TANNIN BASED ORGANIC COAGULANT'S SUCCESS IN THE RED MEAT PROCESSING SECTOR

Revolutionising wastewater treatment, a tannin-based organic coagulant derived from Acacia tree bark has proven its success over the past two years in the red meat sector. This trial adoption marks significant progress toward sustainable and efficient wastewater treatment practices.

Improving Pre-Treatment Efficiency: The study conducted on the tannin-based organic coagulant's implementation showcased its prowess in replacing metal-based coagulants, significantly enhancing the efficiency of Dissolved Air Flotation (DAF) for Total Suspended Solids (TSS), Oil, and Grease (O&G), and Nitrogen (N) removal.

The organic composition, derived from Acacia tree bark, has been tested at a full scale at a red meat processing facility in Western Australia, confirming its exceptional efficacy in pre-treatment processes. According to the plant operator, the tannin-based organic coagulant has not only proven very efficient in removing TSS, oil and grease, and nitrogen but has also resulted in reduced corrosion of equipment, making operations and maintenance (O&M) more straightforward.

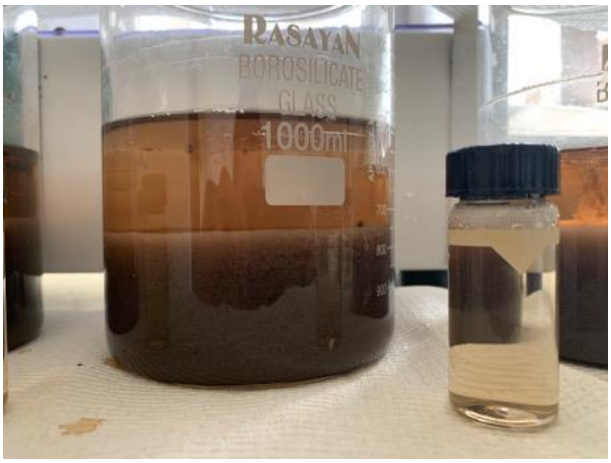

Figure 1. Turbidity removal and treated DAF effluent.

Carbon-Negative Impact: The tannin-based organic coagulant not only proves beneficial in water treatment but also contributes to environmental sustainability. With 25,000 hectares of planted forests, the company boasts a positive Carbon Footprint. Verified by the BVQI certifier, the company's activities result in sequestering 8.2 tons of CO_{2e} for every ton emitted.

No need for pH adjustment

Unlike metal-based coagulants, Tanfloc does not alter the pH of the wastewater and works in a wide range of pH. Also, due to its organic nature, it doesn't contribute to the increase of dissolved solids (TDS) in the wastewater, which is beneficial for reuse applications.

TSS Removal Efficiency: The trial revealed exceptional TSS removal efficiency, exceeding 95% in the initial run. Subsequent runs, designed with lower dosing concentrations, demonstrated remarkable TSS removal rates, even at dosing rates as low as 0.15 mL/L. The results have shown superior turbidity removal and treated DAF effluent, emphasising the effectiveness of the tannin-based organic coagulant.

The use of the tannin-based coagulant (Tanfloc) was tested in two red meat processing plants in Australia. The processing plant based in Western Australia processes around 49,000 tHSCW per annum of sheep/lamb and cattle, and the second plant, based in NSW, processes around 53,000 tHSCW per annum of cattle.

N and P Removal: As part of the study, nitrogen (N) and phosphorus (P) associated with solids were analysed. Approximately 43% of nitrogen and 23% of phosphorous were removed in the preliminary treatment, showcasing the versatility of the tannin-based organic coagulant in addressing nutrient-related challenges.

Removal efficiency in the primary treatment:

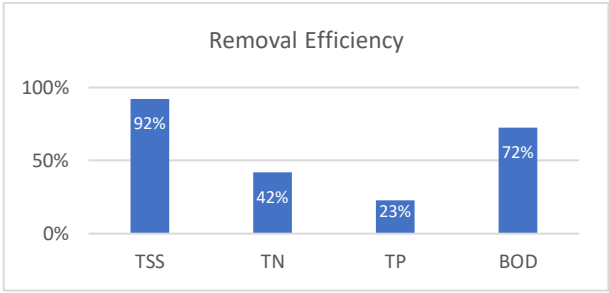

Figure 2. Removal efficiency using the optimised dose of Tanfloc applied to raw wastewater.

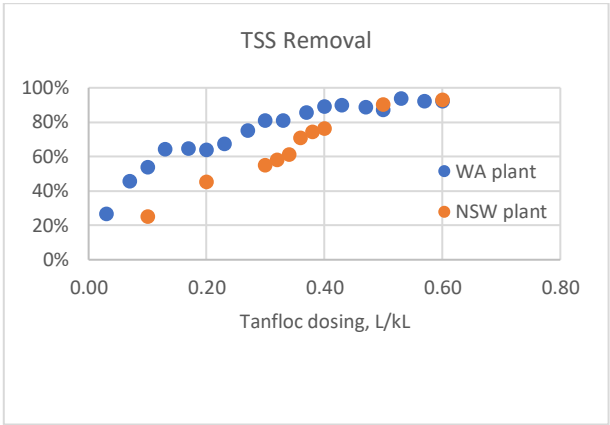

Figure 3. Turbidity and TSS removal using Tannin-based coagulant.

Conclusion: The integration of the tannin-based organic coagulant in raw wastewater has demonstrated significant positive outcomes in various aspects of wastewater treatment. The reported 42% reduction in nitrogen and 23% reduction in phosphorous indicate its effectiveness in

nutrient removal, which is crucial for preventing water pollution and maintaining water quality standards.

The remarkable removal of total suspended solids (TSS) by more than 90% suggests that the tannin-based organic coagulant is highly efficient in clarifying the wastewater. This is particularly valuable as TSS removal is essential for improving the overall quality of treated water and meeting discharge regulations.

Introducing the tannin-based organic coagulant pre-Dissolved Air Flotation (DAF) has resulted in substantial savings in aeration requirements. Aeration is a critical and energy-intensive step in wastewater treatment, so any reduction in its demand represents a significant cost-saving and environmental benefit. Additionally, the decrease in sludge disposal requirements further contributes to the economic and environmental sustainability of the wastewater treatment process.

The success of the tannin-based organic coagulant trial in the red meat sector highlights its potential applicability across various industries. This versatility underscores its capacity to revolutionise wastewater treatment practices, offering cost-effective and environmentally friendly solutions. As industries increasingly prioritise sustainability, the tannin-based organic coagulant emerges as an innovative and promising tool for enhancing wastewater treatment efficiency.

Furthermore, the mention of recovering high-energy content materials at the pre-treatment stage aligns with the principles of resource recovery and energy conservation. This approach not only contributes to saving energy in the overall treatment process (especially in terms of reduced aeration requirements) but also leads to higher biogas productivity. Biogas, a by-product of anaerobic digestion, can be harnessed as a renewable energy source, further emphasising the integrated wastewater management approach's potential benefits.

The tannin-based organic coagulant demonstrates promise in transforming wastewater treatment practices by providing cost-effective, environmentally friendly, and efficient solutions. Its ability to reduce nutrient levels, clarify water, and contribute to energy savings and biogas production positions it as a noteworthy innovation in the quest for sustainable water treatment methodologies.

"Transitioning to the use of Tanfloc has yielded several significant benefits for our business across multiple facets whilst continuing to provide adequate treatment outputs compared to conventional water treatment chemicals. Tanfloc, with its non-corrosive properties, presents a safer chemical solution for water treatment, enhancing both staff safety during handling and fortifying our operational infrastructure. By mitigating the risk of corrosion to our wastewater systems, we've effectively extended preventative maintenance intervals, thereby reducing operational costs associated with various wastewater treatment assets.

As a tannin-based flocculant derived from tree bark, Tanfloc stands out as a markedly more environmentally friendly alternative compared to historically employed metal-based options in the industry. Its organic composition facilitates a broader array of disposal avenues for wastewater sludges generated by the treatment plant while concurrently diminishing sludge volumes relative to our prior use of metal-based flocculants. Moreover, this product serves as a carbon-neutral option for water treatment chemicals.

Given the demonstrated safety, quality, and multifaceted advantages of Tanfloc, we strongly recommend other industrial wastewater treatment facilities trialling this product. Its efficacy presents a compelling case for adoption, promising substantial benefits across diverse operational landscapes."

Statement from Environmental Manager of a WA processing facility

*This project was funded by AMPC via projects 2020-1030 (WA) and 2023-1028 (NSW).

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