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Optimisation of surfactant decontamination and pre-treatment of waste chicken feathers by using response surface methodology

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ABSTRACT:

Commercially processed, untreated chicken feathers are biologically hazardous due to the presence of blood-borne pathogens. Prior to valorisation, it is crucial that they are decontaminated to remove the microbial contamination. The present study focuses on evaluating the best technologies to decontaminate and pre-treat chicken feathers in order to make them suitable for valorisation. Waste chicken feathers were washed with three surfactants (sodium dodecyl sulphate) dimethyl dioctadecyl ammonium chloride, and polyoxyethylene (40) stearate) using statistically designed experiments. Process conditions were optimised using response surface methodology with a Box-Behnken experimental design. The data were compared with decontamination using an autoclave. Under optimised conditions, the microbial counts of the decontaminated and pre-treated chicken feathers were significantly reduced making them safe for handling and use for valorisation applications.