Issue No. 21 November 2019

Putting waste to work

A CENTRE FOR INTEGRATED BIOWASTE RESEARCH PUBLICATION

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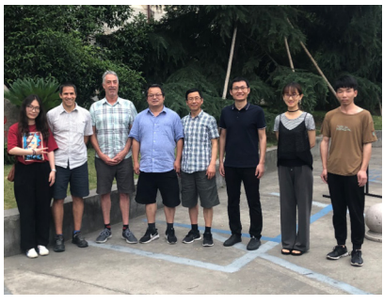

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UPDATE FROM THE PROGRAMME MANAGER

Tēnā koutou and welcome to our spring newsletter.

It has been a very busy winter for the CIBR team.

Many of us have been overseas learning from other countries' experiences about biowaste.

In early June, I was at the Land Use and Water Quality Conference in Aarhus, Denmark. The city is the second largest in Denmark, with regional population of close to 350,000.

At the conference we presented the results of our Lake Waikare Vision Mātauranga Capability project (see page 4) and took the opportunity to learn more about international research to minimise the impacts of land use on water quality.

While in Denmark I visited Aarhusvand (Water Aarhus), who are the managers of waste water, stormwater and drinking water in the Aarhus municipality. They have a range of interesting initiatives around wastewater and resource recovery, including the ambitious goal of building the world's most efficient resource recovery plant. I encourage you to visit their webpage: https://www.aarhusvand.dk/en/international/.

In June, the Ecotoxicology team and members of the Soils team were invited to attend the Second Conference on National Environmental Pollution and Control of Microplastics, in Nanjing. The New Zealand team were the only foreigners among more than 600 participants. Check more information about this visit, and the opportunities for collaboration between China and New Zealand scientists on page 7.

The soils team had new review paper published recently about the improved treatment of emerging organic contaminants (page 6). Congratulations to Jianming Xue and his Chinese colleagues on this work.

In New Zealand, recognition of the need to optimise the use of biosolids, and divert them from landfill disposal, is gaining momentum. Rob Tinholt from Watercare Services Ltd shares with us the discussions about biosolids that took place during two workshops on September (page 3).

The Social and Cultural team has been working on the results from the interviews in the Te Pā School. The aim of this work is to understand the Pā Wānanga as an educational model for environmental sustainability. Learn more about the work at Te Pā in page 8.

Another school that has been recently collaborating with the CIBR team is Naenae School in Upper Hutt. The ESR team ran a series of activities for students to learn about the benefits and risks associated with reusing greywater. See the outcomes in page 5.

Finally, you can follow up the most recent updates about The Pot project in page 2. This project is investigating the potential benefits of exchanging pine trees for native vegetation - for the land treatment of treated municipal wastewater.

Ngā mihi nui,
Maria

NATIVE VEGETATION FOR THE LAND TREATMENT OF TREATED MUNICIPAL WASTEWATER – AN UPDATE FROM "THE POT"

Alexandra Meister, Sian Cass, Kristin Bohm, Maria J Gutierrez-Gines

"The Pot" at Levin comprises 110 ha of sand dune country. Some 40 ha, mostly pine forest, have received Treated Municipal Wastewater (TMW) at a rate of ca. 4 m/ year for the past 28 years. In 2018, the pines were cleared and a 10 ha block has been designated for an experiment to test the interactions of TMW with NZ-native plants. Specifically, it was aimed to test the effect of the TMW on the growth and chemical composition of the NZ native plants as well as to determine the mobility of nitrogen and pathogens under these plants. The NZ native plantings comprised mānuka and kānuka (collectively being 60 %) and 20 other eco-sourced species that occur in similar environments. We hypothesize that mānuka and kānuka can improve water quality, because they have previously shown potential to reduce pathogens in soil and to reduce nitrate leaching[1,2]. The field trial at "The Pot" is running in a collaboration between the CIBR team at University of Canterbury, Massey University, ESR, Lowe Environmental Impact (LEI), Northcott Research Associates, along with Horowhenua District Council (HDC). The project is funded by a Freshwater Improvement Fund (MfE) and the HDC (see previous newsletter for more background about the project).

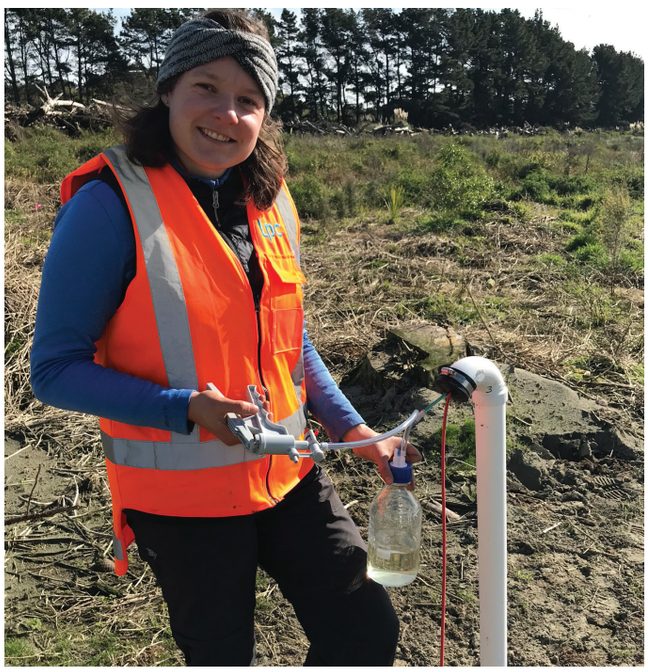
A digger making the 2m deep holes for installing the water flux meters.

IMPROVEMENT OF PLANT GROWTH WITH THE TREATED EFFLUENT

A mini-trial in 2017 was set up to identify whether irrigation would negatively affect the growth of the plant species that were chosen for the full 10 ha experiment. The mini-trial ran for 15 weeks and plants were harvested after that period. The results showed that most of the native plant species grew better, or at least were not negatively impacted, when irrigated with the treated effluent (Figure 1)

Planting started on the 10ha block in the winter of 2018. The growth was monitored for the first time in May 2019 showing that most native species responded well to irrigation with treated effluent, with a growth up to 1 m per year in comparison with non-irrigated plants (growth rate of few centimetres).

"The Pot" field site in August 2019.



Alexandra Meister is collecting the first leachate sample.

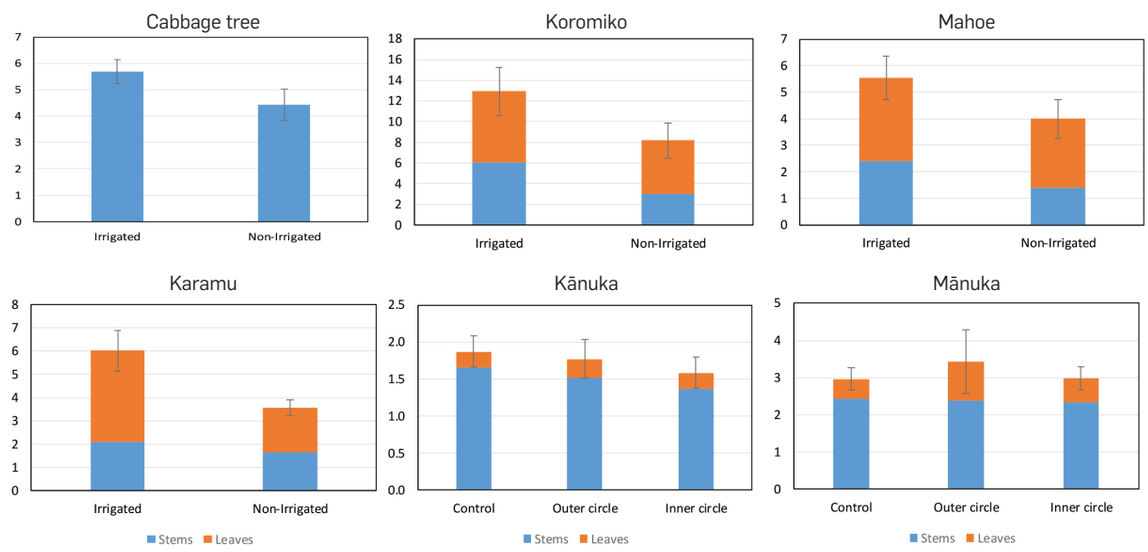


Figure 1. Dry weight (g) of the plants irrigated or not by TMW after a 15-week period.

Kānuka planted around the water flux meters.

Kristin Bohm setting up the data loggers.

MEASURING THE EFFECT OF NATIVE VEGETATION ON LEACHING OF NITROGEN

In order to measure the effect of the native vegetation on the leaching of nitrate (and other contaminants), the team installed eight water flux meters (Drain Gauge G3, METER Environment, USA) at the site. The water flux meter is a lysimeter that is installed 30 cm below the root zone and captures water that infiltrates through the soil. The water flows through a fibreglass wick into a reservoir, where it is stored. From the reservoir, it is possible to take samples for chemical analysis of the leachate. A depth sensor measures the volume of the drainage, while other sensors simultaneously measure the electric conductivity and temperature of the drainage.

The team installed the water flux meters in May 2019 to a depth of 2m. Due to the destructive nature of this process, the team consisting of Alexandra Meister and Kristin Bohm, returned in August 2019 to plant 100 kānuka trees. Richard Dean, ESR Data Scientist, also came along to assist and to see how ESR Data Science can help with improving data collections from field sites. 25 kānuka were planted around four of the water flux meters in an area of 2 m x 2 m. The other four lysimeters will act as a control and will be seeded with pasture. In addition, the water flux meters were fitted with data loggers and cellular telemetry units. These allow remote access to the drainage data via cellular networks through an app and provides a means to monitor drainage over time. In combination with results from the chemical analysis of the drainage, it will be possible to calculate fluxes of nitrate (and other contaminants) through the soil. We hope to provide a first set of results by the next newsletter!

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BIOSOLIDS – AN UNEXPLORED INDUSTRY IN NEW ZEALAND

Rob Tinholt, Resource Recovery Manager, Watercare Services Ltd

Biosolids was front and centre during September, with the WasteMINZ Conference and the Water NZ conferences both hosting presentations and workshops on the topic. The main themes discussed were the current state of biosolids application to land in NZ including some examples of success, and whether it was time to start a sector group for biosolids operators.

New Plymouth's Graham Morris and David Taylor presented "the Bioboost™ Fertiliser Story", covering the first 20 years of the successful product development, sales and marketing of their dried and palletised biosolids product. Some Bioboost™ is sold for $13 per 8kg bag at the local Mitre 10 and Palmers while the bulk of the product is sold to farms across Taranaki and the Waikato. Taupo's contractor Michael Quintern (MyNoke) presented on how the town built on a legacy of 20 years of effluent irrigation, to develop a consented programme for applying vermicomposted biosolids with buy-in from the community, Iwi, and regulators. Lucerne and other feed-crops are grown and sold by the bail for $70. All feed-crops are safety certified and sold to local farmers including dairy farms.

Hamish Lowe and Jen Prosser of LEI presented on the Lower North Island Biosolids Strategy, where seven lower North Island Councils are collaborating in a three year project to develop a biosolids strategy partly funded by the Ministry for the Environment Waste Minimisation Fund and co-ordinated by Lowe Environmental Impact.

Rob Tinholt of Watercare presented on the "Value of Biosolids in NZ" covering off biosolids land application statistics (NZ applies 17% of biosolids to land, while Australia and the UK apply 90 %!). Currently the biosolids industry contributes 3-6% of NZ's landfilled waste. He also covered off some fertiliser economics, highlighting that a typical tonne of biosolids is worth $48 per tonne in its nitrogen and phosphorus content. This equates to $15M of fertiliser value in NZ's annual biosolids production. The paper concluded with summarising seven towns with successful biosolids-to-land programmes, which demonstrates that NZ has a strong foundation of examples and experience for more towns to leverage from.

The biosolids sessions at both conferences concluded with workshops where an industry SWOT analysis was discussed and recorded. One weakness identified was the many organizations addressing various strands of the industry – LTC, WaterNZ, CIBR, ANZBP and WasteMINZ, to name a few, with the opportunity being for these groups to work more closely together. This led to discussions around the need for a cross-industry sector group representing biosolids operations. The need for input from operators, consultants, regulators and researchers was discussed as well as input from the waste industry. Maria J Gutierrez-Gines, manager of CIBR commented: "We can learn from our colleagues in Australia and Europe, who have more experience than us for land application of biosolids. In some of those countries there are very good examples of industry and scientists working together for developing long-term strategies for maximising the resource recovery from biosolids". It was generally agreed that before establishment of any group a clearer understanding of the objectives was needed. The SWOT analysis will be used to develop preliminary objectives. Check the next newsletter or the CIBR webpage for updates.

Water NZ Conference Biosolids Workshop –attended by 80 people (photo courtesy of WaterNZ).

THE WAIKARE LEARNING COMMUNITY – THE OUTCOME OF THE VISION MĀTAURANGA PROJECT

María J Gutiérrez-Ginés

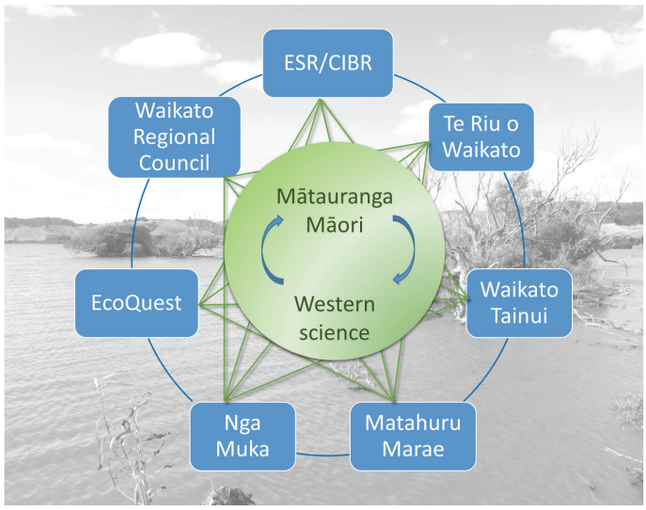
The CIBR team at ESR, Canterbury and Massey Universities, along with representatives from Nikau Estate Trust/ Matahuru Marae, Ngā Muka Development Trust, Waikato Regional Council (WRC), Waikato River Authority (WRA), and the EcoQuest Education Foundation, were at Matahuru Marae early on July for a hui, marking the end of the Vision Mātauranga (MBIE) project.

After having planted 40,000 native trees in Nikau Farm, funded by WRA, to improve water quality of the Lake, the Waikare team soon realized that restoring native vegetation could bring more benefits than just water quality. To explore these extra benefits, and to find ways of measuring them, we embarked into this 2-year VM project: *Measuring the benefits of riparian vegetation restoration on the health and well-being of Lake Waikare for the whānau hapū Iwi and communities of the lower Waikato region.*

During this time, more than 120 participants have collaborated on the project. We held seven wānanga and hui, and one Open Day. Results have been communicated in numerous national and international conferences. Gathering every collaborator's expectations for the restoration of the lake led to creating a list of objectives for the riparian plantings. From those objectives, and following an Ecosystem Services approach, we developed an ecological indicator system. From this process we have gathered important information for the ecological restoration of NZ native ecosystems, such as i) increased invertebrate biodiversity in soils after planting native vegetation, ii) quick exclusion of weeds after the canopy closure of broad-leaf trees, iii) native trees changing soil chemistry properties. This indicator system will be tested in other restoration plots along NZ to test its efficacy.

From the list of objectives and from the results of the interviews and wānanga with the iwi collaborators, we have drafted a Cultural Health Index, including mātauranga māori relevant to the local iwi of Lake Waikare.

Collaborators agree that the main result of this project to date is the creation of a multidisciplinary learning community composed of all the partners, working towards the restoration of Lake Waikare catchment. We have been revitalising oral-based mātauranga Māori and including it in the monitoring systems and the vision for the Lake. We have gathered the voices of many members of the community and stakeholders in the region and have weaved them towards a common objective.



The Waikare Learning Community.

This project contributed to the Vision Mātauranga themes "Taiao: Achieving Environmental Sustainability through Iwi and Hapū Relationships with land and sea", as it recognises the relationship of Waikato-Tainui with the Waikato River including their social, cultural, spiritual and economic relationship. The project also contributed to the theme "Mātauranga: Exploring Indigenous Knowledge and RS&T" as it recognises that in order to restore the valuable and lost riparian cultural resources, we must first determine what these resources were and are. We have been recovering this knowledge, which is oral based, and applying it to the 'real time, real world' issue of degradation of water quality at Lake Waikare. This knowledge is an invaluable resource for the creation of a meaningful vision for the lake that the community want to achieve and measure.

Main results and knowledge communicated and shared in the final Hui of the VM project:

- **the work Matahuru Marae has been doing in the past years to revegetate and restore the shores of Lake Waikare (by Tawera Nikau).**
- **recovering the Māori names of places around the lake, and histories of the lake (by Jumbo Montgomery).**
- **archaeology discoveries from the pre-colonisation period around Lake Waikare (by Warren Gumbly)**
- **main achievements of the VM project (by Maria Gutierrez and Glen Tupuhi):**
- **gathered information from all participants (scientists, regulators and communities) about expectations for restoration of Lake Waikare in multiple wananga and interviews**
- **Waikare learning community**
- **creation of an ecological indicator system, and testing it in 8 sampling campaigns, with >240 soil samples collected, many plants measured and counted, and >10,000 invertebrates identified.**
- **7 hui and wānanga took place with more than 110 collaborators and participants in the different activities.**
- **draft of a Cultural Health Index for Waikare (by Jacqui Horswell and Glen Tupuhi).**
- **increased biodiversity of invertebrates in restoration plots (by David Clarke).**
- **other riparian projects that have been established in the South Island with Waikare as a model (by Harrison Bowman).**
- **the Upper Matahuru Catchment Management Project (by Sarah Lealand).**
- **an overview of the Waikato River Authority funded projects and future priorities areas (by Michelle Hodges)**

Final hui at Lake Waikare on 4th July 2019.

CIBR EDUCATIONAL OUTREACH: SCHOOL VISIT TO NAENAE COLLEGE

Kristin Bohm, Izzie Alderton and Seinalyn Villanueva

To extend science within the New Zealand community, the ESR team (Izzie Alderton, Seinalyn Villanueva and Kristin Bohm) visited a year 9-10 science class at Naenae College, Lower Hutt in early August. In a number of activities throughout the day, the students learnt about the benefits as well as the risks of greywater.

The school visit was organised in collaboration with Partnership Through Collaboration (PTC) Trust. PTC Trust is a non-profit organisation which focuses on the education of youth who are traditionally underrepresented in science, by giving them opportunities for practical hands-on training and development in science. To promote and improve youth participation and appreciation of sciences through their cultural heritage, PTC Trust works with schools, iwi, service providers and whānau communities. The ESR team were joined by Lauren and Hayden from PTC Trust to help with the activities.

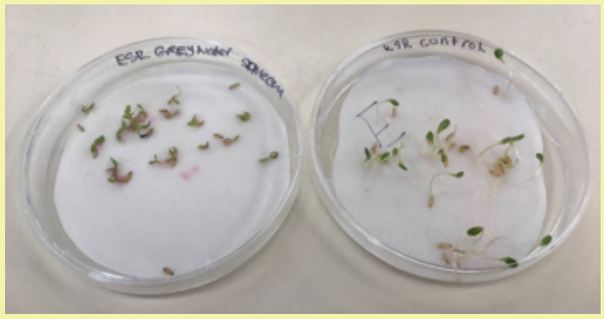
Students were asked to bring greywater samples (sourced from either laundry, basin or shower) to use. They were also provided a worksheet to fill out on what products they used when collecting their samples. ESR scientists were on hand with some pre-made greywater so everyone could participate.

Greywater activities were divided into three. The first activity was designed to test the toxicity of the greywater, using a germination test on lettuce seeds. This test looks at whether there are any contaminants present in the greywater that could affect the germination of the lettuce seeds. The second activity was designed to test the microbial quality of the greywater by measuring the coliforms and *Escherichia coli*. The third activity was a 'how to' section taking the students through the steps of designing an experiment, what might the hypothesis be, and which conclusions they could draw from the results.

For the lettuce seed germination test, students prepared petri-dishes with filter paper and lettuce seeds and watered them with either their own greywater or deionised water (control). The plates were incubated in the student's class room so that a few days later they could count the number of germinated seeds of their own samples, and see if there was a difference between greywater and the control treatments. A decrease in the number of germinated seeds and/or growth of seeds can be used as indicator for the presence of potential toxic compounds in the greywater. As seen in Figure 1, the germination success of the lettuce seeds was varied even when they were taken from the same kind of source like handbasins.

Activity one: Preparation of the lettuce seed petri-dishes by the students with guidance from Seinalyn and Hayden (PTC Trust).

For the second group activity, students tested the microbial quality of their greywater using a Colilert test (IDEXX) which enumerates both total coliforms and *Escherichia coli* (*E. coli*) present in the sample. *E. coli* is a non-disease causing bacteria (although there are some strains that are), and is used as an indicator for the presence of other potential illness causing bacteria within a sample. Samples were taken back to ESR to incubate and analyse them, and the results were reported back to the school. Similar as for the toxicity test, the number of coliforms and *E. coli* detected for the different greywater samples varied a lot (Figure 2), independent of the type of source the samples were taken from.



Toxicity test: The success of lettuce seed germination after seven days of incubation for one of the student's greywater sample (left) compared to deionized water as control (right).

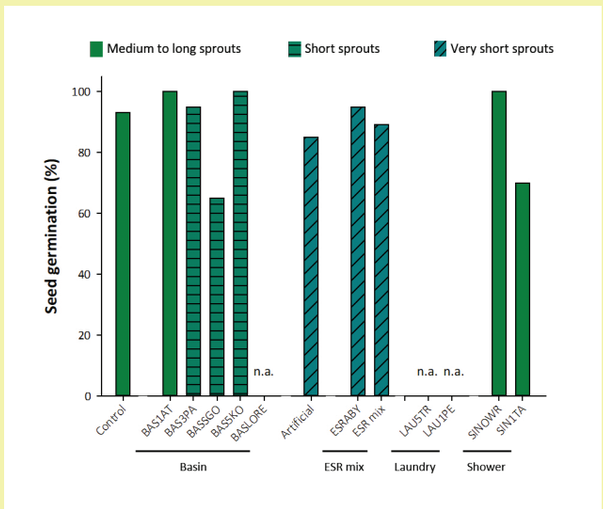


Figure 1: Germination rate of lettuce seeds after treatment with greywater or deionized water (control). Greywater was collected from different sources in various New Zealand residencies. Artifical: artificial greywater is a solution of various detergents mixed with deionized water. ESR mix: 1:1 mix of artificial greywater with greywater from LAU1PE. n.a.: no results.

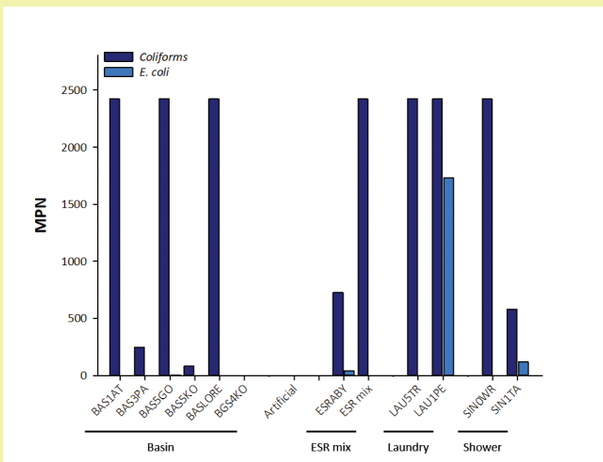


Figure 2: Abundance of coliforms and *E. coli* in greywater collected from different sources in various New Zealand residencies. Artifical: artificial greywater is a solution of various detergents mixed with deionized water. ESR mix: 1:1 mix of artificial greywater with greywater from LAU1PE.

Activity two: Izzie Alderton demonstrates to the students how to perform the Colilert-assay and what they can learn from it, with assistance from Lauren (PTC Trust).

For activity three, the students learnt about the scientific method and worked through a worksheet. Students talked about how they could judge the quality of their greywater in terms of environmental toxicity

Activity three: Kristin Bohm gives the students some theoretical background about scientific principles and how they can assess the experimental results of the activities with greywater.

(lettuce germination test) and risks to human health (Colilert-test). This would enable the students to think critically about their results in later classes with their science teacher.

We hope that with the hands-on experiments, especially the toxicity test, and a small presentation on the role of the students on caring for the environment at the end of day, we have made the students more aware about how they can help with improving greywater quality and environmental health.

ULTRASOUND ASSISTED PERSULFATE DEGRADATION OF ORGANIC CONTAMINANTS IN WASTEWATER: A PROMISING TECHNOLOGY

Drs Jianming Xue (Soil Science Group Leader of CIBR) and Lie Yang (Associate Professor at Whuhan University of Technology)

Associate Professor Lie YANG, a visiting scientist **working with Jianming Xue at Scion**, has published a review paper titled "Review on ultrasound assisted persulfate degradation of organic contaminants in wastewater: Influences, mechanisms and prospective" in *Chemical Engineering Journal*, with impact factor of 8.4. He completed this review paper at Scion with Jianming, who is one of the corresponding authors of it. This is an excellent achievement for both Lie and Jianming and it will support CIBR's research targeting remediation of organic pollutants in wastewater.

ABSTRACT

Persulfate (PS) has attracted great attention as an alternative to H2O2 for advanced oxidation processes in recent years. Among various activation techniques, ultrasound (US) activation acts as an emerging method and has gained increasing interest especially in recent years. The combination of US and PS is a promising alternative for organic wastewater treatment. In this review, the synergistic effects of US and PS were investigated based on wide applications. The degradation efficiency is easily influenced by the reaction factors, including ultrasonic power and frequency, pH, temperature, PS concentration, and coexisting inorganic anions etc. These factors were summarized and analyzed to give the optimal references for further in-depth studies. Moreover, the decomposing mechanisms are outlined in terms of molecular structures due to the one-sidedness of reactive radical analysis. In the end, the concluding remarks and perspectives are made for future study on US-activated PS technologies. This review can provide an overview for the systematic understanding of the mechanisms and synergistic effects of US and PS combination.

HIGHLIGHTS

- The synergistic influences of US and PS are reviewed.
- Operational factors influencing the removal efficiency are discussed and summarized.
- Reaction mechanisms of sono-activated persulfate oxidation are evaluated and outlined.
- Knowledge gaps and research needs of sono-activated persulfate are proposed.

Contents lists available at ScienceDirect

Chemical Engineering Journal

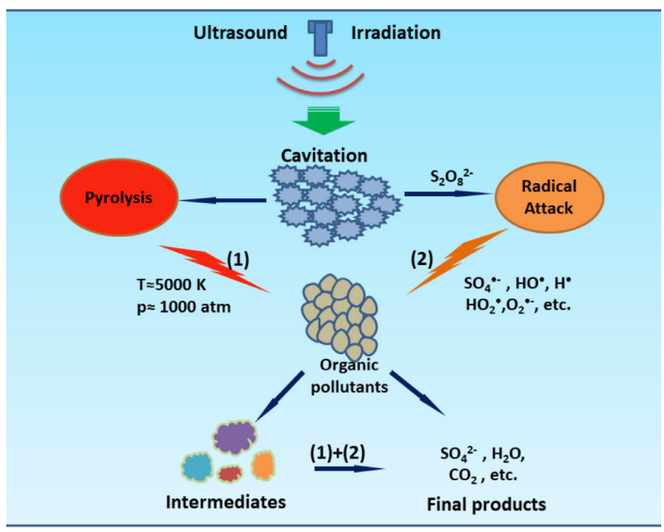
journal homepage: www.elsevier.com/locate/cej

Review

Review on ultrasound assisted persulfate degradation of organic contaminants in wastewater: Influences, mechanisms and prospective

Lie Yang[a,c,*], Jianming Xue[b,c,*], Liuyang He[a], Li Wu[a], Yongfei Ma[a], Huan Chen[a], Hong Li[a], Pai Peng[a], Zulin Zhang[a,d,*]

[a] Hubei Key Laboratory of Mineral Resources Processing and Environment, School of Resources and Environmental Engineering, Wuhan University of Technology, Wuhan 430070, PR China
[b] College of Biology and the Environment, Nanjing Forestry University, Nanjing 210037, PR China
[c] New Zealand Forest Research Institute (Scion), POB 29237, Christchurch 8440, New Zealand
[d] The James Hutton Institute, Craigiebuckler, Aberdeen AB15 8QH, UK



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ECOTOX NEWS

REPORT FROM VISIT TO CHINA

Louis Tremblay and Grant Northcott

Jianming Xue (Scion), Grant Northcott, and Louis Tremblay were invited by Prof Yongming Luo from the Institute of Soil Science, Chinese Academy of Sciences (ISSCAS) to attend the Second Conference on National Environmental Pollution and Control of Microplastics Nanjing, 4-6 June 2019. We were officially welcomed by Renfang Shen, Professor of Plant Nutrition and current Director General of ISSCAS. Others attending the meeting included Prof. Luo, Prof. Ying Teng (Head of R & D Division of ISSCAS), and Prof. Xin Song (Deputy Head of Soil and Environmental Bioremediation Research Centre of ISSCAS). These senior figures within ISSCAS were supportive of establishing research links with New Zealand in the area of soil pollution and health with a focus on microplastics (MP).

A motivating factor for establishing such link between China and New Zealand is the new Memorandum of Arrangement between the Ministry of Business, Innovation and Employment (MBIE) and the Chinese Academy of Sciences (CAS) that was signed on 1st April 2019 by the New Zealand Ambassador in Beijing and Vice-President Zhang Yaping of the Chinese Academy of Sciences. Through the arrangement, MBIE and CAS will support jointly beneficial research cooperation, and encourage the participation of researchers from across New Zealand's science system and the Chinese Academy of Sciences in relevant cooperative projects.

At the conference, we were the only foreigners amongst the more than 600 participants and we were fortunate to be invited to give a plenary presentation on the New Zealand MBIE MP Research Program (Grant) and two keynote presentations on assessing the ecotoxicological risk of MPs (Louis), and the impact and risk of MPs in soil (Jianming).

Participants at one of the sessions of the Nanjing microplastics conference.

Grant Northcott during his plenary presentation at the Nanjing conference.

Following the conference, we participated in a mini workshop to discuss collaboration opportunities between China and New Zealand in microplastics research. In addition to Prof. Luo's ISSCAS team other researchers from organisations working across a range of MPs projects from the Yangtze River Delta area attended the meeting. We gave presentations of the NZ MPs and Emerging Contaminants research programmes and discussed and identified a number of opportunities to develop collaborations with Chinese researchers within these two programs

Participants with Prof Li's research group.

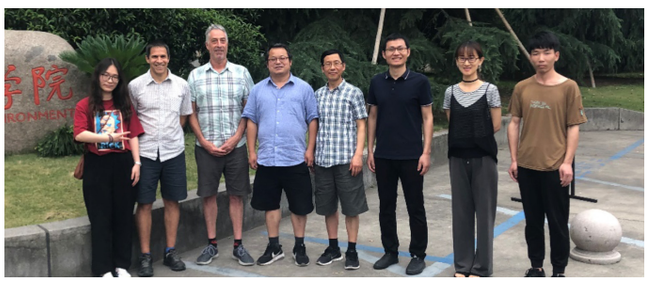
Following the conference, we travelled to Hangzhou by train where we were hosted by Prof. Pan at The Institute of Toxicology and Remediation, College of Environment, Zhejiang University of Technology (ZUT). At ZUT we met with Professor Pan's colleagues and research group, gave presentations on MPs research in New Zealand and discussed potential collaborations on MPS. Prof. Pan has recently received considerable funding to upgrade instrumental capability within his laboratories and he has produced a state-of-the-art facility for the characterisation and quantitation of plastic and MPs down to the nano scale. This includes high resolution micro-FTIR and automated micro imaging and high-resolution imaging with micro-Raman spectroscopy combined with Atomic Force Microscopy. This capability enables automated detection and size distribution analysis of MP particles and the identification of different MPs down to the sub-micron scale. The IETR also has a Perkin Elmer thermogravimetric analyser connected in line to a FTIR gas detector and GCMS, enabling the characterisation of different plastics by their thermogravimetric profile and the subsequent identification of volatilised chemicals by FTIR analysis of the gas phase and in-line GCMS analysis.

The following day we flew to Beijing where we were hosted by Prof Li, head of the Centre of Soil and Fertilizer Research at the Institute of Agricultural Sciences, Chinese Academy of Science. We attended another workshop to discuss developing a long-term collaboration between China and New Zealand on EOCs and MPs research. Grant and Jianming gave the MPs presentations and Louis gave an overview of the MBIE EOCs research programme.

Our approach to research was well received, particularly the trans-disciplinary nature of our projects and partnerships with iwi incorporating cultural values/knowledge- that's something that resonated with our Chinese colleagues. It was agreed that enduring solutions for chemical contaminants and MPs require a whole of society response and we scientists, therefore, have to engage with communities. Our Chinese counterparts were also impressed with the partnerships we have in our research programs with local/central government agencies and industry, e.g. aquaculture, horticulture, dairy.

We were very impressed by the breadth and quality of research being undertaken on contaminants and MPs by CAS and other research institutes in China, and it is apparent that collaboration with scientists from these organisations will be of significant benefit to our research in New Zealand.

We are very grateful for the amazing hospitality we received from our Chinese hosts and the considerable effort they made to make our visit memorable. While we had limited free time we managed to squeeze in a couple of half days of sightseeing that left us wanting to return to see more.



TE PĀ O RĀKAIHAUTŪ - UNDERSTANDING CULTURALLY GROUNDED EDUCATIONAL MODELS FOR SUSTAINABILITY AT A PĀ WĀNANGA IN ŌTAUTAHI/CHRISTCHURCH

Jinny Baker, Jamie Ataria, Alan Leckie, Joanna Goven, & Lisa Langer.

AIMS OF THE RESEARCH

The Social and cultural team are working with Te Pā o Rākaihautū (Te Pā) to understand the Pā Wānanga as a culturally grounded model of education that supports environmental sustainability. The aim of the research is to explore the strength of their culturally grounded educational approach for fostering leadership and learning that supports student achievement, kaitiakitanga/guardianship, environmental sustainability, and sustainable change in the Te Pā whānau and wider community.

In-depth interviews have been conducted with members of the staff and Te Tautarinui o Matariki (Board of Trustees) to learn more about the model of a Pā Wānanga as understood by the people of Te Pā and what makes the Te Pā o Rākaihautū model of education unique. We sought accounts of the origins of Te Pā, the motivating aims underpinning it, and the visions for its future. We also asked about transformational changes in pononga (students) and their whānau as a result of their involvement with Te Pā, and how to best capture and measure these changes for the purpose of Te Pā's self-assessment and development. The research has aimed to better understand what is working and why, how the various elements relate and support each other, and how the model is implemented across Te Pā.

The team are most grateful to the staff and board members at Te Pā o Rākaihautū who agreed to be interviewed and shared freely their thoughts and insights. Tēnā koutou katoa.

QUALITATIVE DATA COLLECTION FROM ONE ON ONE INTERVIEWS

We conducted fifteen interviews with selected Te Pā staff from governance, management, teaching and staff roles to gather their insights on what a Pā Wānanga model means in practice, to record personal observations and experiences on positive outcomes achieved, and obstacles to achieving goals. This information will inform the development of evaluation methods to capture the kinds of impacts and outcomes that are not measured by the Ministry of Education, but that are important to Te Pā in order to affirm progress towards their desired goals and mission.

Interviews have been transcribed and have been checked for accuracy against the audio files. A number of interviewees opted to view their transcripts to

ensure they were comfortable with CIBR including their interview in the study.

Our next step is to analyse the interviews for key elements and themes using an app for analysing qualitative data called Dedoose, to develop the Te Pa model to discover how and why it works.

Following that, we will produce a preliminary report on the analysis to give initial feedback to those interviewed and to help prepare for a workshop in which we will seek feedback from participants regarding the accuracy, completeness and usefulness of our analysis.

FEEDBACK WORKSHOP WITH INTERVIEW PARTICIPANTS

The CIBR research team have provided initial feedback with Te Tautarinui during a Board meeting on August 2nd. Te Tautarinui were appreciative of the opportunity to pause and reflect what has been almost a 5 year journey for Te Pā and the value in our research which will provide an important anchor point and reference for Te Tautarinui when they report on the progress. Importantly, at this meeting we received support to set a date for a workshop with staff who participated in the interviews. The purpose of the workshop is to invite feedback, both on the accuracy and completeness of the analysis as a depiction of Te Pā and also on the usefulness of the analysis to Te Pā to create/depict the "Te Pā model".

This model is intended to become a resource for Te Pā's own cultural and educational development. Based on the feedback from the workshop, the preliminary analysis will be refined into a final summary report for Te Pā. Our aim is for this document to support future work at Te Pā towards a living evaluation framework.

If you would like to subscribe to this newsletter please email kristin.bohm@esr.cri.nz with your contact details.

If you would like further information on the programme or have any questions, please see our website www.cibr.org.nz or contact a member of the Science Leadership Team:

PROGRAMME MANAGER

Dr Maria Gutierrez Gines
ESR, Christchurch
27 Creyke Road, Ilam
Maria.Gutierrez-Gines@esr.cri.nz
Phone: (03) 351 6019

SOCIAL AND CULTURAL RESEARCH

Lisa Langer
Scion, Christchurch,
PO Box 29-237, Christchurch
Lisa.Langer@scionresearch.com
Phone (03) 364 2987 ext. 7204

SOIL SCIENCE

Dr Jianming Xue
Scion, Christchurch,
PO Box 29-237, Christchurch
Jianming.Xue@scionresearch.com
Phone (03) 364 2987 ext. 7826

ECOTOXICOLOGY

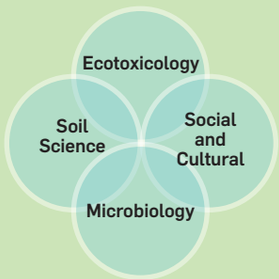
Dr Louis Tremblay

Cawthron Institute, Nelson,
98 Halifax Street, Nelson
Louis.Tremblay@cawthron.org.nz
Phone (03) 539 3290

MICROBIOLOGY

Dr Louise Weaver
ESR, Christchurch
27 Creyke Road, Ilam
Louise.Weaver@esr.cri.nz
Phone: (03) 351 6019

NEWSLETTER EDITOR
Dr Kristin Bohm
ESR, Wellington
kristin.bohm@esr.cri.nz
Phone: (04) 914 0684



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