

**DOMESTIKASI DAN BUDIDAYA LEBAH *Tetragonula laeviceps*:
EVALUASI POTENSI PRODUKSI DAN KUALITAS MADU
SEBAGAI IMUNOMODULATOR**

INTISARI

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Penelitian ini bertujuan untuk mengetahui tingkat keberhasilan domestikasi lebah *Tetragonula laeviceps* dari bambu ke kotak, mengetahui kualitas madu lebah *T. laeviceps* berdasarkan komposisi kimia, dan mengetahui manfaat madu lebah *T. laeviceps* sebagai imunomodulator dalam respon imun seluler. Penelitian ini menggunakan 40 koloni lebah *T. laeviceps* dari bambu yang didomestikasikan ke kotak dan dibudidayakan selama 4 bulan di Fakultas Peternakan UGM. Madu dari Lombok Utara NTB dan Nglipar Gunungkidul digunakan sebagai pembanding. Variabel penelitian terdiri dari keberhasilan domestikasi dan tingkat kaburnya lebah, produksi madu dan propolis, kadar air, protein, lemak, abu, vitamin C, pH, total fenolik, total flavonoid, karbohidrat, gula reduksi, sukrosa, glukosa, fruktosa, rasio fruktosa/glukosa, jumlah fruktosa+glukosa, rasio glukosa/air, aktivitas antioksidan DPPH, dan asam amino madu, konsumsi pakan, berat badan, profil hematologi, proliferasi limfosit, kadar IL-6, dan kadar TNF- α . Hasil penelitian menunjukkan bahwa tingkat keberhasilan domestikasi lebah *T. laeviceps* dari bambu ke stup 100% pada bulan pertama dan menjadi 92,5% sampai akhir penelitian dan kabur 7,5%. Produksi madu lebah *T. laeviceps* berkisar 60 – 263 ml dan propolis berkisar 33,60 – 77,20 g. Lokasi budidaya yang berbeda sangat berpengaruh terhadap kadar air, karbohidrat, pH, antioksidan DPPH, total fenolik, fruktosa, rasio fruktosa/glukosa ($P < 0,01$) dan berpengaruh terhadap kadar abu, lemak, protein, vitamin C, total flavonoid, glukosa, rasio glukosa/air, gula reduksi, sukrosa ($P < 0,05$), dan tidak berpengaruh ($P > 0,05$) terhadap jumlah fruktosa+glukosa. Selain itu, juga mempengaruhi profil asam amino. Perbedaan kondisi tikus sehat dan malnutrisi serta pemberian madu *T. laeviceps* berpengaruh terhadap konsumsi pakan, berat badan dan pertumbuhannya ($P < 0,01$). Pemberian madu lebah *T. laeviceps* pada tikus sehat dan malnutrisi berpengaruh terhadap HGB, MCHC, RDW ($P < 0,05$), dan tidak berpengaruh terhadap WBC, RBC, HCT, MCV, MCH, PLT, NEUT, PDW, MPV, dan P-LCR ($P > 0,05$). Selain itu, pemberian madu dapat meningkatkan persentase limfosit ($P < 0,05$), proliferasi limfosit serta dapat menurunkan produksi sitokin proinflamasi IL-6 dan TNF- α ($P < 0,01$). Dapat disimpulkan bahwa tingkat keberhasilan domestikasi lebah *T. laeviceps* sebesar 92,5%. Madu lebah *T. laeviceps* dari Fakultas Peternakan UGM dan Lombok NTB memiliki kualitas yang sama dan bahkan lebih baik daripada madu dari Nglipar Gunungkidul. Madu lebah *T. laeviceps* dapat berperan sebagai imunomodulator melalui peningkatan persentase dan proliferasi limfosit, dan penurunan sitokin proinflamasi IL-6 dan TNF- α pada tikus malnutrisi.

Kata kunci: Lebah tanpa sengat, *Tetragonula laeviceps*, madu, kualitas madu, pro-inflamasi, imunomodulator

**DOMESTICATION AND MELIPONICULTURE OF STINGLESS BEE
Tetragonula laeviceps: EVALUATION OF PRODUCTION
POTENCY AND HONEY QUALITY
AS AN IMMUNOMODULATOR**

ABSTRACT

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This study aimed to determine the rate of domestication success of *stingless bee Tetragonula laeviceps* from bamboos to box hives, to determine the quality of honey from *T. laeviceps* based on the chemical composition and to know the benefits of honey from *T. laeviceps* as an immunomodulator on the cellular immune responses. This study was used 40 colonies of bee *T. laeviceps* from bamboo hives then was domesticated into box hives and meliponiculture for 4 months in the Faculty of Animal Science UGM. Honey from North Lombok NTB and Nglipar Gunungkidul were used as the comparison. The study variables were the success of domestication and the absconding bees, production of honey, and propolis, moisture, protein, fat, ash, vitamin C, pH, phenolic total, flavonoid total, carbohydrate, reducing sugar, sucrose, glucose, fructose, fructose/glucose ratio, sum fructose+glucose, glucose/water ratio, DPPH antioxidant activity, and amino acids, feed consumption, body weight, hematology profile, lymphocyte proliferation, IL-6, and TNF- α levels. The results showed that the domestication of bee *T. laeviceps* from bamboos hives was success 100% in the first month and decreased becoming 92,5% until the study finished and the bee's absconding 7,5%. Production of honey from bee *T. laeviceps* was ranged from 60 to 263 ml and propolis was ranged from 33.60 to 77.20 g per 4 months meliponiculture. The different location for meliponiculture was greatly influencing on moisture, carbohydrate, pH, DPPH antioxidant activity, phenolic total, fructose, fructose/glucose ratio of honey ($P<0.01$). The different location for meliponiculture also was influencing on ash, fat, protein, vitamin C, flavonoid total, glucose, glucose/water ratio, reducing sugar, sucrose ($P<0.05$), and did not affect ($P>0.05$) on the sum fructose+glucose. In addition, the different locations also influencing the profile of amino acids of honey. The different condition both healthy rats and malnourished, and honey administration were greatly influencing on feed consumption, body weight, and the gain ($P<0.01$). In addition, influencing on the HGB, MCHC, RDW ($P<0.05$), did not effect on the WBC, RBC, HCT, MCV, MCH, PLT, NEUT, PDW, MPV, and P-LCR ($P>0.05$), increased the lymphocyte percentage ($P<0.05$), lymphocyte proliferation and decreased the cytokines production of pro-inflammatory were IL-6 and TNF- α ($P<0.01$). It can be concluded that the success rate of the domestication of *T. laeviceps* bee was 92.5%. The honey quality from the Faculty of Animal Science UGM and Lombok was similar and was better than honey from Nglipar. The honey act as an immunomodulator by increasing percentage and lymphocyte proliferation and suppressing pro-inflammatory cytokines IL-6, and TNF- α in malnourished rats.

Keywords: *Stingless bee*, *Tetragonula laeviceps*, honey, honey quality, pro-inflammatory, immunomodulator