

Department of Chemistry
Departmental Seminar:
Biodiscovery Month

You are cordially invited to a virtual lecture presented by



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Supervised by Prof. Vinesh Maharaj and Dr. Phanankosi Moyo

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Date: 3 December 2021

Time: 10:30 – 11:20

Venue: [Google Meet](#)

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***In-vitro* screening of South African medicinal plants in the pursuit of anti-viral agents against SARS-CoV-2**

The COVID-19 pandemic continues to be a global health concern despite numerous efforts being undertaken to curb it. This has necessitated the urgent need to seek more complementary tools, including drugs, to treat this disease. Inspired by the fact that natural products have historically served as a source of chemical scaffolds for development of drugs, the current study aims to interrogate South African biodiversity in search of novel anti-viral agents against SARS-CoV-2. A dual approach was adopted where *in-silico* screening and a rigorous criterion were used to select pure natural compounds and medicinal plants for the study. Compounds were phenotypically screened *in-vitro* against the main protease and spike protein of SARS-CoV-2. Using a high-throughput fractionation technique, twenty traditionally used plants were extracted and fractionated into semi-pure fractions using hyphenated analytical technologies for an accelerated screening approach.

Of the compounds screened, epigallocatechin gallate showed the most pronounced activity in the spike/ACE2 disruptive assay (IC_{50} of 0.44 $\mu\text{g/ml}$), presenting some inhibition activity at 15 $\mu\text{g/ml}$ in the whole-cell assays. From the twenty plant species screened, four demonstrated good activity ($IC_{50} < 10 \mu\text{g/ml}$) in the disruption of the spike/ACE2 complex and inhibition of the main protease (>80% inhibition at 1 $\mu\text{g/ml}$). Two known ellagitannins, punicalagin and punicalin were identified in a traditionally used plant and found to possess

potent whole cell activity, with their MOA determined to be as entry inhibitors. The compounds are currently undergoing *in-vivo* trials in hamsters. One semisynthetic compound additionally exhibited pronounced activity against the wuhan, beta and delta variants in phenotypic screens. To protect the discovery, a patent was filed for its use against SARS-CoV-2. Our data motivates the continued interrogation of South African plants in the search of novel antiviral agents against SARS-CoV-2.