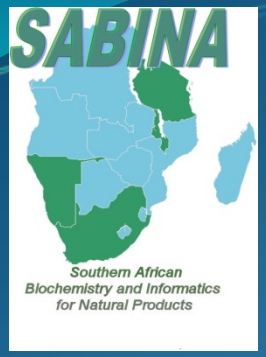


Southern Africa Biochemistry and Informatics for Natural Products

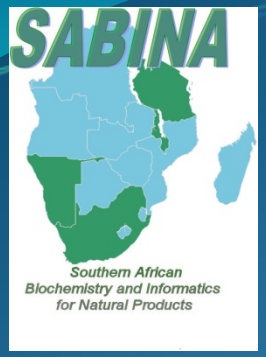
John Saka and Jane Morris

Focus areas

- Linking biology and chemistry to wealth creation and better human health
- Molecular biology/functional genomics
- Natural product chemistry
- Synthetic chemistry
- Biochemistry
- Bioinformatics
- Food science

Network partners

- University of Malawi
- University of Namibia
- University of Dar es Salaam
- University of Pretoria
- University of the Witwatersrand
- CSIR (Council for Scientific and Industrial Research)
- Tea Research Foundation of Central Africa



Secretariat

- Department of Chemistry, Chancellor College, University of Malawi, P.O. Box 280, Zomba, Malawi
- Academic Director
- ACGT
- Project Manager
- Accounts Offices

Purpose and goal

- Implementation of proactive postgraduate programmes in chemistry/biochemistry and bioinformatics of natural products. The specific objectives are:
  - Development of networks integrating chemical and biological sciences.
  - Implementation of both PhD and MSc programmes.
  - Strengthening networking among the departments of chemistry and biochemistry in key SADC universities

Main Activities

1. Co-supervision of students between faculty in different partner institutions.
2. Student exchanges between partner institutions (up to 6 months at a time, with a focus on building collaborative research and on training in techniques not available at the student's home institution).
3. Short term faculty visits between institutions (eg to run short courses, deliver guest lectures, and liaise concerning student research projects).
4. Longer term faculty visits and sabbaticals between partner institutions (where necessary and strongly motivated, sabbaticals may also involve visits to institutions that are not part of the network).
5. Organization of visits/lecture tours by distinguished guest lecturers from advanced academic institutions in the North.

Expected outputs

- Innovative networking in chemistry and biochemistry of natural products among SADC universities and research institutes.
- Cadre of doctoral and MSc young men and women participating actively in studies on the chemistry and biochemistry of natural products using top class facilities.
- Greatly enhanced participation in publication of scientific results in international journals.

Research Components

- Development of screening assays for determination of levels of known valuable compounds in plants
- Use of biochemical and bioinformatics methods for elucidation of structures, synthetic pathways, and modes of action of potentially valuable plant natural products
- Implementation of informatics tools for data management, incorporating information on plant distribution vs levels of natural products, sample management protocols etc. This will provide a common tool for all members of the network to manage and access data in the programme.
- Molecular biology studies on selected plant species to determine genetic diversity as related to production of the product(s) of interest
- Transcriptomic and proteomic approaches to the elucidation of key genes and enzymes involved in the synthetic pathways for selected metabolites
- Development of chemical and biochemical approaches for the synthetic production of selected compounds of interest

PhD/MSc training plan

- MSc and PhD students will register for degrees at any of the network institutions, depending on the availability of an appropriate supervisor.
  - Each student will be co-supervised by an appropriate faculty member from one of the other network partners, spending periods of 25-50% of time in the laboratories of at least one other network partner.
  - Secondment to other advanced South African laboratories and elsewhere in the world for periods of a few weeks to a few months will also be actively pursued
- Short courses will be organised to introduce new techniques to students and faculty in the network, such as bioinformatics, protein X ray crystallography, proteomics etc. T
  - The South African institutions playing a significant supporting role.
- Students expected to publish in accredited international journals and presenting their research findings at local and international conferences.
- 3 PhD and 3 MSc students yearly except in the Year 3

M&E Systems

- Programme of Work and budget being drafted for Year 1
- Key milestones and means of verifications established and be agreed at the initiation meeting

Progress

- Advertisement placed for bursaries and Project Manager
  - Targeting at least 30% female participation
  - 6 applications received so far.
- USD100000 received in Malawi
- Project initiation meeting being organised.

Sustainability

- Strengthening the capacity and capability of partner institutions in Malawi, Tanzania and Namibia rather than South Africa. Through provision of
  - housing subsidies for faculty involved in the programme, conditional on their obtaining a PhD (subsidy of up to a maximum of 15% of actual rental or mortgage costs)
  - funding for post-doctoral fellowships to support faculty members to build up their research group ($16 000 per annum)
  - financial incentives for publications in ISI rated journals ($1500 per publication)
  - an allowance for purchase and/or maintenance of laboratory equipment for faculty involved in the programme (maximum of $15 000 per annum, actual award to be based on a well motivated proposal)
  - a competitive travel fund for faculty to travel internationally based on well motivated proposals.
- Development of winning proposals to other funding agencies involving international partners