**Commercialization of biocatalysis technologies**

Corresponding author: Lucia Steenkamp,

Affiliation: CSIR, Chemicals Cluster, South Africa1

Ph: +27 (0) 823966662

Email: lsteenkamp@csir.co.za

Whatsapp number: 0823966662

Alternative number: 072 9350353

Other authors: Chris vd Westhuyzen, Varsha Chhiba

Presentation type: Oral

**Abstract**: Bio-economy in South Africa is defined as any biotechnological activities and processes which can be implemented on commercial scale and creating revenue. The South African Government has identified the bio-economy to be a significant contributor to the country’s economy by 2030 in terms of the gross domestic product (GDP) and it is therefore necessary to grow novel industries that can commercialize biotechnologies. Biocatalysis has been identified as one of the areas in South Africa which will contribute to the Bio-economy.

In order to enhance the commercialization of biocatalysis technologies and growing the bio-economy, the Department of Science and Innovation (DSI) and the Technology Innovation Agency (TIA) in South Africa, selected the Council for Scientific and Industrial Research (CSIR) to host the Industrial Biocatalysis Hub. One of the main activities of the Hub, is the development of new or improved technologies for commercialization in collaboration with large companies and SMME industry partners.

The use of biocatalysis in commercial processes is gaining momentum as the processes can be carried out with very mild conditions and in organic solvents as well as aqueous environments, with enzymes and biocatalytically active cells. Some of the biocatalysis technologies developed by the CSIR for industry include flavour esters, nicotinic acid, (S)-naproxen, an anti-inflammatory drug, (-) Ambrafuran and irones for the fragrance industry, L-menthol for the flavours industry, natural extraction of ferulic acid for the food and cosmetics industry and aloesin for the cosmetics industry as well as products for the biocide and insecticidal markets. A platform technology has also been created for bioconversion of nitro containing substrates to amine products, which with classical chemical synthesis can potentially result in explosive reactions. Biocatalysis is also extremely valuable in the circular economy where waste streams are turned into valuable products. These examples will be covered in detail.

**Biography with photo**

Dr Lucia Steenkamp is a Principal Researcher at CSIR and Director of the Industrial Biocatalysis Hub in South Africa, specialising in Biocatalysis and has been an author and co-author of numerous peer-reviewed papers and two book chapters. She has developed technologies for industry clients in the pharmaceutical, veterinary, biocides, food, flavours and fragrance industries, leading to five granted patents, twelve technology demonstrators and 8 technologies licensed to external clients. She has won the South African Women in Science Award (SAWISA) for Research and Innovation in 2018 for her work in biocatalysis leading to technologies for commercialisation. She has been a finalist in the NSTF rewards in 2012, 2019 and 2020 for the development of new Green technologies. She is passionate about research which can lead to implementation of technologies on commercial scale and training the next generation of scientists.