**ABSTRACT**

**12th National Aboriginal and Torres Strait Islander Environmental Health Conference 2019.**

**Safe drinking water for healthy Aboriginal communities:**

**Solar Powered Reverse Osmosis Water Treatment:**

**Co-design with community to achieve an appropriate, cost-effective solution**

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Mara West, Telethon Kids

Martin & Barbara Brezger, Moerk Water Solutions

**Abstract**: 495 words. Maximum of 500 words.

Many Aboriginal and Torres Strait Islander communitiesin Australia have poor quality drinking water.  There are 274 Aboriginal communities in Western Australia, many of these with poor quality drinking water. Sources vary, storage and distribution systems have to be examined and measures put in place to provide safe water. There are arrangements to test water in all Aboriginal communities where the provision of water is made through government resources, but to conduct regular testing and ensure proper treatment is difficult.

Murdoch University is committed to improving the health and wellbeing of Aboriginal families through research and translating its research into positive sustainable change in the health and wellbeing of Aboriginal people. It is exploring safe drinking water for healthy Aboriginal communities. Murdoch is undertaking water quality tests through co-designing a cost effective solution with the community. This collaborative approach seeks to ensure that the solution can be recognised and supported by the community.

This project will gather water quality test reports from all communities in Western Australia. The results will be tabulated and evaluated according to Australian Drinking Water Quality Standards. The tabulation will be sectioned to communities that require: urgent and immediate attention; improvement necessary; those recommended for improvement but satisfactory for the present; and safe, good quality which do not need any further treatment.

Murdoch University had previously developed a simplified on-site drinking water quality test method using the hydrogen sulphide method (Nair *et al.* 2001) and deployed the kit to numerous remote communities with training as well as the kits. Health Departments preferred the standard methods based on *E. Coli* bacteria detection. Since then, numerous kits have been commercialized. For example, the Compartment Bag Test (CBT), now commonly used in developing countries, detects and quantifies bacteria in a 100 mL sample. It scores Most Probable Number (MPN) test results by easy color match within 24-48 hours to determine if water poses a health risk. Another bacteria test kit uses presence/absence test of 1CFU per 100ml. If detection of total coliform is positive, then the presence of E.coli can be detected using a blacklight with a wavelength of 365 (NVF-4 blacklight).

Drinking water quality can be achieved by reverse osmosis membranes used in water treatment plants. The capital costs are high. However, new techniques can be used to reduce the size of the total plant and thus costs. Such a method is an auto-blending device. Murdoch University and Moerk have developed the prototype and the team will start field trials this year with farmers and IBN Corporation.

The blending strategy which was applied demonstrated that it is capable of maintaining steady states, whilst also maintaining the level of water in the tank above 50%, thereby successfully proving this blending concept by means of a laboratory scale system. Application in the laboratory-scale system of hardware components, will be translated to field-scale for trials with IBN Corp in the Pilbara. A co-design workshop with participating Aboriginal communities across WA will be held at Murdoch University.

**Abstract summary**: 147 words. Maximum of 150 words.

Many Aboriginal and Torres Strait Islander communitiesin Australia have poor quality drinking water.  Murdoch University is exploring safe drinking water for healthy Aboriginal communities. Murdoch is undertaking water quality tests through co-designing a cost effective solution with the community. This collaborative approach seeks to ensure that the solution can be recognised and supported by the community. This project will gather water quality test reports from all communities in Western Australia. Murdoch University had previously developed a simplified on-site drinking water quality test method using the hydrogen sulphide method (Nair *et al.* 2001) and deployed the kit to numerous remote communities with training as well as the kits. Health Departments preferred the standard methods based on *E. Coli* bacteria detection. Drinking water quality can be achieved by reverse osmosis membranes used in water treatment plants. A co-design workshop with participating Aboriginal communities across WA will be held.

Presentation type: is your presentation is one of the following – **PowerPoint**

Rosier, D.J., Ashbolt, N., Ho, G., Mathew, K., Nair, J., Ryken-Rapp, D. and Toze, S. (2005) Hydrogen sulphide production tests and the detection of groundwater faecal contamination by septic seepage. Water Science & Technology, 51 (10). pp. 291-3000.

Nair, J., Gibbs, R., Mathew, K. and Ho, G. (2001) Suitability of the H2S method for testing untreated and chlorinated water supplies. Water Science & Technology, 44 (6). pp. 119-126.

Biographies: A short biography of up to 150 words for the main presenter.

**Martin Anda** is an environmental engineer with over 30 years experience in the water and built environment sectors since completing a Bachelor of Engineering (Mechanical) degree in 1982 at The University of Western Australia. After several years of working with consulting engineering firms on large industrial projects, he joined the Remote Area Developments Group at Murdoch University and spent 15 years working with remote Aboriginal communities and Pundulmurra College. Today, Dr Martin Anda is Academic Chair and Senior Lecturer in Environmental Engineering at Murdoch University in Western Australia where teaches several units in urban and water systems engineering and coordinates a team of postgraduate researchers in a group called Environmental Engineering & Life Systems (EELS) with research on water energy and waste systems. In 2016 Martin was awarded the WA Water Professional of the Year by AWA and Pioneer Award from the World Renewable Energy Network.

A short biography of up to 150 words for each other person presenting.

**MARA WEST, BA, BSc (Hons) and Grad Dip Teach**

Mara is a Malgana woman from the Gascoyne/ Murchison area. She worked in the public and private sectors as a consultant, trainer and researcher operating in various locations and environments in community engagement. She was awarded the Murdoch University Medal for services to the University and the community. One of her passions is Aboriginal health and works at the Telethon Kids Institute as a Coordinator of the Kulunga Aboriginal research Development Unit. Her passion includes Aboriginal people taking control of research in Aboriginal health. It highlights the issue that cultureis often paid lip service, with few research organisations having the capacity or understanding of what is actually required to *authentically* and *systematically* address cultural issues in a meaningful way. Training and capacity building of community members enables them to legitimately take their place as community researchers in the research space.