Comparative analysis of nutritional composition and the level of antinutritive compounds of M.oleifera leaf accessions from Kenya, Tanzania and Mali

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Introduction

- *Moringa oleifera* is one of the most important plants in the world
- It has multiple uses*:* food, ethnomedicine, water purification, ingredient for cosmetics and lubricants [1].
- Constitutes secondary metabolites which chelates and antagonize nutrients uptake
- The tree could contribute significantly to food security in Kenya in the wake of climate change and variability. [2].
- Most studies have focused on medicinal aspects and have overlooked the comparative nutritional analysis of the tree from different agroclimatic regions
- We therefore aimed to assess the nutritional content and the level of antinutritive compounds of *M.oleifera* leaf accessions from in selected sites in Kenya, Tanzania and Mali

Method

- Plant samples were collected from nine regions in Kenya, two in Tanzania, and two in Mali. Sorting of discoloured samples and removing dust was carried out before the analysis.
- The dry matter (DM) content was determined according to Teye et al. (2011) by weighing a sample before and after drying.
- The total carbohydrate content was determined by differential method, according to Onwuka (2005) and Unuofin et al. (2017). Total carbohydrate = 100 - % (crude protein + crude fat + crude fibre+ crude fat + ash + moisture).
- Proteins, fats, fibre and moisture content were determined according to standards methods outlined by AOCC 2016.
- The antinutritive content of oxalates, phytates, cyanogenic glycosides andcarotenoids wase determined throughthe HPLC method

Fig.1 Pcture of *Moringa oleifera* tree

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Results

- There was significant ($p < 0.05$ differences in nutrients and anti nutritive compounds among the geographical regions (Table 1)
- The content of the antinutive compounds varied .significantly among the sites

The nutrients were found in significant amounts, and the antinutritive compounds were relatively low.

High protein content indicates that it can be used to fortify products such as bread, cakes among other products

Its low moisture content suggests a good keeping quality hence cannot easily be degraded by micro organisma.

- The differences in nutrients and antinutrients can be attributed this to genetic, environmental and agroclimatic conditions among the sites

Table 1: Nutritional composition

	Proteins		MC		Ash		CHO		Fat		Dietary Fibre	
Site Name	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Arumeru	24.6	2.7	1.13	0.06	10.71	1.2	58.7	4.62	5.70	1.86	9.47	1.80
Arusha Town	25.1	3.6	1.11	0.01	10.76	1.7	60.6	3.61	2.73	1.42	10.13	1.24
Gede	25.4	4.1	5.96	3.81	9.91	3.2	52.8	7.10	5.02	0.76	10.69	1.22
Kibwezi	27.2	3.6	5.90	3.21	11.22	3.2	50.0	5.84	5.12	0.85	11.66	1.83
Kilifi	28.5	4.8	6.86	3.99	9.22	3.8	48.9	7.33	5.31	0.58	10.36	1.42
Kitui	25.9	2.9	2.39	1.22	11.97	2.1	56.5	3.97	5.13	0.86	9.95	1.41
Kouikoro	20.1	5.8	10.99	1.28	10.09	1.9	57.5	5.77	1.45	0.07	9.86	0.97
Likoni	27.1	4.1	5.01	2.98	10.10	2.6	52.0	4.71	4.91	0.97	10.81	1.25
Malindi	26.5	3.2	7.06	1.52	9.11	3.5	49.3	5.24	5.45	1.58	11.68	3.72
Matsangoni	28.1	4.5	7.36	1.13	10.25	0.7	48.0	4.70	4.71	0.66	11.70	0.92
Mbololo	27.2	5.0	6.74	3.55	10.51	3.6	49.6	7.52	5.25	1.03	11.18	1.51
Msambweni	25.6	3.4	6.28	3.48	9.66	4.1	51.8	5.92	5.36	0.80	10.84	1.53
Sikaro	19.1	3.3	11.42	1.26	9.69	3.3	58.3	3.92	1.46	0.06	9.63	0.21
Df	12		12		12		12		12		12	
F	24.1		61.02		2.55		25.33		129.14		9.86	
Chi2(12)	48.22		840.57		120.72		60.44		572.95		285.31	
Prob > F	0.000***		0.000***		0.0027***		0.000***		0.000***		0.000***	

Table 2: Antinutritive compounds

	Cyanogenic glycoside		Oxalates		Carotenoids		Ptc Acid	
Site	Mean	Std. Dev	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Arumeru	0.0144	0.007	855.002	835.11	6.92	1.43	3.33	0.20
Arusha Town	0.0085	0.004	571.585	485.62	8.49	1.88	3.26	0.39
Gede	0.0130	0.009	721.393	478.40	8.39	0.85	3.42	0.60
Kibwezi	0.0103	0.005	896.225	1396.7	8.49	2.01	3.45	0.59
Kilifi	0.0096	0.007	650.511	328.43	7.34	1.44	3.29	0.53
Kitui	0.0164	0.006	860.103	615.60	8.48	3.45	3.06	0.44
Kouikoro	0.0108	0.003	891.764	365.93	6.38	3.49	1.51	0.82
Likoni	0.0130	0.006	570.28	264.37	9.29	2.68	3.32	0.68
Malindi	0.0059	0.003	713.285	154.52	7.89	3.50	3.13	0.42
Matsangani	0.0129	0.006	620.105	67.28	11.49	4.67	3.34	0.42
Mbololo	0.0106	0.006	622.899	347.48	8.02	1.45	3.40	0.46
Msambweni	0.0134	0.014	995.123	373.23	8.36	3.17	3.33	0.56
Sikaro	0.0102	0.004	729.075	337.8	6.74	2.45	1.93	0.54
Df	12		12		12		12	
F	4.71		1.04		8.17		63.76	
Chi2(12)	221.6534		731.593		164.557		73.66	
Prob > F	0.000 ***		0.411		0.000***		0.000***	

Conclusion

- The high nutrients content was an indication that the plant could be used to reduce malnutrition levels among the population by consuming and fortifying food products).
- The presence of antinutritional compounds indicates the plant's potential for therapeutic use, confirming its traditional use as a medicine
- The variations in the amounts of nutrients and antinutrients among the different study sites reveal genetic differences that could be exploited for breeding purposes.

References

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