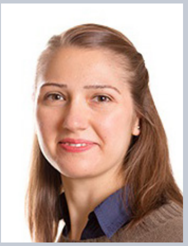
This thesis presents work that was done within the Swedish Centre for Resource Recovery (SCRR). Research and education performed within SCRR identifies new and improved methods to convert residuals into value-added products. SCRR covers technical, environmental and social aspects of sustainable resource recovery.



Increasing population and industrial activities result in an increase in residual materials/wastes. After processing agricultural crops and fruits, the fractions with low value remain. Alternative to considering these materials as waste or using them in low-value applications, the residuals with nutrient content can be utilized in microbial processes to produce added-value products. In this way, the waste materials are transformed into new products and joined back to the economy, the so-called circular bioeconomy. The biorefinery concept is significant to achieve energy and food security in future generations while protecting the environment. In this study, an integrated bio-refinery concept was investigated to produce bioethanol, lignin, and protein-rich feed/food. The challenges with fruit processing wastes and lignocellulosic feedstock were addressed through the process development and integration with edible filamentous fungi, conventional bioethanol plant, and organosolv pretreatment with a solvent recovery strategy. Conventional bioethanol plants can be converted into fungi biorefinery with an increased range of added-value products, which improves the process economy.

ISBN 978-91-89271-78-4 (printed)
ISBN 978-91-89271-79-1 (pdf)
ISSN 0280-381X, Skrifter från Högskolan i Borås, nr. 130
Electronic version: http://urn.kb.se/resolve?urn=urn:nbn:se:hb:diva-28588

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