KEYNOTE

MONTHLY

LECTURES



Food *for* **Brain**

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Lecture #6

13:00 CET

June 2022

Wednesday 29th

HOW TO DETERMINE WHETHER A BIOPLASTIC IS TRULY BIODEGRADABLE?

Approximately 10 million tonnes of plastics flow to the ocean each year. A range of measures to avoid plastic pollution include bans on plastic items, producer responsibility schemes and penalties for littering.

Another measure is the substitution of bioplastics into household consumer items.

There are many questions on the benefits of this substitution, such as how persistent these products are in the natural environment as opposed to engineered digestion or composting conditions. Even if a bioplastic is disposed to a composting unit or a digester, there are challenges in determining whether the bioplastic is fully biodegradable, particularly in cases where the composition of a plastic is unknown.

Biodegradation standards typically require that a material biodegrades by 90% relative to a standard biodegradable material such as microcrystalline cellulose based on the amount of carbon evolved as either biogas or dissolved CO_2. Even if this criterion is met, it is difficult to unequivocally verify that all carbon in a plastic sample has been converted to either biogas, dissolved metabolic products, microorganisms or extracellular polymers. E.g., it is difficult to detect the production of refractory microplastics from a proprietary plastic, either by carbon mass balance or by direct detection in the background media such as digested sludge.

This presentation will discuss various challenges like this in regulating the uptake of bioplastics.



Prof. William Clarke

The University of Queensland

Australia

William (Bill) Clarke is a Professor in the Schools of Civil Engineering at the University of Queensland where he is currently the Director of Teaching and Learning. He is a Civil Engineer (Uni Sth Aust) with an MSc in Env Eng (Notre Dame, USA) and PhD in Chemical Engineering (UQ).

Prof Clarke has 28 years of experience as researcher in bioengineering processes for solid organic waste. He has published extensively on landfill-based treatment processes, leach-bed technology and the solubilisation of solid organic waste. He designed and coordinated the only full-scale, batchdigestion facility for solid waste in Australia in 2011-13 consisting of two 1,000m^3 in-ground vessels operated as flood and drain reactors. His research group was one of the first to characterise microbial colonisation processes for solid organic waste.

He has 64 journal publications and has supervised 30 PhD and MPhil students, 20 of those as Principal Supervisor.

He is currently the vice-President of the International Waste Working Group (IWWG) and the incoming President in 2023-24. He was an Associate Editor of Waste Management from 2008-13. He is active in consulting, particularly in assessing the biodegradability and methane yield of numerous varieties of municipal and agricultural wastes, as well providing expert witness and expert opinion work on the biodegradability of packaging, kitchenware and sanitary products for various companies.