

## Manuka and kanuka enhance the die-off of pathogens in soils amended with biowastes.

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The beneficial re-use of biowastes (biodegradable waste) is constrained because of concerns about pathogens that can cause disease in humans and animals. Biowastes can also contain high concentrations of plant nutrients and thus provide a way for rehabilitation of degraded lands. Potentially, these lands could be returned to NZ native vegetation, dominated by manuka (*Leptospermum scoparium*) or kanuka (*Kunzea robusta*) for the production of honey or essential oils. This research aimed to investigate antimicrobial properties of manuka and kanuka against *Escherichia coli* ATCC13706, used as a model pathogen. Sterile water extracts from roots and shoots of both native plants (young and mature) were assessed against *E. coli* growth in liquid medium and results demonstrated both species significantly reduced the survival and growth of *E. coli* with both roots and leaves extracts. Root extracts of both native plants were more active than leaves extracts and both kanuka extracts showed much greater activity against bacterial growth than manuka. In contrast, an extract from pasture leaves (*Lolium perenne*), used as a control, indicated significant increase in the growth of *E. coli*. These results demonstrated potential use of manuka and kanuka plants against biowaste pathogens and their role in reducing groundwater contamination due to leaching of pathogens through soil.

The research is currently under progress to determine *E. coli* leaching and survival under manuka and kanuka in glasshouse and field trials. These experiments will be conducted with dairy shed effluent, municipal wastewater and biosolids. We envisage that our results will reduce the restrictions placed on applying biosolids to land with the goal of establishing productive native ecosystems.