

Evaluation of the Antibacterial Effects of Turmeric Oleoresin, Capsicum Oleoresin and Garlic Essential Oil against Shiga Toxin-Producing *Escherichia coli*

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Abstract : Colibacillosis is one of the major health problems in young piglets ultimately resulting in their death, and it is common especially in young piglets. For the swine industry, colibacillosis is one of the important economic burdens. Therefore, it is necessary for the swine industries to prevent Colibacillosis in piglets in order to reduce economic losses. Thus, we tested three types of natural plant extracts (PEs) to evaluate antibacterial effects against Shiga toxin-producing *Escherichia coli* (STEC) isolated from the piglet. Three PEs including turmeric oleoresin (containing curcumin 79 to 85%), capsicum oleoresin (containing capsaicin 40%-40.1%), and garlic essential oil (100% natural garlic) were tested using the direct contact agar diffusion test, minimum inhibitory concentration test, growth curve assay, and heat stability test. The tests were conducted with PEs at each concentration of 2.5%, 5%, and 10%. For the heat stability test, PEs with 10% concentration were incubated at each 4, 20, 40, 60, 80, and 100 °C for 1 hour, then the direct contact agar diffusion test was used. For the positive and negative controls, 0.5N HCl and 1XPBS were used. All the experiments were duplicated. In the direct contact agar diffusion test, garlic essential oil with 2.5%, 5%, and 10% concentration showed inhibit zones of 1.1cm, 3.0cm, and 3.6 cm in diameters compared to that of 3.5cm diameter for 0.5N HCl. The minimum inhibited concentration of garlic essential oil was 2.5%. Growth curve assay showed that the garlic essential oil was able to inhibit STEC growth significantly after 4 hours. The garlic essential oil retained the ability to inhibit STEC growth after heat treatment at each temperature. However, turmeric and capsicum oleoresins were not able to significantly inhibit STEC growth by all the tests. Even though further tests using the piglets will be required to evaluate effects of garlic essential oil for the Colibacillosis prevention for piglets, our results showed that the garlic essential oil could be used as a potential natural agent to prevent Colibacillosis in swine.

Keywords : garlic essential oil, pig, Colibacillosis, *Escherichia coli*

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