

TITLE: ANTIBACTERIAL ACTIVITY OF *Macrocystis pyrifera* ETHANOLIC EXTRACT AND ITS EFFECT ON SWARMING MOTILITY OF *Pseudomonas aeruginosa* PAO1 AND *Serratia liquefaciens* MG1

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ABSTRACT: *Macrocystis pyrifera* is a kelp species (large brown algae) distributed on the coast of the Pacific ocean of North and South America. Studies with different extraction protocols have shown its antibacterial potential. Biofilms are communities of surface attached bacteria characterized by increased resistance to antibiotics. Swarming motility is important at the beginning of biofilm formation favoring the attachment process which precedes micro colony growth. This study aimed to test the antibacterial activity of *M. pyrifera* ethanolic extract and its effect on swarming motility of pathogenic and opportunistic bacteria *Pseudomonas aeruginosa* PAO1 and *Serratia liquefaciens* MG1. The kelp was collected from the Palominos Island (Constitutional Province of Callao – Lima, Peru). After external cleaning, seaweed was dried with cool drying technology, then grinded in Ultra Centrifugal Mill ZM 200 until particles size of 0.25 mm. Twenty grams of dried kelp was left overnight with 70% ethanol:water (volume/volume) at room temperature. After being centrifugated at 3000 rpm for 15 minutes, ethanol present in the supernatant was evaporated in a rotary evaporator obtaining a concentrated extract in water. The final ethanolic extract (EE) had a total solid concentration of 7.3 mg/ml. Total phlorotanins compounds were 3.87 mg/ml expressed as phloroglucinol equivalents. The EE was diluted in Luria Bertani (LB) broth for microbiological tests. Minimal inhibitory concentration (MIC) and growth curves were performed before swarming motility assay, which was done in LB agar at 0.5%. The MIC of the EE for both strains was 3.65 mg/ml. A wide concentration range was tested, resulting that concentrations ranging from 114 µg/ml to 7.125 µg/ml did not affect the growth of both strains since they presented growth curves equal to the control in the absence of extracts. Swarming motility inhibition was observed in *P. aeruginosa* (3.65 mg/ml – 7.125 µg/ml) and *S. liquefaciens* (3.65 mg/ml – 28.5 µg/ml). These results confirmed the antibacterial activity of *M. pyrifera* previously reported. In addition, the inhibition of swarming motility at concentrations that did not affect bacterial growth may suggest an antiquorum sensing effect of *M. pyrifera* extract. The high concentration of phlorotanins in dried kelp indicates the observed effects might be due to these molecules.

Keywords: *Macrocystis pyrifera*, ethanolic extract, phlorotanins, antibacterial effect, swarming motility.

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