

**NANOEMULSI MINYAK ATSIRI CENGIH (*Syzygium aromaticum*) SEBAGAI
PENGAWET ALAMI DAGING AYAM BROILER SELAMA PENYIMPANAN
PADA SUHU REFRIGERATOR**

INTISARI

DITA AVIANA DEWI
23/529082/PPT/01315

Penelitian ini bertujuan untuk menentukan formula nanoemulsi minyak atsiri cengkih (*Syzygium aromaticum*) dan mengetahui efektivitas nanoemulsi terhadap kualitas mikrobiologis, fisikokimia, dan sensoris daging ayam broiler selama penyimpanan. Nanoemulsi diformulasikan melalui sistem self-nanoemulsifying drug delivery system (SNEDDS). Formulasi dan optimasi nanoemulsi dilakukan menggunakan D-optimal mixture design. Karakterisasi nanoemulsi dilakukan untuk mengetahui ukuran partikel, polydispersity index (PDI), potensial zeta, dan aktivitas antibakteri. Aplikasi nanoemulsi pada daging ayam dilakukan terhadap beberapa konsentrasi yaitu 25.000 ppm (P1), 12.500 ppm (P2), 6.250 ppm (P3) dan 3.125 ppm (P4). Daging ayam broiler yang telah dicelupkan pada nanoemulsi disimpan untuk diamati pada hari ke 0, 4, 8, dan 12. Data dianalisis dengan rancangan acak lengkap pola searah menggunakan SPSS 29.0. Apabila terjadi perbedaan antar nilai rerata, maka dilakukan uji lanjut menggunakan Tukey HSD. Formulasi nanoemulsi minyak atsiri cengkih (*Syzygium aromaticum*) dengan komposisi minyak atsiri cengkih 2,5%, VCO 2,5%, surfaktan Tween 80 sebesar 15,84%, ko-surfaktan PEG 400 sebesar 4,15% dan aquadest 75% memiliki karakteristik ukuran partikel 12,77 nm, PDI 0,372, dan zeta potensial 29,6 mV. Uji antibakteri terhadap *Salmonella sp*, *Escherichia coli*, dan *Staphylococcus aureus* menunjukkan aktivitas antibakteri sedang. Uji aktivitas antioksidan menunjukkan nanoemulsi minyak atsiri cengkih memiliki presentase inhibisi sebesar 85,06% dan nilai IC_{50} sebesar 2,884 $\mu\text{g/ml}$. Aplikasi nanoemulsi minyak atsiri cengkih pada konsentrasi 25.000 ppm pada daging ayam broiler efektif menekan pertumbuhan bakteri, mampu mempertahankan kualitas fisik daging dan mampu meningkatkan mutu sensoris pada atribut warna, aroma, dan daya terima selama penyimpanan.

Kata Kunci: Daging ayam broiler, Minyak atsiri cengkih, Nanoemulsi, Pengawetan daging

NANOEMULSION OF CLOVE ESSENTIAL OIL (*Syzygium aromaticum*) AS A NATURAL PRESERVATIVE FOR BROILER CHICKEN MEAT DURING STORAGE AT REFRIGERATOR TEMPERATURES

ABSTRACT

DITA AVIANA DEWI
23/529082/PPT/01315

This study aims to determine the nanoemulsion formula of clove essential oil (*Syzygium aromaticum*) and determine the effectiveness of nanoemulsion on the microbiological, physicochemical, and sensory quality of broiler chicken meat during storage. Nanoemulsion was formulated through a self-nanoemulsifying drug delivery system (SNEDDS). Formulation and optimization of nanoemulsion were carried out using a D-optimal mixture design. Nanoemulsion characterization was carried out to determine particle size, polydispersity index (PDI), zeta potential, and antibacterial activity. Application of nanoemulsion to chicken meat was carried out at several concentrations, namely 25,000 ppm (P1), 12,500 ppm (P2), 6,250 ppm (P3) and 3,125 ppm (P4). Broiler chicken meat that had been dipped in the nanoemulsion was stored to observe its physical, chemical, microbiological, and sensory quality on days 0, 4, 8, and 12. The data were analyzed using a completely randomized design with a one-way pattern using SPSS 29.0. If there were differences between the mean values, a further test was performed using Tukey HSD. The formulation of clove essential oil (*Syzygium aromaticum*) nanoemulsion with a composition of 2.5% clove essential oil, VCO 2.5%, Tween 80 surfactant 15,84%, and PEG 400 co-surfactant 4,15% and aquadest 75% had particle size characteristics of 12.77 nm and PDI 0.372. Antibacterial tests against *Salmonella* sp, *Escherichia coli*, and *Staphylococcus aureus* showed moderate antibacterial activity. Antioxidant activity tests showed that clove essential oil nanoemulsion had an inhibition percentage of 85.06% and an IC₅₀ value of 2.884 µg/ml. The application of clove essential oil nanoemulsion at a concentration of 25,000 ppm on broiler chicken meat effectively suppressed bacterial growth maintained the physical quality of the meat, and improved the sensory quality in terms of color, aroma, and acceptability during storage.

Keywords: Broiler chicken meat, Clove essential oil, Nanoemulsion, Meat preservation