

SUPLEMENTASI MIKROKAPSUL PROBIOTIK *INDIGENOUS* BAKTERI ASAM LAKTAT DAN HERBAL EFEKNYA TERHADAP KESEHATAN USUS DAN PROFIL PROTEIN TELUR AYAM

INTISARI

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Penelitian ini bertujuan untuk mempelajari pengaruh suplementasi mikrokapsul probiotik bakteri asam laktat (BAL) *indigenous* campuran dan herbal terhadap kesehatan usus ayam petelur dan profil protein telur ayam. Penelitian tahap pertama memproduksi mikrokapsul BAL. Variabel yang diukur adalah waktu pertumbuhan dan waktu generasi BAL, perbandingan campuran probiotik BAL, viabilitas sebelum dan setelah mikroenkapsulasi, pelepasan probiotik BAL dari bahan penyalutnya. Penelitian tahap kedua suplementasi mikrokapsul probiotik BAL dan herbal terhadap kesehatan usus ayam petelur. Pada penelitian ini digunakan 45 ekor ayam petelur strain Lohmann Brown umur 57 minggu. Ransum basal yang diberikan berbasis jagung-bungkil kedelai tanpa antibiotik dengan kandungan protein kasar 17,01 % dan energi termetabolis 2809,74 kcal/kg. Herbal yang digunakan adalah herbal Sekuntum. Variabel yang diamati meliputi histomorfologi tiga segmen usus halus: tinggi dan lebar vili, kedalaman dan lebar kript, rasio tinggi vili dan kedalaman kript, serta kepadatan sel goblet, dan diameter lempeng Peyer. Data hasil penelitian dianalisis statistik menggunakan rancangan acak lengkap pola searah, dan dilanjut menggunakan Duncan's new multiple range test. Penelitian tahap ketiga mengkaji profil protein telur ayam yang disuplementasi probiotik dan herbal. Variabel yang diamati adalah profil protein kuning telur dan putih telur. Profil telur diamati menggunakan SDS-PAGE. Telur yang dikoleksi dari 3 hari terakhir dari setiap siklus peneluran, yaitu: hari ke-26, 27, dan 28. Data hasil penelitian menunjukkan bahwa perbandingan yang terbaik dari campuran tiga strain probiotik BAL adalah *Lactobacillus murinus* Ar3, *Streptococcus thermophilus* Kp2, dan *Pediococcus acidilactici* Kd6 1: 1,18: 1,6 v/v. Viabilitas setelah *spray drying* sebesar 75,90% dan stabilitas sebesar 72 %. Suplementasi mikrokapsul probiotik BAL dan herbal meningkatkan tinggi vili, kedalaman kript dan rasio tinggi vili dengan kedalaman kript ($P < 0,05$). Kepadatan sel goblet dan diameter lempeng Peyer meningkat ($P < 0,05$) dengan suplementasi mikrokapsul probiotik BAL dan herbal. Suplementasi probiotik maupun herbal sekuntum menambah jumlah fraksi protein kuning telur. Dapat disimpulkan dari penelitian ini bahwa suplementasi mikrokapsul probiotik bakteri asam laktat indigenous maupun campuran herbal meningkatkan kesehatan usus dan menambah jumlah fraksi protein telur ayam.

Kata kunci: Bakteri asam laktat, Herbal, Kesehatan saluran pencernaan, Mikrokapsul probiotik *indigenous*, Profil protein telur

SUPPLEMENTATION OF INDIGENOUS PROBIOTIC LACTIC ACID BACTERIA MICROCAPSULE AND HERBS EFFECTS ON INTESTINAL HEALTH AND CHICKEN EGG PROTEIN

ABSTRACT

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This study was aimed to evaluate the benefits of indigenous probiotic lactic acid bacteria (LAB) microcapsule and herbal mixture supplementations on intestinal health and chicken egg protein profile. The first step evaluated the best combination of 3 strains lactic acid bacteria with viability bacteria and releasing time of probiotic from the microcapsule as response criterion studied. Variable data collected in the best combination of probiotic formula were generation time and viability of the 3 strains of probiotic, as well as the releasing time of LAB probiotic from microcapsule. Second step evaluated the application of probiotic on intestinal health of laying hens. Efficacies of the probiotic and herbal mixture supplementations were studied using 57 weeks old of 45 Lohmann Brown laying hens. A corn-soybean based diet was used with 17.01% crude protein and 2809.74 kcal/kg metabolizable energy contents. Herbal product used in current study was Sekuntum herbal, a mixture of Indonesian local herbs. Variable data collected in the health state parameter was small intestine histomorphology. All collected data were statistical analysed using Oneway arrangement of Completely Randomized Design. The significant difference data were separated using Duncan's new multiple range test, based on the P-value of less than 5%. Third step evaluated egg protein profile of laying hens fed diets containing multi strains of probiotic or mixture of herbal additives. Variable data collected in the chicken egg protein parameter was egg protein profile using SDS-PAGE from the last 3 days collection in each laying period, i.e. from days 26, 27, and 28, respectively. Results of the study showed that the best formulation of a combination of 3 strains of probiotic lactic acid bacteria would provide the best viability with a ratio of *Lactobacillus murinus* Ar3, *Streptococcus thermophilus* Kp2, and *Pediococcus acidilactici* Kd6 was 1: 1.18: 1.6 v/v. Probiotic BAL was able to survive after spray drying by 75,90% and stability 72%. Supplementation of BAL probiotic microcapsules and herbal increased villi height, crypt depth and the ratio of villi height to crypt depth ($P < 0.05$). Goblet cells density and diameter of Peyer's patches increased by supplementation of microcapsule probiotic and herbal ($P < 0.05$). Supplementation of probiotic microcapsules of lactic acid bacteria or herbal sekuntum improved egg yolk protein fractions. It could be concluded from current studies that supplementations of microcapsule probiotic indigenous lactic acid bacteria or combination of herbs improved intestinal health status and the number of protein fractions in chicken egg.

Keywords: Herbal, Indigenous probiotic microcapsule, Intestinal health, Lactic acid bacteria, Profile of egg protein