

# **$\alpha$ -Lipoic acid treatment alleviates postharvest pericarp browning of litchi fruit by regulating antioxidant ability and energy metabolism**

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## **Abstract**

Litchi fruit has high commercial value and significant benefits for humans. However, pericarp browning, as the indicator of litchi fruit senescence, limits the shelf life of litchi fruit. Effect of  $\alpha$ -lipoic acid ( $\alpha$ -LA) that has great antioxidant potential, on litchi fruit senescence was investigated. Results showed that  $\alpha$ -LA delayed pericarp browning and attenuated redox stress of litchi fruit, indicated by lower hydrogen peroxide ( $H_2O_2$ ) and superoxide radical ( $O_2^{\cdot-}$ ) contents but higher hydroxy radical scavenging rate. Compared to control,  $\alpha$ -LA treatment enhanced enzymatic: superoxide dismutase (SOD), catalase (CAT), ascorbate peroxidase (APX) and glutathione reductase (GR) as well as nonenzymatic antioxidants: glutathione (GSH) and ascorbate (AsA). Meanwhile,  $\alpha$ -LA was protective against oxidative stress by inducing *glutaredoxin* (*LcGrx*), *thioredoxin* (*LcTrx*) and *methionine sulfoxide reductase* (*LcMsr*) expression levels. These  $\alpha$ -LA-induced antioxidant systems directly increased the antioxidant capacity. Further research indicated that  $\alpha$ -LA pretreatment maintained higher intracellular ATP level and activated extracellular ATP signaling through up-regulating *LcDORN1s* expression, indirectly increasing the antioxidant capacity. In conclusion,  $\alpha$ -LA is effective to increase the antioxidant capacity and delay the pericarp browning of litchi fruit.