

Title:	Development of acaricidal agents from <i>Commiphora swynnertonii</i> for management of livestock ticks for smallholder farmers
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Purpose	To develop affordable and eco-friendly acaricidal agents from the traditionally used <i>Commiphora swynnertonii</i> (an indigenous shrub/tree) for the management of ticks and thus tick-borne diseases suitable for small holder farmers in Tarime
Project Summary	<p>Tick-borne infections resulting from tick infestation in livestock are a common veterinary health problem in Tanzania. It is the main cause of reported cattle deaths and was estimated to account for 68% of the 364 million USD annual total losses resulting from tick-borne diseases in Tanzania. The strategy to lower losses attributed with tick infestation in Tanzania has been through the application of synthetic acaricidal agents usually suspended in water and applied on the animal skins to prevent tick manifestations and thus transmission of pathogens. Despite of promising results through the use of synthetic acaricidal agents, unaffordability of veterinary services and reduced susceptibility of ticks to some acaricides leads to serious loss of cattle among the poor small holder farmers. Thus there has been a need to development alternative acaricidal agents which are affordable, eco-friendly, effective and applicable to rural small holder farmers notably from the sources available in rural remote areas. The use of wild ethnoveterinary plants used for the management of ticks among the ethnics groups in Tanzania offers the best source. The project aims therefore to develop acaricidal agent from <i>Commiphora swynnertonii</i> exudates for the management of tick infestation and thus tick borne diseases. <i>Commiphora swynnertonii</i> is a wild plant which is readily available in rural areas northern parts of Tanzania. The <i>Commiphora swynnertonii</i> acaricidal agent (CAA) project builds on previous undertakings and complements on-going efforts to promote sustainable harnessing of biodiversity resources for management of societal challenges at Nelson Mandela African Institution of Science and Technology (NM-AIST). The project is a graduate student research grant designed to train 2 MSc students. The NM-AIST will work in collaboration with National Institute of Medical Research (NIMR), Community based Organisation – PAMODZ (CBO - PAMODZ), local veterinary officers and villagers in Tarime District.</p> <p>Key words: bio-acaricides, <i>Commiphora swynnertonii</i>, Nelson Mandela African Institution of Science and Technology</p>
Country and Specific Location(s)	Tanzania: Nelson Mandela African Institution of Science and Technology laboratories, Komaswa village, Tarime District
Participating Institutions	<ol style="list-style-type: none"> 1. National Institute of Medical Research (NIMR) 2. Community based Organisation – PAMODZ (CBO - PAMODZ)
Start Date	1 st July, 2015

End Date	30 th July, 2017
Budget	USD 59,959

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Musa Chacha is a Senior Lecturer at Nelson Mandela African Institute of Science and Technology (NM-AIST) where he also heads the Department of Sustainable Agriculture and Biodiversity Ecosystem Management (SABEM). He has expertise in Natural Products Chemistry. Chacha holds a PhD from University of Botswana (Botswana), MPhil and BSc from University of Dar es Salaam (Tanzania). Both his PhD and MPhil were supported by the Deutscher Akademischer Austausch Dienst German Academic Exchange Service scholarship. Dr. Chacha worked as an Assistant Lecture at the University of Dar es Salaam before joining the NM-AIST in 2013. He has successfully supervised 9 MSc students and currently supervising 3 PhD and 5 MSc students. Dr. Chacha has continued to spur the NM-AIST's institutional focus of "Education for Society and Industry" through applied natural products chemistry in harnessing biodiversity resources for management of challenges facing rural communities in Tanzania. He has published several articles that unveils the potential of biodiversity resources in addressing societal challenges. Dr. Chacha is the member of internationally recognized scientific bodies namely Natural Products Research for Eastern and Central Africa (NAPRECA) and Western Indian Ocean Marine Association (WIOMSA).

Selected Publications

- Elihuruma, W., Chacha, M., Omolo, J. (2015). In vitro antimycobacterial activity of *Sterculia quinqueloba* (Garcke) K. Schum and *Canthium crassum* Hiern. *European Journal of Medicinal Plants* 6(2), 103-109.
- Mwanaisha, M., Chacha, M., Kazyoba, P.E. (2014). Antimicrobial and cytotoxicity efficacy of *Commiphora swynnertonii* (Butt) extracts. *International Journal of Science and Research* 3(7), 1611-1615.
- Elihuruma, W., Chacha, M., Omolo, J. (2014). Antimicrobial and cytotoxic activities of extracts from *Sterculia quinqueloba* (Garcke) K. Schum and *Canthium crassum* Hiern. *Journal of Pharmacognosy and Phytochemistry* 3(3), 125-129.
- Zekeya, N., Chacha, M., Shahada, F., Kidukuli, A. (2014). Analysis of phytochemical composition of *Bersama abyssinica* by gas chromatography – mass spectrometry. *Journal of Pharmacognosy and Phytochemistry*, 3(4), 246-252.
- Zekeya, N., Shahada, F., Chacha, C. (2014). In vitro antibacterial and antifungal activity of Tanzanian *Bersama abyssinica*. *International Journal of Science and Research* 4(4), 40-43.
- Chritopher, R., Nyandoro, S.S., Chacha, M., de Koning, C. (2014). A new cinnamoylglycoflavonoid, antimycobacterial and antioxidant constituents from *Heritiera littoralis* leaf extracts. *Natural Products Research: Formerly Natural Product Letters* 28(6), 351-358.

- Chacha, M. (2012). Comparative anticancer activity of dolaborane diterpenes from the roots of *Ceriops tagal* (Rhizophoraceae). *International Journal of Biological and Chemical Sciences* 6(2), 913-919.
- Chacha, M. (2011). Terpenoids from the roots of *Ceriops tagal* induces apoptosis through activation of caspase-3 enzyme. *International Journal of Biological and Chemical Sciences* 5(2), 402-409.
- Chacha, M. (2010). Flavonol derivatives with antioxidant activity from the stem bark of *Xylocarpus granatum*. *International Journal of Biological and Chemical Sciences* 4(2), 371-376.
- Mbwambo, Z., Foubert, K., Chacha, M., Kapingu, M.C., Magadula, J.J., Moshi, M.M., Lemièrre, F., Goubitz, K., Fraanje, J., Peschar, R., Vlietinck, A., Apers, S., Pieters, L. (2009). New furanoditerpenoids from *Croton jatrophioides*. *Planta Medica* 75(3), 262-267.
- Chacha, M., Mapitse, R., Afolayan, A.J., Majinda, R.R.T. (2008). Antibacterial diterpenes from the roots of *Ceriops tagal*. *Natural Product Communications* 3(1), 17-20.
- Mbukwa, E., Chacha, M., Majinda, R.R.T. (2007). Phytochemical constituents of *Vangueria infausta*: their radical scavenging and antimicrobial activities. *ARKIVOC* ix, 104-112.
- Chacha, M., Bojase-Moleta, G., Majinda, R.R.T. (2005). Antimicrobial and radical scavenging flavonoids from the stem wood of *Erythrina latissima*. *Phytochemistry* 66(1), 99-104.

Selected Funded Projects

- 2008 to date: Western Indian Ocean Regional Initiative in Marine Science and Education (WIO-RISE). Project Coordinator (2008 – 2013 and Node Leader (2013 to date). Supports 21 postgraduate students admitted in University of Dar es Salaam (Tanzania), Eduardo Mondlane University (Mozambique) and University of Cape Town (South Africa). Funded by the Carnegie Corporation of New York. Amount: US\$ 1.6 Million.
- 2015 to date: Postgraduate Training at NM-AIST. In-Country/Regional Scholarship Deutscher Akademischer Austausch Dienst German Academic Exchange Service. To support 8 MSc and 4 PhD students. Chairman of the Proposal Development Team. ≈ US\$ 597,760.

