

Antibacterial activity of extracts from *Sanguisorba officinalis* against the fish pathogens *Vibrio anguillarum* and *Aeromonas salmonicida*

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A number of diseases caused by bacterial, viral, and parasitic pathogens have led to heavy mortality in Japanese flounder causing economic losses to farmers. Among fish bacterial pathogens *Vibrio anguillarum* and *Aeromonas salmonicida* are the more common causative agents in Korean mariculture. There is an increasing interest in the use of antimicrobial herbal extracts over the use of chemicals and antibiotics due to their little or no side-effects. Antimicrobial properties of extracts from the root of *Sanguisorba officinalis* were assayed against the bacterial fish pathogens *V. anguillarum* and *A. salmonicida*. The root of *S. officinalis* was extracted with 80% methanol, suspended in water and then partitioned with methylene chloride. The methylene chloride fraction of *S. officinalis* (SO-MC) was subjected to chromatography and antibacterial activity, as assessed by the disc diffusion method, was detected in nine fractions. Fraction III was the most active against *V. anguillarum* and *A. salmonicida* with additional activity detected in fractions V, VII and VIII. After further chromatography, four compounds were isolated and their antibacterial effects were determined using disc diffusion and micro dilution methods. In a comparison of HPLC elution patterns of the active fractions, one metabolite peak was common in these fractions. Isolation of this metabolite identified it as methyl 3-O-methyl gallate. From the other fractions, three compounds were isolated and identified as β -amyryn, 3,3',4'-O-trimethylellagic acid, and ziyuglucoside. The chemical structures of purified compounds were elucidated by NMR analyses. Out of the four isolated compounds, only methyl 3-O-methyl gallate showed significant antibacterial activities against *V. anguillarum* and *A. salmonicida*, showing minimum inhibition concentrations of 125 $\mu\text{g/mL}$ and 62.5 $\mu\text{g/mL}$, respectively. Thus, the root of *S. officinalis* may be a potential source for the identification and development of anti-bacterial alternatives in aquaculture.

Keywords: *Sanguisorba officinalis*, *Vibrio anguillarum*, *Aeromonas salmonicida*, methyl 3-O-methyl gallate

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