

SNAPSHOT

EVALUATION OF ELECTROCOAGULATION AS A WASTEWATER TREATMENT TECHNOLOGY FOR MEAT PROCESSORS

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Project Description

The aim of the project was to review the effectiveness of electrocoagulation (EC) for treating wastewater streams from small to medium sized red meat abattoirs in Australia as a possible alternative to chemical coagulation. EC has a long history as a wastewater treatment technology in industries including meat processing, dairies, tanneries, textiles and others. While EC is relatively uncommon in the Australian Meat Processing sector, its small footprint, low chemical consumption and ability to meet stringent wastewater treatment discharge standards has renewed interest in the technology. The project included a technology review and trial as follows:

- A literature review of the application and effectiveness of EC in treating meat processing wastewater streams. The review included comparisons with alternative treatments.
- A pilot trial of an Electrocoagulation Wastewater Treatment System provided by the company, Inovin.
- A comparison of treated wastewater quality with council wastewater treatment discharge standards and environmental regulations surrounding onsite treated water reuse and wastewater irrigation.
- An evaluation of the capital and operating costs for a full scale installation.

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Project Outcome

Lab and full-scale trials have shown that electrocoagulation is capable of removing contaminants from meat processing wastewater including up to and greater than 90% for BOD/COD, oil and grease and phosphorus. It is also capable of removing organic nitrogen (up to 50%) but less effective in removing ammonium nitrogen (15%). The process is quick with residence times of minutes compared to days for commonly used treatment methods.

A number of Australian trials on treatment of meat processing wastewater by electrocoagulation have provided good results with wastewater quality meeting the majority of the local water authority trade waste discharge limits. A trial undertaken for this project required the addition of salt to aid the EC process which produced a salty wastewater stream, which exceeds the discharge limits. Additional treatment is therefore required to remove the salt (e.g. membrane filtration).

There is some research on the cost effectiveness of operating electrocoagulation for meat processors. However, much of this is lab or pilot scale and inconclusive when compared with the cost of chemical coagulation (CC). There is additional research on the cost effectiveness of electrocoagulation compared with chemical coagulation for other non-meat processing waste streams with results showing CC is consistently at least 2-3 times higher to operate with some studies exceeding 10 times higher. The cost of electrical energy, anodes, chemicals and sludge disposal are all very important factors contributing to operational costs of wastewater treatment, with EC having high energy and relatively low chemical and sludge disposal costs. The project has highlighted that existing research on the economics of EC is limited to comparing it with CC when there is potential for EC to be an alternative to broader secondary treatment methods including floatation and treatment ponds and therefore could be suitable for space-constrained meat processing sites.

Benefit for Industry

The project demonstrates that electrocoagulation is a possible and proven alternative to traditionally used treatment methods for meat processing wastewater in Australia. However, further research is required on the actual operating costs of EC for meat processing wastewater and its comparison with traditional treatment methods.