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The Future of Ethnopharmacology in East Africa: Some Examples on the Current Status, Challenges and Opportunities

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Introduction

- ❑ East African Botanical block is rich in medicinal plants and other natural products.
- ❑ These are used by the various indigenous communities for ailments.
- ❑ Herein, we highlight current status, challenges and opportunities for drug discovery from natural products in the East African Community.



Some examples on the current status of ethnopharmacology in East Africa

- ❑ Increased governmental interest in exploring natural products for drug discovery.
- ❑ For example; Presidential Scientific Initiative on Epidemics (PRESIDE), Covidex and Covilyce-1 potential COVID drugs in Uganda, exploring antimalarial plants in Kenya and Tanzania for development of drugs.



Some examples on the current status....

- ❑ **Hosting of regional Centers of Excellence**
- ❑ World Bank, IUCEA & Country government-funded (ACE II PTRE for phytochemicals and bioactivity studies-Moi University, Kenya & Pharm-Biotechnology and Traditional Medicine Center (PHARMBIOTRAC) for Natural Products, Mbarara University of Science and Technology, Uganda.



Some examples on the current status

- ❑ Formation and strengthening the Pharmacological Society for Natural Products Research: The Natural Products Research Network for Eastern and Central Africa (NAPRECA-1984).
- ❑ Constituted by Uganda, Kenya, Tanzania, Zimbabwe, DR Congo, Ethiopia, Botswana, Egypt, Cameroon, Madagascar, Rwanda and Sudan.
- ❑ Formation of a Natural Products Library at the University of Nairobi, Kenya.



Some examples on the current status

- ❑ Collaborations among and with Universities/laboratories outside the region.
- ❑ Makerere, University of Nairobi, Kenya Medical Research Institute (KEMRI) with University of Potsdam, the Technical University of Berlin, the Neubrandenburg University of Applied Sciences (Germany). Moi University with KEMRI, KIRDI (Kenya), University of Lorraine (France), Busitema, Mbarara University, (Uganda).



Some examples on the current status

- ❑ Conservation of priority and endangered medicinal plants e.g. *Prunus africana* at Kenyatta University, Kenya.



Challenges and Opportunities

- ❑ **Inadequate funding;** e.g. Kenya's investment in research and development stands at 0.8% of her GDP (Wetaya, 2021). **Increase budgetary allocation.**
- ❑ **Limited instrumentation/laboratory facilities.** E.g. few **Biosafety Level 3** Labs.
Collaboration-Enabling investigation of structure-bioactivity relationships of isolated molecules & computer-aided drug discovery.



Challenges and Opportunities.....

- Ambiguity in ethnomedicinal information;** e.g. plant part(s) used are unspecified (ambiguously reported) or specific use(s) are not captured due to trust issues by the traditional medicine practitioners (use of polyherbals/adjuvants).
- Can be improved by “giving back” the benefits of surveys to their indigenous owners (Schultz et al. 2021).



Challenges and Opportunities.....

- ❑ **Limited clinical trials;** e.g. Covidex and Covilyce-1 have not undergone clinical trials despite their promising anti-SARS-COV-2 potential. These herbals required up to UGX 2 billion (about USD 551,000) each for clinical trials.
- ❑ Treat trials of natural products as a matter of urgency as witnessed during the COVID-19 era (for UBV-01N COVID-19 product in Uganda).



Challenges and Opportunities.....

- ❑ Intellectual property rights and benefit sharing; especially civil servants who have to hand over the rights to government. This will drive off innovativeness.
- ❑ Give a fair share of the rights to the scientists. In addition, the local participants should benefit from the information usually published.



Selected references



- ❑ Derese et al. (2015) Mitishamba database: a web based *in silico* database of natural products from Kenyan plants.
- ❑ Obakiro et al. (2020). <https://doi.org/10.1186/s41182-020-00256-1>
- ❑ Omara et al. (2021). <https://dx.doi.org/10.26655/JMCHEMSCI.2021.2.4>
- ❑ Schultz et al. (2021). <https://doi.org/10.1163/23644583-bja10018>



ACKNOWLEDGEMENTS



THANK YOU FOR YOUR AUDIENCE