

Development of Alternative Crab Claw Processing Systems to Minimize Environmental Impact

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(ABSTRACT)

In the recent years, environmental regulations enforced by federal, state, and local agencies have increasingly addressed water quality issues through progressively more stringent regulations. These regulations have raised concerns in the blue crab industry because processors are now subject to regulations under which new processors are unable to meet the effluent limitations with current processing techniques. This study focuses on the mechanized processing of crab claws. Currently, processors use a brine bath, referred to as the Harris Claw machine, to separate crab claw meat and shell, and this process yields a wastewater which is significantly high in pollutant strength, and is untreatable by biological methods due to the toxicity associated with the high chloride concentrations found in the waste stream.

Several alternative crab claw processing systems were developed and evaluated in terms of the meat product yield, the meat product quality, and the wastewater characterization. Two alternatives involved the use of dense media, a 22.5% Staley 1300 corn syrup solution with 5.0% salt and a 30.0% Staley 1300 corn syrup solution, to separate the crab claw meat and shell. These methods, in full scale tests, produced meat yields comparable to that of the brine solution and improved the overall taste of the meat product. However, the effluents had significantly higher BOD₅ concentrations.

Another alternative to the Harris Claw machine, involved the design, characterization, and testing of a hydraulic separator system (HSS). The HSS was tested on a small scale, but was found to have a meat yield comparable to the Harris Claw machine. The HSS significantly improved the flavor of a final meat product, although the HSS meat product had a significantly lower shelf life than the Harris Claw machine meat product. The wastewater quality was improved, because the HSS eliminates the problems associated with a high chloride ion concentration and potentially reduces overall water consumption.