PENGARUH DESAIN KANDANG TERHADAP PERTUMBUHAN KOLONI, PRODUKTIVITAS, DAN KUALITAS PRODUK YANG DIHASILKAN LEBAH TANPA SENGAT (*Tetragonula laeviceps*)

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ABSTRAK

Indonesia memiliki lebih dari 400 spesies lebah salah satunya ialah lebah tanpa sengat. Dalam menunjang kualitas lebah *Tetragonula laeviceps* yang optimum diperlukan desain kandang yang baik. Penelitian ini bertujuan untuk mengetahui pengaruh desain kandang terhadap pertumbuhan koloni, produktivitas, dan kualitas produk yang dihasilkan lebah tanpa sengat *(T. laeviceps)* dan mengetahui keterkaitan desain kandang terhadap karakteristik fisikokimia dan bakteri asam laktat pada produk lebah *T. laeviceps*. Pada penelitian ini desain kandang disusun atas lima kelompok diantaranya desain kandang kayu *grid*, kandang kayu nilon, kandang bambu, kandang *Modular Tetragonula Hives* (MOTIVE) I dan II. Variasi kandang diduga memengaruhi pertumbuhan koloni lebah tanpa sengat, produktivitas, dan kualitas produk. Pengamatan lapangan meliputi pertumbuhan koloni *T. laeviceps*, inventarisasi sumber pakan, kuantitas produk, dan kondisi lingkungan selama 60 hari. Pengujian laboratorium meliputi uji fisikokimia, identifikasi bakteri asam laktat, dan identifikasi pakan melalui *bee pollen.* Data dianalisis menggunakan IBM SPPS versi 29, *Image J*, dan *Image Raster* 3.0. Hasil penelitian menunjukkan pertumbuhan koloni terbaik pada kandang kayu nilon, produktivitas madu dengan kuantitas terbanyak ada pada kandang kayu nilon, propolis terbanyak kandang MOTIVE I, dan *bee pollen* pada kandang bambu. Hasil uji kualitas madu terbaik ialah pada kandang bambu dengan nilai pH 3,98, kadar air 22,7%, kadar gula total 76,7%, kekentalan 56,4 milipoise, HMF 13,49 mg/kg, dan kadar fenolik total 4,7 mg GAE/ g. Bakteri asam laktat ditemukan pada sampel madu dengan hasil gram positif dengan bentuk basil dan kokus. Hasil identifikasi *bee pollen* ditemukan polen terbanyak ada pada tanaman stroberi. Berdasarkan hasil penelitian dapat disimpulkan bahwa desain kandang berpengaruh terhadap pertumbuhan koloni, produktivitas dan kualitas produk lebah *T. laeviceps.* Desain kandang kayu nilon merupakan desain kandang yang direkomendasikan karena pertumbuhan koloni, produktivitas, dan kualitas produk paling optimum dibandingkan jenis kandang lainnya.

Kata kunci: desain kandang, kualitas, pertumbuhan, *T. laeviceps*

INFLUENCE OF CAGE DESIGN ON COLONY GROWTH, PRODUCTIVITY, AND QUALITY OF PRODUCTS PRODUCED BY WILDLESS BEES (*Tetragonula laeviceps*)

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ABSTRACT

Indonesia has more than 400 species of bees, one of which is the stingless bee. To support the optimal quality of *Tetragonula laeviceps* bees, a good hive design is required. This study aims to investigate the influence of hive design on colony growth, productivity, and the quality of products produced by stingless bees (*T. laeviceps)*, as well as to determine the relationship between hive design and the physicochemical characteristics and lactic acid bacteria in *T. laeviceps* bee products. In this study, the hive design was divided into five groups: a wooden *grid* hives, a wooden nylon hives, a bamboo hives, and a Modular Tetragonula Hives (MOTIVE) I and II. The variations in hive design are suspected to influence the growth of stingless bee colonies, productivity, and product quality. Field observations included the growth of *T. laeviceps* colonies, inventory of food sources, product quantity, and environmental conditions over 60 days. Laboratory tests included physicochemical analysis, identification of lactic acid bacteria, and identification of food sources through bee pollen. Data were analyzed using IMB-SPSS version 29, Image J, and Image Raster 3.0. The results showed the best colony growth in nylon wood hives, the highest honey productivity in nylon wood hives, the most propolis in MOTIVE I hives, and bee pollen in bamboo hives. The best honey quality test results were found in the bamboo hive with a pH value of 3.98, moisture content of 22.7%, total sugar content of 76.7%, viscosity of 56.4 millipoise, HMF of 13.49 mg/kg, and total phenolic content of 4.7 mg GAE/g. Lactic acid bacteria were found in honey samples with Gram-positive results, appearing as bacilli and cocci. Bee pollen identification results showed the highest pollen content in strawberry plants. Based on the research findings, it can be concluded that hive design influences colony growth, productivity, and the quality of *T. laeviceps* bee products. The nylon wood hive design is the recommended hive design because it yields the most optimal colony growth, productivity, and product quality compared to other hive types.

Keyword: *design, quality, growth, T. laeviceps*