

## Drinking water treatment in Tanzania using purified seed extracts from the pan-tropical tree *Moringa oleifera*

### Research fellow

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### Involved institutions

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River water is almost the exclusive drinking water source for many tropical developing countries and treatment processes heavily depend on chemical water treatment agents, which, however, must be imported using scarce convertible foreign currency (Schultz & Okun, 1983). Many water treatment plants therefore resort to underdosing of chemicals so as to meet the increasing water demand of a fast growing population. The result is the supply of low quality water, especially during the rainy season when rivers carry highly turbid water (Muyibi & Alfugara, 2003). Beside the economic drawback, chemical water treatment agents such as metal salts, synthetic polymers and chlorine formulations are also considered to have a negative impact on the human health (Bove et al., 2002) and the environment (Kaggwa et al., 2001) after long-term exposure.

Naturally occurring alternatives to conventionally used chemical agents are generally considered as being safe and have therefore been investigated for decades, such agents include compounds found in plants (Fink, 1984). Of particular interest is the pan-tropical tree *Moringa oleifera*, since grounded seed powder have traditionally been used for the clarification of turbid drinking water in rural areas in the Sudan (Jahn & Hamid, 1979). The fact however, that the active compounds from seeds can be extracted from the press-cake, an agricultural waste product accumulating after a high quality vegetable oil has been processed, has perhaps been one of the most significant findings that has driven the *Moringa* development ([website](#)) as a whole (Sutherland et al., 2001, [doc, 47 kb](#)).

Being in the vanguard of these research efforts, the Laboratory of Chemical and Biological Engineering (LGCB) at the ETH in Lausanne has developed a novel procedure over the past few years for a robust but cost-effective large scale production of purified *Moringa* seed extracts (Doerries, 2005). These extracts show high coagulation and antimicrobial activities in laboratory assays (Suarez et al., 2003) and methods for their implementation into drinking water treatment processes in the tropics are now subject to the present RFPP project. The project in collaboration with the Prospective College of Engineering and Technology (pCET) at the University of Dar es Salaam in Tanzania and the International Centre for Insect Physiology and Ecology (ICIPE) in Nairobi, Kenya aims at verifying the potential transfer of the bio-technology for a more self-dependent and environmental friendly drinking water treatment in countries, where the pan-tropical *Moringa* tree is naturally abundant. The specific research project objectives are:

- To validate a novel extraction procedure recycling a locally available agricultural waste product for the processing of purified seed extracts suitable for drinking water treatment.
- To evaluate purified seed extracts harbouring coagulant and antimicrobial activities under actual conditions occurring in tropical developing countries, where a robust, cost-effective, self-dependent yet high quality drinking water treatment is urgently required.
- To develop a method for implementing a purified *Moringa* seed extract into local drinking water treatment works.

The present RFPP project is in line with the new country programme (2004-2010) of the Swiss Agency for Development and Cooperation (SDC) in Tanzania ([website](#)). The research conducted by the research fellow and a MSc candidate from the University of Dar es Salaam (2 years thesis research) also enhances a previous bilateral cooperation agreement between the Swiss State Secretariat (SER) and the Tanzanian government in the field of research and education.

### References

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*Moringa oleifera* in monoculture



Intercropped, agro-forestry cultivation of *Moringa oleifera*



Harvested pods for further and local processing of a high quality vegetable oil



*Moringa oleifera* seeds



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Dehusked seed kernels ready for oil extraction



Press cake



Purified Moringa seed extracts harbouring coagulant antimicrobial activities



The Ruvu River close to Dar-Es-Salaam





