

## Environmental Research, Technology Demonstration and Conference Project

<b>ECF Project:</b>	ECF 2018-108
<b>Project Title:</b>	Biochar assisted co-digestion of food waste and sludge for enhancing organic loading efficiency – A special reference to Hong Kong
<b>Principal Investigator:</b>	Dr Guneet Kaur (from 1/5/2019 to 15/6/2020) and Professor Wong Woon Chung, Jonathan (with effect from 16/6/2020), Department of Biology, Hong Kong Baptist University
<b>Total Approved Grant:</b>	\$1,160,220
<b>Duration:</b>	1/5/2019 to 31/7/2021
<b>Project Status/Remarks:</b>	Completed
<b>Project Scope:</b>	<p>The project aims to –</p> <ul style="list-style-type: none"> <li>(a). Investigate the feasibility of volatile fatty acid decomposition and enhanced methane production upon biochar addition in food waste/sludge co-digestion and influence of process parameters;</li> <li>(b). Demonstrate an increased food waste loading in biochar-assisted codigestion under optimised conditions for high methane recovery; and</li> <li>(c). Evaluate the properties of biochar-enriched digestate for composting applications.</li> </ul>
<b>Summary of the Findings/Outcomes:</b>	<p>Anaerobic digestion has been touted as a promising method for the treatment of food waste/sludge by stabilizing waste and recovering energy. Biochar's addition had a significant impact on the overall performance of the co-digestion system. Adding biochar to co-digestion for VFA degradation is crucial because of its cost-effectiveness, as well as the fact that it increased cumulative methane production by 25 % compared to controls without biochar. Process modeling has widely adopted this approach and has increased anaerobic co-digestive processes. As a result of this project, specific methane yields improvement were achieved, organic loading was increased, reaction retention times were shorter, VFA inhibition was mitigated, and nutrient recycling was improved. Biochar is an effective amendment for co-digesting food waste sludge. In addition, the biochar enriched digester has a higher level of micro-and macronutrients than the control digestate without biochar. Therefore, digestates amended with biochar have a great potential for agriculture use. The results of this study will benefit the government's co-digestion process for food waste and sludge, i.e., to increase the yield of methane and recover the high-quality digestate.</p>