ANALISIS RISIKO DAN BIAYA KUALITAS BUAH STROBERI (*Fragaria x ananassa*) DALAM PROSES BUDIDAYA DI *TROPICAL PLANT FACTORY*

INTISARI

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Stroberi (*Fragaria x ananassa*) memiliki prospek tinggi untuk dikembangkan di Indonesia, namun budidaya konvensional masih terkendala iklim terbuka dan metode yang kurang efisien. *Plant factory* menjadi solusi melalui sistem tertutup yang memungkinkan kontrol iklim mikro dan produksi sepanjang tahun. Namun, sistem ini tetap menghadapi risiko operasional seperti gangguan sirkulasi udara dan pengendalian hama yang kurang optimal. Penelitian ini bertujuan mengidentifikasi dan mengevaluasi risiko budidaya stroberi dalam *plant factory* menggunakan metode *Failure Mode and Effects Analysis* (FMEA), menganalisis biaya kualitas (*Cost of Quality*/CoQ) dengan pendekatan *Activity Based Costing* (ABC), serta menilai mutu fisik dan kimia buah stroberi. Terdapat 12 mode kegagalan, dengan RPN tertinggi (252) pada pengendalian hama dan penyakit tanaman. Total biaya kualitas sebesar Rp14.663.964, terdiri atas biaya pencegahan (66,86%), penilaian (31,21%), dan kegagalan internal (1,93%), menunjukkan sistem mutu berjalan optimal. Meskipun demikian, tingginya RPN pada pengendalian HPT mengindikasikan bahwa efektivitas investasi pada aspek tersebut masih perlu ditingkatkan. Stroberi varietas *Kingsberry* menunjukkan mutu baik dengan bobot 15 gram, warna cerah, kekerasan 2,06 N, kadar air 90,04%, °Brix 9,43°, dan vitamin C 95,59 mg/100 g. Integrasi FMEA dan CoQ terbukti efektif dalam mendukung efisiensi dan peningkatan mutu produksi.

Kata kunci: *Activity Based Costing, Cost of Quality*, FMEA, kualitas buah, *plant factory*, stroberi.

RISK AND QUALITY COST ANALYSIS OF STRAWBERRY (*Fragaria x ananassa*) CULTIVATION IN A TROPICAL PLANT FACTORY

ABSTRACT

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Strawberries (*Fragaria x ananassa*) have strong potential for development in Indonesia, yet conventional cultivation remains constrained by open climate conditions and inefficient farming methods. The plant factory system offers a solution through a closed environment that allows for microclimate control and year-round production. However, it still faces operational risks such as poor air circulation and suboptimal pest and disease control. This study aims to identify and evaluate cultivation risks using the Failure Mode and Effects Analysis (FMEA) method, analyze quality costs (Cost of Quality/CoQ) with an Activity-Based Costing (ABC) approach, and assess the physical and chemical quality of strawberries. A total of 12 failure modes were identified, with the highest Risk Priority Number (RPN) of 252 found in pest and disease control. The total quality cost reached Rp14,663,964, consisting of prevention costs (66.86%), appraisal costs (31.21%), and internal failure costs (1.93%), indicating that the quality system is functioning optimally. Nevertheless, the high RPN in pest and disease control suggests that the effectiveness of investment in that area still needs improvement. Kingsberry strawberries showed good quality, with an average weight of 15 grams, bright color, hardness of 2,06 N, moisture content of 90.04%, °Brix of 9.43°, and vitamin C content of 95.59 mg/100 g. The integration of FMEA and CoQ has proven effective in supporting production efficiency and quality improvement.

Keywords: Activity Based Costing, Cost of Quality, FMEA, fruit quality, plant factory, strawberry.