Self-emulsifying delivery system of oregano oil as a natural alternative antibiotic in poultry production

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Abstract: This study aimed to develop the self-emulsifying delivery system for dispersing oregano (Origanum vulgare L.) oil in poultry drinking water in order to use as a natural alternative for replacing antibiotic. The self-emulsifying oil formulations were prepared by using the surfactant mixtures of lecithin and Tween 80 at different weight ratios (0:1, 1:3, 1:1, 3:1 and 1:0). The developed formulations were investigated for physicochemical properties in terms of appearance, oil droplets size, polydispersity index (PDI) and zeta potential (ZP). In addition, the chemical stability of the selected formulation was investigated by GC-MS technique after three months of storage. The results revealed that combination of lecithin and Tween 80 with the weight ratio of 3:1 provided the highest stability of oil-in-water (O/W) emulsions. The synergistic performance of lecithin or Tween 80 is possibly attributed to favourable interaction between both molecules at O/W interface. The oil droplets size was below 200 nm with low PDI (~ 0.2) when mixed with deionized water. Zeta potential of the emulsion droplets had a high negative charge of ~ -50 mV. GC-MS chromatogram showed that the main component of oregano oil was carvacrol (>80%). This active component remained stable in our self-emulsifying oil formulations after storing at room temperature for three months.

Keywords: Lecithin; Oregano oil; Self-emulsifying delivery system; Surfactant; Tween 80