ISSUES AND SOLUTIONS OF FRESH FRUIT EXPORT IN INDONESIA

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Summary

Specific issues of fresh fruit exports in Indonesia are competition with domestic market, requirement of intensive effort for introduction and adoption of GAP and postharvest handling technology, lack of integrated system to meet high quality and food safety standard, and pressure to choose either supplying the export or domestic market. Center for Tropical Fruit Studies (CETROFS) has been founded to create a concerted action to improve fresh fruits development. CETROFS has assisted small-scale growers in improving GAP, collected germ plasm, and released some new hybrid varieties of fruits. Efforts of government and private sectors for extensification, strengthening supply chain management, and introducing the cooling system and equipment are outlined. Sea-freight transportation is essential for Indonesia along with the land transportation and air-freight. CA and active MAS system in the fruit container for fruit shipment have been introduced. Non-destructive evaluation of fruits is major topic for research and development by concerned engineers. Some investigated areas have been the application of visible light to separate seedless lanzone from ones with seeds, image processing and the use of NIR for classification of mango by color and taste, and ultrasonic to detect the maturity, ripeness, and spoilage of durian and mangoesteen. It is recommended that APCAEM develops R&D cooperations, recognized certification system for standard export quality, and networking among the member countries.

1. Introduction

Indonesian exports of fresh fruits have been fluctuated in the last five years as illustrated both in the total volume (Fig. 1) and the total value (Fig. 2) of major fresh fruit exports, whilst the fruit production has been remained relatively stable (Fig. 3). Major fresh fruit exports are mangosteen, pineapple, mango, banana and papaya. The total export value of Indonesian fresh fruits reached 15.95 million USD in 2002 and dropped back to 9.89 million USD in 2004, and that meant less than 1% world share market. The fresh fruit exports were only about 10% the portion of the total fruit production of Indonesia. Major importing countries of Indonesian fresh fruits remain to be neighbouring Asians (Fig. 4) such as Hongkong for mangosteen and Malaysia for pineapple, with the Middle Eastern countries come lately as new importers for mango and banana.

Whilst the problems faced by fresh fruits growers and exporters in Indonesia are common to other developing nations, major issues are identified as follows.

1. Competition with domestic fruit market for the price of prime quality and total demand. Indonesia has a population of 210 millions with a growing consumption from 37 kg fresh fruits /capita / year since 2004.

2. Requirement of intensive effort for introducing and adoption of good practices in production, and postharvest and distribution handling, due to more small-scale over large-scale growers.

3. Lack of integrated system to meet increasing high quality and food safety standard required by importing countries, and to reduce the cost of export handling and transportation.

4. Driven to choose either supplying the export market or the domestic market, since the consumer preferences in importing countries may quite diverse from the domestic one.

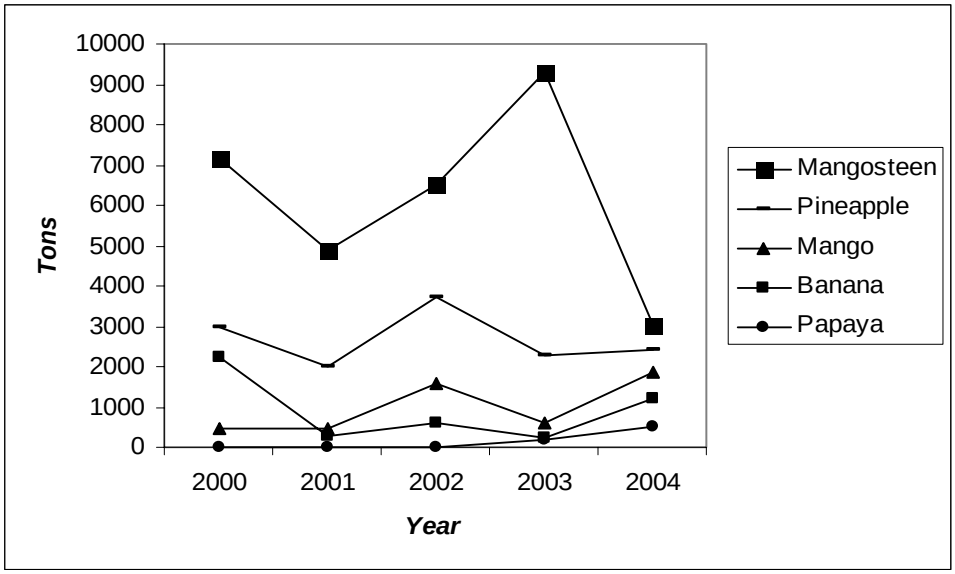

Fig. 1. Major fresh fruit exports of Indonesia in volume (tons), 2000-2004.

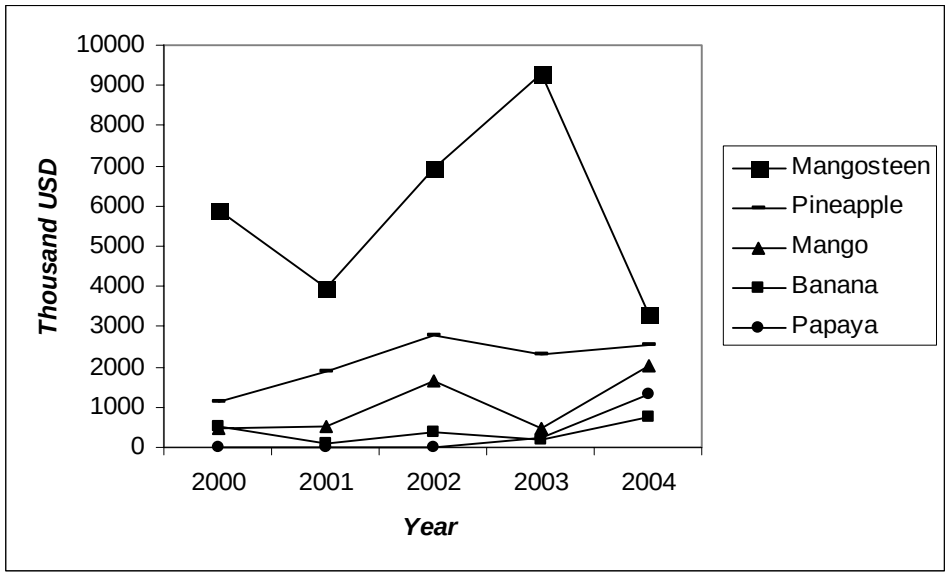

Fig. 2. Major fresh fruit exports of Indonesia in value (thousand USD), 2000-2004.

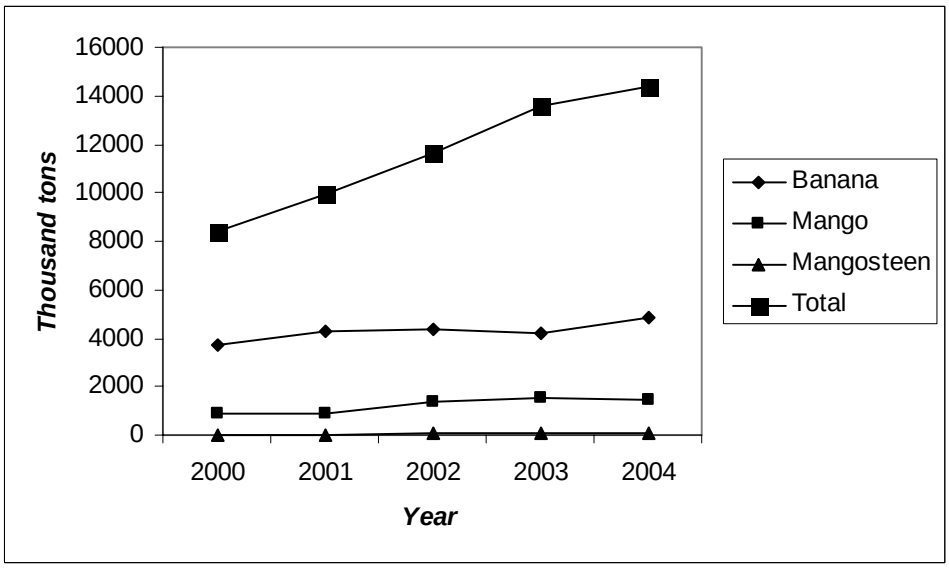

Fig. 3. Major fruit production of Indonesia (thousand tons), 2000-2004.

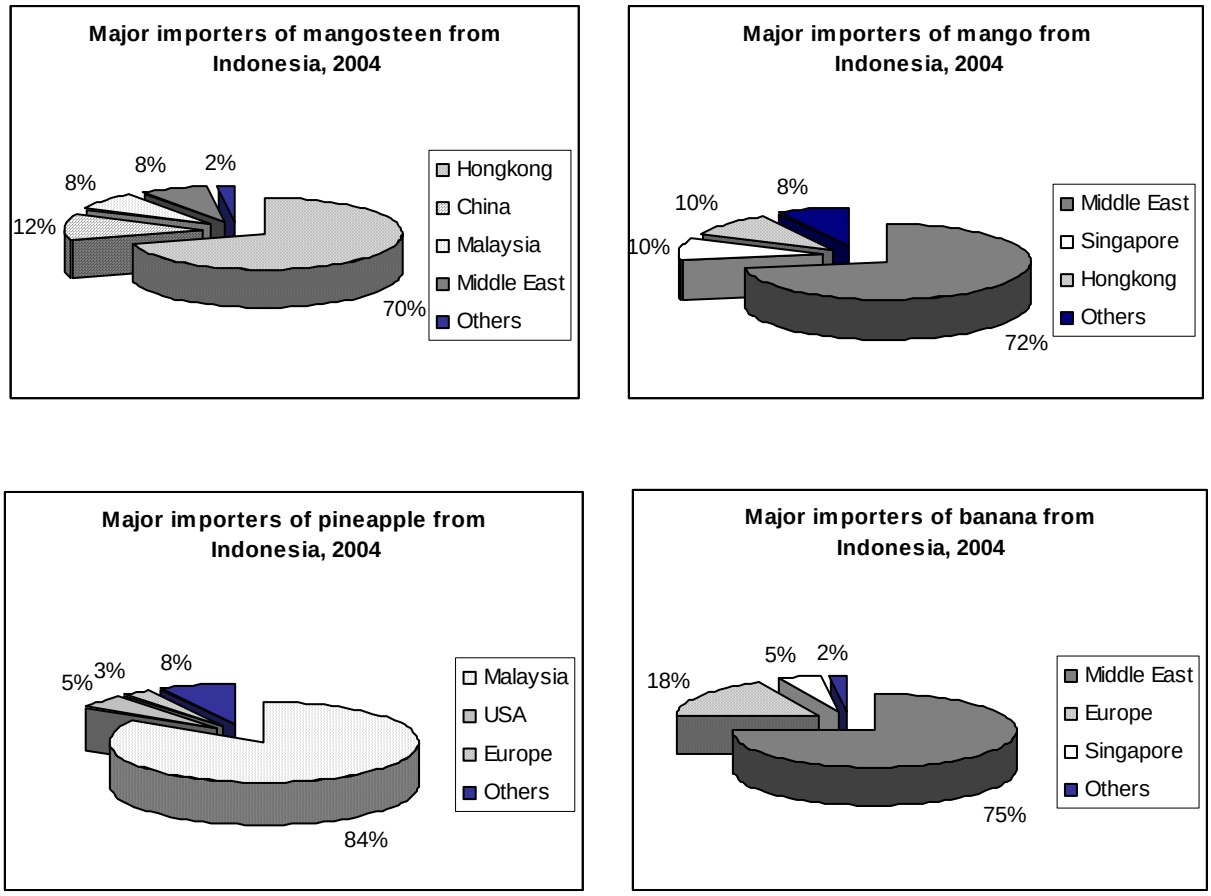

Fig. 4. Major importers of Indonesian fresh fruits, 2004.

2. Strengthening the Institutions Involved in Fruit Development

In effort to create a concerted action to improve GAP and postharvest handling, Indonesia has founded a Center for Tropical Fruits Studies (CETROFS) since 1997. The center has a network covering the universities, the government bodies, and the private sectors. The scope covers from breeding, production, and post harvest handling, and distribution. Currently, the center focus on mangosteen, pineapple, banana and papaya. The center is stationed at IPB, Bogor and funded by the Ministry of Research and Technology, e-mail address is ipbfruit@indo.net.id, http://www.rusnasbuah.or.id.

CETROFS has improved the agricultural practices of mangosteen small-scale growers effectively so that the portion of fruit produced for export quality increased from 5% to 40% (Fig. 5). The method developed by CETROFS includes improvement in terrace system, reducing dense population, alternatingthe use of in-organic with organic fertilizer, pruning, cropping pattern, and control of pest and diseases.

International cooperation has been also set up to help mango small-scale growers in extensification and implementing GAP, like the project of Integrated Horticultural Development in Upland Area at five provinces West Java, Bali, West Nusa Tenggara, and South Sulawesi supported by JICA.

3. Development of New Hybrid Varieties

New hybrid varieties have been developed and released by CETROFS (Fig. 6), for examples, *arum Bogor* and *prima Bogor* papaya, *wanayasa* and *kiarapedes* mangosteen, *mahkota Bogor* (crown of Bogor) and *delika Subang* (delicate of Subang) pineapple. CETROFS has also collected germ plasms resulted in 61 pineapple genotypes, 75 papaya genotypes and 230 banana genotypes. Genetic markers for some fruit varieties have also been determined and method to achieve high multiplication rate of fruits by tissue culture already under way. Sobir and Sujiprihati (2005), for instant, obtained DNA markers to identify sex expression in papaya, utilizing five SCAR (Sequence Characterized Amplified Region) markers of 20-21 mers.

4. Supply Chain and Cold Chain Distribution System

In the supply chain management, the regional governments and private sectors have recently built packing houses at the production centers and sub-terminal agribusinesses at the district cities often completed with cold storage. Even so, the design of packing house and sub-terminal agribusiness needs to be improved, the management institutions need to be strengthened, and the postharvest handling technology needs to be implemented.

Fig. 5. Small scale mangoesteen orchard before (above) and after (below) GAP introduced by CETROFS.

In the last five years, a lot of improvement has taken place in implementing the cold chain distribution system starting from the growers up to the exporters. Many manufacturers of refrigerated truck and containers have opened their business and the sale has been reasonably good since the awareness of using cooling equipment and system to obtain the prime quality of fruits is increasing. However, simple techniques to provide cooling on farm right after harvesting the fruits are not yet spread out widely, and training and demonstration are still required to encourage growers to adopt them, even as simple as pre-cooling method by soaking fruits in a water-ice mixture.

Indonesia is an archipelago consisted of more than 13 000 islands. Collection of fresh fruits from the growers sometimes has to be done from outer islands of Java and Sumatera. In this case, sea-freight is essential next to land transportation, and is more efficient and cheaper compared to air-freight. Sea-freight for export is also the only means of transportation besides air-freight since Indonesia does not have access of land transportation for export as other countries may have in the mainland of Asia, Europe and America. Thus, the use of refrigerated container is a must to support a longer transportation time. The exporters have to accurately calculate the required time to reach the destination port in order to maintain the prime quality of their produce.

Appropriate technology has been considered such as the automatic control of atmosphere (CA) and the active modified atmosphere storage (MAS) inside the fruit container, so that the ripening process could be extended during the transportation and achieved the pre-determined quality when the fruits arrive at the destination markets. Foreign companies supplying the technology have been present in Indonesia, however, the commercial test run for shipping domestic tropical fresh fruits by CA or MAS is still required close observations and studies.

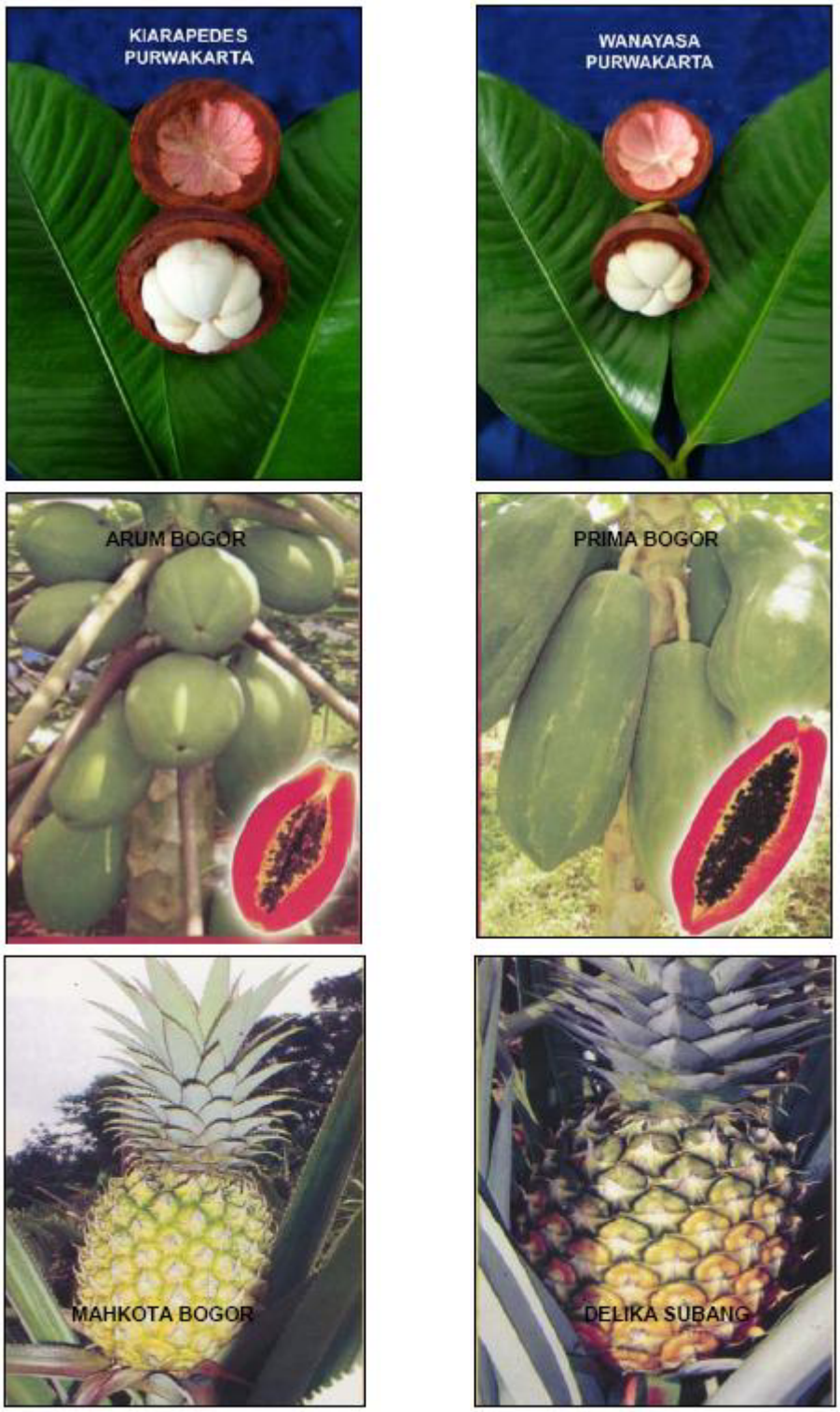

Fig.6. Some of new hybrid varieties released by CETROFS, Indonesia.

5. Research and Development

Lately, research for fresh fruit exports has the objective to facilitate grading for the prime quality fruits. In this point of view, methods for non-destructive quality evaluation have been developed using image processing, visible light, NIR (near infrared reflectance) and ultrasonics. Whilst some researches have provided good results, the implementation of the new techniques is in the hands of commercial parties.

Image processing has been applied to detect and monitor the development of bruise for *salak* stored at room temperature (26°C) and 10°C (Ahmad et al., 2001). Grading of lanzone using the visible light has been developed to separate the seedless fruits from the ones having seeds (Hendri et al., 2001). An evaluation system using image processing for the color of mango cv. *gedong* has been successfully applied along with using NIR for the taste evaluation of the fruits, grading the mango into four different groups : sweet-sour, sweet, sour and tasteless (Saputra et al., 1995, and Susanto et al., 2000).

Ultrasonic is used to evaluate the maturity and ripeness of durian and mangosteen (Budiastra et al., 1999; Haryanto et al., 2001; and Nasution et al., 2005). In the latter case, it also detects the spoiled pulp either by the presence of gamboge, transluscence tissue or rotten fruit. Fig. 7 illustrates the experimental set up for quality evaluation of mangoesteen using ultrasonic wave.

6. Recommendations

1. Research and development cooperation should be established through the APCAEM network based on mutual interests and sponsored by concern donor countries.

2. Development of certification system for standard export quality and food safety in each APCAEM member country, supported by excellent laboratory facilities, which is recognized by all.

3. Available website concerning updated market information and consumer preferences in each APCAEM member country.

4. Networking of association of fruit growers and exporters among APCAEM member countries.

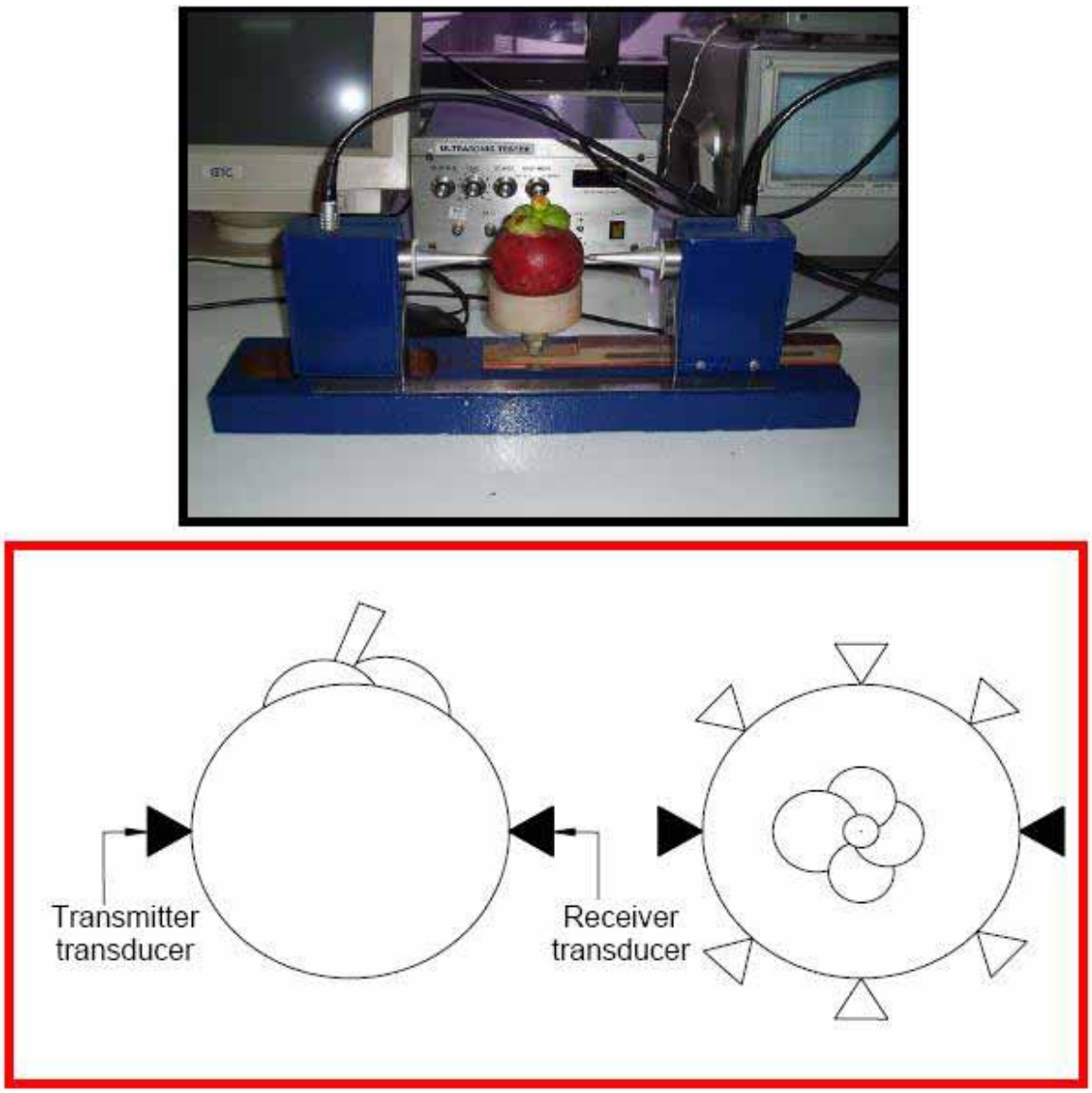

Fig. 7. Experimental set-up for non-destructive evaluation of mangoesteen using ultrasonic wave (Nasution et al., 2005).

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