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# INTERNATIONAL SCIENCE PROGRAMME ISP

## #ISP60years WEBINAR SERIES

### Secondary metabolites from African medicinal plants: chemotaxonomic markers and potential prototypes of medicines for neglected tropical diseases

Kenya is endowed with a rich higher plant biodiversity with certain areas being declared biodiversity hotspots. There is a strong folk lore on usage of higher plants for ethno-medication by the 41 ethnic groups in the country; indeed, certain plants are used across several ethnic groups for the same application(s). To bridge the gap in lack of development of new compound drug candidates by Big Pharma for neglected tropical diseases (NTDs), several tropical research groups have taken to surveying medicinal plants for compounds that are active against micro-organisms which cause NTDs.

Phytochemical analysis of the Myrsinaceae and the Rumex genus of the Polygonaceae family illustrated that Kenyan medicinal plants could yield high concentrations of secondary metabolites. The anthelmintic widely used Myrsinaceae are harbingers of long alkyl side chain benzoquinones while the Rumex genus harbors anthraquinones which are established anti-intestinal worm metabolites.

In bioassay accompanied study of the Kenyan medicinal plants, the extracts of *Albizia schimperiana*, *Abrus schimperi*, *Clerodendrum eriophyllum*, *Sphaeranthus bullatus*, *Terminalia brownii*, *Polygonum senegalense*, and *Dodonaea angustifolia*, *Croton alienus* and compounds isolated from them were found to have activity against *Plasmodium falciparum* chloroquin sensitive and resistant strains significantly. Their activity against *Leshmania donovani* promastigotes were also observed. The extracts and compounds also showed strong activity towards a battery of pathogenic bacterial and fungal organisms- *C. neoformans*, methicillin-resistant *S. aureus*, *E. coli*, *M. intracellulare*, *A. fumigatus*. All the plants yielded reasonably active pure compounds; the most active compounds were from *A. schimperiana* in which the IC<sub>50</sub> value of the budmunchiamine spermine alkaloids were in the range of 120-270 ng/ml which are almost at the level of activity as of chloroquin 135 ng/ml and artemisinin 6 ng/ml against W2 strain of *Plasmodium falciparum*. The IC<sub>50</sub> for the compounds isolated from this plant towards the *Leshmania donovani* promastigotes ranged from 1.2 to 3.4 µg/ml which is an indication of significant activity. Some of the compounds isolated from the other plants also had good individual activities.

Keywords: *Albizia schimperiana*, *Clerodendrum eriophyllum*, *Sphaeranthus bullatus*, *Terminalia brownie*, *Polygonum sengalense*, *Dodonaea angustifolia*, *Croton alienus*, bioactivity, structural analysis

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