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| <b>Title (13)</b>             | : | <b>Effect of particle size, solvent to sludge ratio and solvent temperature on the extraction of lipids from sewage sludge cake using methanol</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Journal</b>                | : | AIP Conference Proceedings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Document Type</b>          | : | Conference Paper                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Publisher</b>              | : | AIP Publishing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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| <b>Link to Full Text</b>      | : | <a href="https://pubs.aip.org/aip/acp/article-abstract/2923/1/040014/3279809/Effect-of-particle-size-solvent-to-sludge-ratio?redirectedFrom=fulltext">https://pubs.aip.org/aip/acp/article-abstract/2923/1/040014/3279809/Effect-of-particle-size-solvent-to-sludge-ratio?redirectedFrom=fulltext</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <b>Abstract</b>               | : | <p>Municipal wastewater treatment plant generates a large amount of sludge each year with a generation rate of up to 30.8 kg per population equivalent per year. These sewage sludge cakes contain an abundant amount of lipids that can be extracted, and their compound can be utilized in the production of value-added products. The separation of lipids subsequently reduces the volume of sludge to be managed and disposed of. Lipids can be separated using the conventional Soxhlet extractor, and the yield depends on process parameters such as solvent to sludge ratio, temperature, extraction time, and particle size. Among these parameters, particle size was scarcely studied while extraction time shows an insignificant effect on lipids yield. Therefore, this paper focuses on the impact of the particle size as effective extraction size as well as significant extraction parameters; temperature and sludge-to-solvent ratio on the lipids yield of extraction from the sewage sludge cake using methanol as solvent. Four sludge particle size ranges (x) were selected as the effective extraction size (<math>x \leq 0.425\text{mm}</math>, <math>0.425 &lt; x \leq 1.00\text{mm}</math>, <math>1.00 &lt; x \leq 2.00\text{mm}</math>, <math>2.00 &lt; x \leq 4.00\text{mm}</math>, and <math>x &gt; 4.00\text{mm}</math>), five solvents to sludge ratio (7, 8, 10, 13, and 20mL/g) and solvent temperature ranging from 60 to 90°C were studied with the percentage of lipids yield as the response. The results show that the fine treatment region of <math>x \leq 2.00\text{mm}</math> resulted in higher lipids output compared to the coarse treatment region of <math>x &gt; 2.00\text{mm}</math>. The highest lipid of 9.70% was obtained at an effective size range of <math>1.00 &lt; x \leq 2.00\text{mm}</math> and it is considered as the critical particle size.</p> |