

## **LOW PROCESSING TECHNOLOGY FOR SMALL SCALE PROCESSOR FOR SUSTAINABLE TROPICAL FRUIT INDUSTRY IN INDONESIA**

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Indonesia is a large country with a population of 283,487,931 replete with a significant diversity of tropical fruits for domestic consumption and export potential. Tropical fruit supply is usually abundant during the season but very limited in the off-season, which leads to increased market prices. However, prices are much lower during October, November, and December, when many of the fruits are in season. Even under normal production conditions, about 20-30% of tropical fruit produced are considered off-grades for the fresh market, though this number has been gradually decreasing. This paper aims to look at the development of low-cost processing technology for tropical fruit in Indonesia, focussing on two important fruit types: mangoes and bananas. In the development of processing techniques, the research follows a cycle that includes laboratory scale, scaling up (using machinery), and model technology. The full cycle takes three years to complete. During model development, it is essential to involve a "champion," meaning a resolute, forerunning focal point or expert, which could be a private company, farmer group, or small processor. The champion will bring forward the technology to the commercial scale and market. For mangoes, processing technologies for mango puree and mango juice were introduced. Based on technical processes outlined in a report, the processing model was implemented by a small processor in Cirebon, West Java, in 2003. A collaborative scheme was developed to ensure the presence of a champion in its development. Additionally, technology was developed to process unmarketable mangoes to detect the presence of resorcinol, a disease-resistant compound in mangoes. The extract has potential to treat anthracnose-like diseases and is more efficient compared to benomyl. However, this extract still needs improvement in its formulation to widen its spectrum. The second commodity is bananas. Bananas can be classified into plantains (Kapas, Tanduk), cooking bananas (Kepok, Uli), and table bananas (Gross Mitchell, Cavendish, Pisang Raja). Unripe bananas contain very high starch content and low acidity, which converts to sugar during ripening. They can be processed into various products such as flour, noodles, banana crisps, banana yogurt, banana artificial rice, and more. For low-cost processing to help reduce waste and stabilize tropical fruit prices in the market, there must be high demand or highly profitable techniques. Additionally, efficient machinery is necessary to ensure production efficiency. Finally, a champion is required to bring the technology to the broader market and society.

Keywords: Indonesia, low processing technology, added value, champion