

BROWNING OF JACKFRUIT (*ARTOCARPUS HETEROPHYLLUS* CV. J33) RIND DURING FRUIT DEVELOPMENT

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Jackfruit (*Artocarpus heterophyllus*) cv. J33 is an important fruit for export. However, poor postharvest handling and prolonged transit time often results in browning of jackfruit rind, significantly diminishing its external quality. Thus, understanding the biochemical changes during fruit development is crucial, as these influence jackfruit's postharvest behaviour. Thus, this study was conducted to determine reactive oxygen species (ROS) metabolism, antioxidant systems and enzymatic browning reactions of jackfruit rind during fruit development. Fruit of 2, 4, 8 and 12 weeks after anthesis (WAA) were used in the study. Total phenolic compound (TPC), polyphenol oxidase (PPO) enzymatic activity, enzymatic and non-enzymatic antioxidant activity, ROS metabolism were assessed; individual phenolic compounds were determined by UPLC-MS/MS. Present result indicated that TPC, individual phenolic compounds, all antioxidant activities (except catalase, [CAT]) and hydrogen peroxide (H₂O₂) content in jackfruit rind were high during 2 WAA, followed by a gradual decline. Malondialdehyde (MDA) content in jackfruit rind peaked during 4 WAA but decreased in subsequent WAA. Conversely, PPO activity in jackfruit rind increased starting from 4 WAA. Initially, H₂O₂ content in jackfruit rind might have acted as signaling molecules, while during 4 WAA, the excess H₂O₂ might also have functioned as main toxic molecule to stimulate lipid peroxidation (MDA) and oxidative stress. Superoxide dismutase (SOD), CAT, ascorbate peroxidase (APX) and peroxidase (POD) were facilitated differently in jackfruit rind. During 2 WAA, APX and POD activities in jackfruit rind might have controlled the balance between ROS production and antioxidant defenses, while CAT activities have arisen as crucial enzymatic antioxidant to alleviate oxidative damage during 8 and 12 WAA. Besides, phenolic compounds in jackfruit rind, mainly played a role as an antioxidant instead of serving as substrates for oxidation reactions catalyzed by PPO enzyme.

Keywords: Jackfruit rind, fruit development, browning enzyme, phenolic compounds, antioxidants