



Centre for Bioprocess Engineering Research

University of Cape Town (UCT)

Cape Town, South Africa

www.ceber.uct.ac.za

Title:	Wastewater Biorefineries
Abstract:	<p>The wastewater biorefinery (WWBR) is centered on the conversion of the organic, nitrogen, phosphorous and other contaminants in the wastewater stream to value added products, while simultaneously providing clean water as a product. The development of the WWBR concept facilitates the use of multiple unit operations to simultaneously allow multi-criteria optimisation within the overall system. This project reviews the potential for wastewater biorefineries, and places it in context of the emerging bioeconomy. The project reviews the basic unit processes constituting a WWBR along with potential products from these units. These basic units are the bacterial bioreactor, algal bioreactor, macrophyte reactor (similar to treatment wetlands) and the biosolid, or fungal, bioreactor.</p> <p>These unit processes are incorporated into a high-level predictive model suited to early-stage feasibility analysis, and concludes with case studies illustrating the model's use.</p>
Lead institution:	Centre for Bioprocess Engineering Research (CeBER), University of Cape Town, Department of Chemical Engineering
Partner institutions:	Water Research Commission (WRC)
Student name:	Bernelle Verster
Supervisor name:	Prof STL Harrison
Degree:	PhD
Funded by:	CeBER, Water Research Commission (WRC)
Start date:	2007
End date:	2016
Feedstock:	Wastewater, specifically municipal wastewater.
Value chain products:	Alginic acid, Biosurfactants, biopolymers, cellulosic biomass, cellulosic fibre, industrial enzymes, poly-glutamic acid.
Geographic source of the feedstock:	Pilot studies are done with wastewater from Athlone WWTW, Cape Town. General model considerations are applicable to any wastewater in any region.