

MONASH INDUSTRY TEAM INITIATIVE (MITI)

Applying innovative technologies to improve wastewater management in dairy processing

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SCOPE

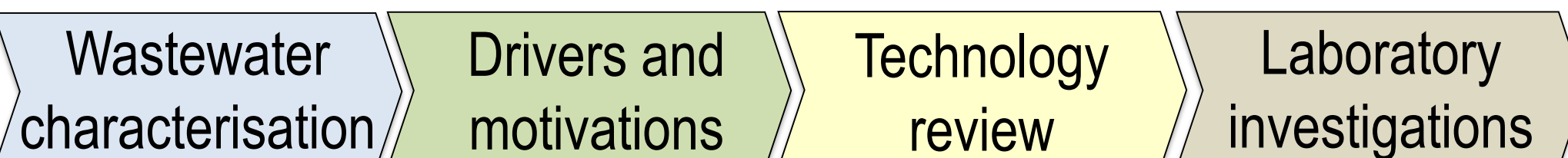
The dairy industry is worth \$4.3b to the Victorian economy and is its single largest export earner. However, dairy processing generates 10 GL of wastewater annually which contains high organic, salt and mineral concentrations, often compromising land application. The high variability in composition and flow further complicates treatment options. The aim of this project was to identify innovative technologies to address the organic and salinity loads in dairy factory wastewaters.



APPROACH

- Identified problematic components
- Compared within and between factory wastewater compositions

- Reviewed common technologies that reduce organic and salinity loads
- Identified upgrade opportunities for air flotation, aerobic lagoons, reverse osmosis and ion exchange



- Explored environmental and regulatory pressures for improving wastewater management

- Coagulation-flocculation capabilities of chitosan & sludge reagent product
- Ion-exchange capabilities of lignite, calcium bentonite and vermiculite to reduce sodium and potassium concentrations



MITI students with supervisors Drs Cameron Gourley & Sharon Aarons

OUTCOMES

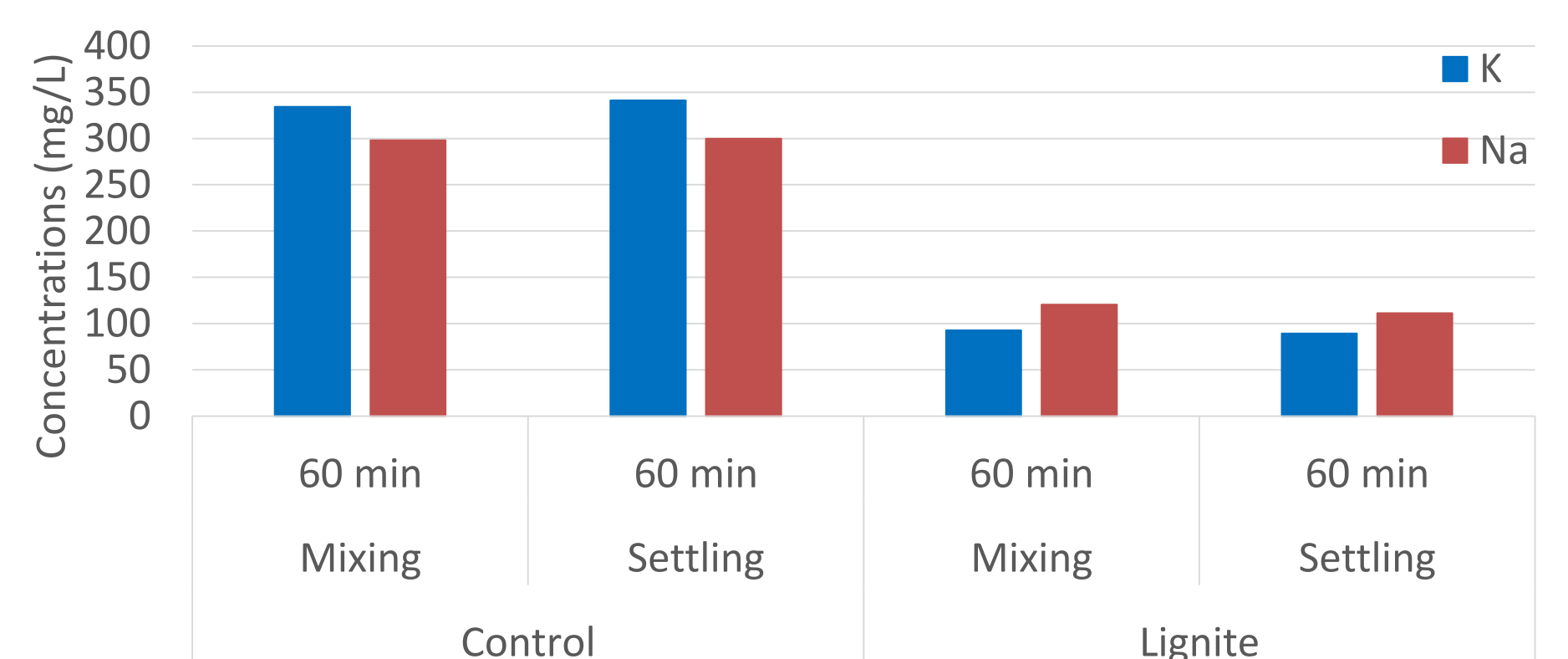
ORGANIC LOAD REDUCTION

- Potassium alum (600 mg/L) is a highly effective coagulant
- Reduced turbidity by up to 99% at approx. pH 8



DESALINATION

- Lignite (brown coal) is a promising natural cation exchange agent
- Reduced Na and K concentrations by 73% and 83% respectively



RECOMMENDATIONS

- Perform direct measurement of BOD reduction in coagulation-flocculation experiments
- Investigate alum regeneration and re-use from coagulation sludge
- Investigate feasibility of lignite as an ion exchange medium, particularly the effects of lignite dehydration and calcining on Na and K reduction efficiencies.
- Investigate coagulants that can aid settling of dispersed lignite solution.