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Potential use of marine *Enterococcus spp.* to ferment seaweeds and enhance anticoagulant properties

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The current investigation was performed to evaluate the ability of marine lactic acid bacteria (LAB) as starter cultures for seaweeds fermentation to enhance their anticoagulant activity. 24 LAB isolates from seven marine sediment samples and seven shrimp specimens collected from the Red Sea, Egypt were characterized for their ability to use selected local seaweeds (*Sargassum* sp., *Pterocladia capillacea* and Ulva *lactoca*) as sole carbon source in the growth media. Two LAB strains were selected for seaweed fermentation according to their ability to grow and produce organic acids as indicated by marked pH decreases of the media. Potent strains were biochemically identified as: *Eterococcus durans* MED5 and *Eterococcus hirae* MEH23. The optimum seaweeds fermentation period was determined by monitoring the fermented samples at regular interval for a period of 5 weeks during which activated partial thromboplastintime (APTT), prothrombin time (PT) as well pH values were recorded. The most promising results were observed in cases of *Sargassum* sp., fermented by *E. durans* MED5 and *E. hirae* MEH23 for 2 weeks as they inhibited intrinsic blood coagulation system and recorded APTT assay results of 982 s and 820 s, respectively without affecting the PT assay records at the assessed concentrations. Moreover, *Sargassum* sp., samples fermented by *E. durans* MED5 showed enhanced antioxidant activities compared to the control as they recorded 68.42% in the 2,2-diphenyl-1-picrylhydrazyl (DPPH) scavenging assay. Sulfated polysaccharides (SP) with anticoagulant activity (APTT>1000 s) were partially purified from *Sargassum* sp., sample fermented with *E. durans* MED5 by anion exchange chromatography using DEAE-cellulose column. The FTIR spectrum of the partially purified SP was very much typical to that previously reported for fucoidan, which is the SP characteristic to brown algae. The total dry matter yield in the crude seaweed extract (CSE) and ethanol precipitate (PPT) represents 25 and 13.3% of the fermented seaweed dry weight, respectively. Therefore, this study reveals a novel well-defined starter culture from marine origin intended for seaweed fermentation for recovery of anticoagulant compound and provides information to pave a way towards the development of wide range of seaweed functional foods.

Biography

Khouloud M Barakat is presently working as an Assistant Professor of Marine Microbiology at Alexandria University, Egypt.

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