



HOSTED BY



ELSEVIER

Contents lists available at [ScienceDirect](http://ScienceDirect.com)

## Asian Pacific Journal of Tropical Biomedicine

journal homepage: [www.elsevier.com/locate/apjtb](http://www.elsevier.com/locate/apjtb)Letter to the Editor <http://dx.doi.org/10.1016/j.apjtb.2015.12.016>The African *Moringa* is to change the lives of millions in Ethiopia and far beyond

Solomon Habtemariam\*

Pharmacognosy Research Laboratories and Herbal Analysis Services UK, Chatham-Maritime, Kent, ME4 4TB, United Kingdom

Dear Editor,

I vividly recall one of my medicinal plant collection trips in the southern regions of Ethiopia back in 1986. Besides collecting few plants of interest, we were asking the locals to show us medicinal plants of importance in the region. Within few minutes, a group of enthusiastic young men brought us branches of massive pinnate leaves of a plant locally called in Amharic Shiferaw (also called Aleko in Oromo, [Figure 1](#)). We were told that it is a good medicine for treating diabetes (“illness from sugar” as they call it). By then, I was working with Chemistry Department colleagues at the Addis Ababa University with an ambitious mission to establish the pharmacological basis of Ethiopian medicinal plants. As I did not have the experimental model for diabetes, however, I left Shiferaw's collection for another day. Since then, I have investigated here in the UK hundreds of medicinal plants collected from almost all corners of the world while my promise of collecting Shiferaw for scientific studies was nothing but all forgotten.

When I visited Addis Ababa in the summer of 2013, I noticed that Shiferaw has made it all the way to the capital and far beyond. Shiferaw in Amharic means “feared by a thousand” but there now seems to be no fear of using this plant at all. Every department food store and others were selling the powdered dried leaves with endless claim. People that I visited were drinking herbal teas of the leaves in the evening. When I went to Addis Ababa University to visit old friends, students were busy experimenting on the plant. I felt the impact of this plant even more when I came to know about the work being done by international Aid agencies who have been assisting the plantation of hundreds of thousands of *Moringa* trees in some areas of Ethiopia as part of their programme on enhancing the long-term adaptability of people to environmental changes. The hope is that the fast growing multipurpose *Moringa* tree in a less-fertile soil and/or drier habitat could serve as a reliable source of food and income to many communities.

The leaves of Shiferaw (African *Moringa*, *M. stenopetala*) are eaten like cabbage; most of the plant parts are used for curing various ailments; the dried leaves are traded as nutritional supplement and as medicine particularly for diabetes and associated disorders; the seeds are good sources of edible oil as well as sources of biofuel; the seeds are excellent flocculent agents and employed for water purification, *etc.* Not surprisingly and for all the claimed usage, the plant is also called ‘The Miracle Plant’. For many people who are familiar with the story of ‘The Miracle Tree’, it exclusively means the Indian *Moringa* [*Moringa oleifera* (*M. oleifera*)] which has been scientifically well characterised and traded world-wide in large volumes. It is also introduced to many African countries for its multipurpose usage. Although the African *Moringa* (Shiferaw, *M. stenopetala*) has very similar usage and morphology with the Indian *Moringa*, it never showed superiority in any form and it has been a worry by some in the scientific community that the search for an economically viable crop may push out the native African *Moringa* from the game. A comparative analysis of the goodies coming from the two *Moringa* species would thus be vital not only for large-scale utilisation of the plants but also in reserving the genetic pool of the native African *Moringa*. Some important pioneering scientific studies on the plant has already been done in the past two decades and the earlier multi-centred African research efforts has been summarised by the prominent Ethiopian biologist, Professor Yalemtehay Mekonnen [2].

Fortunately, just few months after my Ethiopian trip, I was in another plant collection mission to India and I was also able to bring with me samples of *M. oleifera*. These two plants being genetically related, they have quite few group of compounds in common but the African *Moringa* appears to be distinctly different from its Indian relative. The simplicity of the African *Moringa* leaves' chemistry is even more astonishing. It contains one predominantly active chemical compound called rutin in as much as 2.3% of the dry weight [3,4]. Interestingly, this compound is not present in detectable amount in the Indian

\*Corresponding author: Solomon Habtemariam, Pharmacognosy Research Laboratories and Herbal Analysis Services UK, Chatham-Maritime, Kent, ME4 4TB, United Kingdom.

Tel: +44 (0) 208 331 8302

Fax: +44 (0) 208 331 9805

E-mail: [s.habtemariam@herbalanalysis.co.uk](mailto:s.habtemariam@herbalanalysis.co.uk)

Peer review under responsibility of Hainan Medical University. The journal implements double-blind peer review practiced by specially invited international editorial board members.

Article history:

Received 16 Nov 2015

Accepted 18 Dec 2015

Available online 14 Jan 2016



**Figure 1.** *Moringa stenopetala* (*M. stenopetala*) [1].

*Moringa* leaves [3]. Rutin being naturally sourced from plants for its various nutraceutical and pharmaceutical usage, the African *Moringa* now turned out to be a good potential candidate for isolating this biomolecule. Rutin is also a known antioxidant, antidiabetic and multifunctional natural compound that could be responsible for the variety of medicinal claims of the leaves of the African *Moringa* [5]. Coincidentally, it is the Southern regions of Ethiopia (namely ‘Kaffa’) that gave the world the gift of coffee. It also appears that the active ingredient of coffee, caffeine, is present in many varieties of coffee seeds in less than 2.3% on dry weight basis. With careful selection of plants growing under different environmental conditions and breeding experiments, there is therefore no doubt that a super-variety of the African *Moringa* that may serve as a better food/medicine could be found.

The rational utilisation of *Moringa* seeds for nutritional, pharmaceutical and other usages, like water purification, should be based on removal of the edible oils in the first instance. This can be done by various extraction means such as supercritical carbon dioxide or a cheaper methods of solvent extraction. We could easily get a yield of 25% by extraction with petroleum ether but a higher yield has also been reported. The left over plant material from the oil utilisation (food, biofuel, etc.) could

be further extracted with water. Incredibly, this product is a potent antimicrobial and flocculent agent and can be utilised for water purification. It also appear that the simplicity of the African *Moringa* chemistry is extended to the seeds. A single molecule, glucomoringin as a major active component as oppose to a complex mixture of glucosinolate products in *M. oleifera* seeds is apparent. We are currently studying on these bio-molecules but the result from our laboratory and others clearly demonstrated that the African *Moringa* is distinctly different from the Indian species.

So far, the utilisation of Shiferaw (the African *Moringa*) for its multiple usage has effectively been demonstrated by millions of people at the local level. The next step is to combine local knowledge with science and make this natural gift cross big geographical boundaries as a commercial cash crop. The trend in this regard is very promising too and hopefully government and international Aid organisations will continue using their funding to realise people supporting themselves via exploiting their untapped natural resources.

### Conflict of interest statement

I declare that I have no conflict of interest.

### References

- [1] Top Tropicals. *Moringa stenopetala*. Ft Myers: Top Tropicals; 2015. [Online] Available from: [http://toptropicals.com/catalog/uid/moringa\\_stenopetala.htm](http://toptropicals.com/catalog/uid/moringa_stenopetala.htm) [Accessed on 15th August, 2015]
- [2] Mekonnen Y. The multi-purpose *Moringa* tree: Ethiopia. Paris: MoringaNews; 2015. [Online] Available from: <http://www.moringanews.org/documents/stenopetala.pdf> [Accessed on 15th August, 2015]
- [3] Habtemariam S. Investigation into the antioxidant and antidiabetic potential of *Moringa stenopetala*: identification of the active principles. *Nat Prod Commun* 2015; **10**(3): 475-8.
- [4] Habtemariam S, Varghese GK. Extractability of rutin in herbal tea preparations of *Moringa stenopetala* leaves. *Beverages* 2015; **1**(3): 169-82.
- [5] Habtemariam S, Lentini G. The therapeutic potential of rutin for diabetes: an update. *Mini Rev Med Chem* 2015; **15**(7): 524-8.