

THE EFFECTS OF NANOENCAPSULATED PUMPKIN EXTRACT IN DRINKING
WATER ON GROWTH PERFORMANCE, GUT HEALTH,
AND MEAT QUALITY OF BROILER CHICKEN

ABSTRACT

Ifan Dwi Suryayuliana
20/470099/PPT/01141

Current study was aimed to determine the characteristics and the effect of nanoencapsulated pumpkin extract (NPE) on growth performance, meat quality, and intestinal histomorphology of broiler chickens. This research was consisted of three consecutive studies: NPE characteristics evaluation (particle size, zeta potential, and morphology of the extract), ability of NPE on bacterial inhibition, and *in vivo* study using broiler chickens. A total of 180 unsexed broiler chickens were placed randomly into six treatments with five replications, and six chicks per pen. The treatments applied were: drinking water without additive supplementation (P1), drinking water with 100 ppm antibiotic Tetracycline (P2), or with 100 ppm pumpkin extract (P3), or with 200 ppm pumpkin extract (P4), or with 100 ppm NPE (P5), or with 200 ppm NPE (P6). Parameter studies included growth promoting properties, meat quality, and intestinal histomorphology of broiler chickens. All data were analyzed statistically using Oneway ANOVA with completely randomized design. Result showed that NPE had particle size of 17.5 nm and zeta potential of -15.7 mV. Visual study showed that homogeneity of the NPE solution was appeared clear and good. NPE had the ability to inhibit ($P < 0.001$) the growth and population of *Escherichia coli* and *Salmonella typhimurium*. Results also showed that NPE supplementations in drinking water had no effect on growth performance, water holding capacity, cooking loss, tenderness, and protein content of broiler chickens meat. However, NPE supplementation in drinking water reduced ($P < 0.001$) fat and water contents of the meat, increased ($P < 0.001$) villi height, villi width, crypt depth, but decreased ($P < 0.001$) the ratio of jejunal villi height to crypt depth. The conclusion is nanoencapsulation of pumpkin extract can improve the quality of water content and fat content of broiler chicken meat, and maximize the health of the digestive tract of broiler chickens.

Keywords: Broiler chickens, Growth performance, Intestinal health, Meat quality, Pumpkin extract nanoencapsulation

PENGARUH NANOENKAPSULASI EKSTRAK LABU KUNING DALAM AIR MINUM TERHADAP KINERJA PERTUMBUHAN, KESEHATAN SALURAN PENCERNAAN, DAN KUALITAS DAGING AYAM BROILER

INTISARI

Ifan Dwi Suryayuliana
20/470099/PPT/01141

Penelitian ini bertujuan untuk mengetahui karakteristik dan pengaruh nanoenkapsulasi ekstrak labu kuning (NELK) terhadap kinerja pertumbuhan, kualitas daging, dan histomorfologi usus ayam broiler. Penelitian ini terdiri dari tiga tahap: evaluasi karakteristik NELK (ukuran partikel, potensi zeta, dan morfologi), pengujian kemampuan NELK dalam penghambatan bakteri, dan studi *in vivo* menggunakan ayam broiler. Pada penelitian *in vivo*, sebanyak 180 ekor ayam broiler ditempatkan secara acak ke dalam enam perlakuan dengan lima ulangan, dan enam ekor ayam per kandang. Perlakuan yang diterapkan meliputi: air minum tanpa suplementasi aditif (P1), air minum dengan 100 ppm antibiotik tetrasiklin (P2), air minum dengan ekstrak labu kuning 100 ppm (P3), air minum dengan ekstrak labu kuning 200 ppm (P4), air minum dengan 100 ppm NELK (P5), dan air minum dengan 200 ppm NELK (P6). Parameter yang diamati meliputi laju pertumbuhan, kualitas daging, dan histomorfologi usus ayam broiler. Semua data dianalisis secara statistik menggunakan Oneway ANOVA dengan rancangan acak lengkap. Hasil penelitian menunjukkan bahwa NELK memiliki ukuran partikel 17,5 nm, potensial zeta -15,7 mV. Studi visual menunjukkan bahwa homogenitas larutan NELK tampak jelas dan baik. NELK memiliki kemampuan untuk menghambat ($P < 0,001$) pertumbuhan dan populasi *Escherichia coli* dan *Salmonella typhimurium*. Hasil penelitian menunjukkan bahwa penambahan NELK dalam air minum tidak berpengaruh terhadap kinerja pertumbuhan, daya ikat air, susut masak, keempukan, dan kandungan protein daging ayam broiler. Namun demikian, suplementasi NELK dalam air minum menurunkan ($P < 0,001$) kandungan lemak dan air daging, meningkatkan ($P < 0,001$) tinggi vili, lebar vili, kedalaman kript, dan menurunkan ($P < 0,001$) rasio tinggi vili terhadap kedalaman kript jejunum. Dapat disimpulkan bahwa nanoenkapsulasi ekstrak labu kuning mampu meningkatkan kualitas kadar air dan kadar lemak daging ayam broiler, serta memaksimalkan kesehatan saluran pencernaan ayam broiler.

Kata kunci: Ayam broiler, Kesehatan usus, Kinerja pertumbuhan, Kualitas daging, Nanoenkapsulasi ekstrak labu kuning