

Nutrient accumulation in leaves and soft twigs of *Moringa oleifera* Lam. at different growth stages in Western Highland of Cameroon

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Introduction *Moringa oleifera* belongs to the Moringaceae family and is considered to have its origin in the south of the Himalayan mountains. The species is being introduced into the highland zone of Cameroon. It is a tree which has many valuable properties and it is of great nutritional and scientific interest. The objective of this experiment was to evaluate nutrient composition in leaves and soft twigs of *M. oleifera* at different growth heights when grown in the Western Highland of Cameroon.

Material and methods Seeds of *M. oleifera* from Nicaragua were directly planted on plots (1m x 1m), at 30cm x 30cm density on the clay soil at the Research and Teaching Farm of the University of Dschang located at an altitude of 1400 m in December 2003. Leaf samples and soft twigs of the plants were collected at different growth heights, i.e.: at 0.5, 1, 1.5 and 2 m for leaves and 1, 1.5 and 2 m for soft twigs respectively. Organic matter (OM), ash, crude protein (CP), lipids and phosphorous were analysed according to the methods described by AOAC (1990), while cellulose (Cell) and hemicellulose (H-cell) were determined as described by Goering & Van Soest (1970). For the non-fibrous sugar, the method described by Wattiaux (2002) was used. The results were submitted to ANOVA and the differences between means were tested by the Duncan multiple range test (Steel & Torrie, 1980).

Results Stage of growth had relatively less effect on OM (88.9-90.5%) and ash (9.5-10.7%) contents of *Moringa* leaves and soft twigs (Table 1). Lipids were significantly ($p<0.05$) higher in leaves than in soft twigs. While hemicellulose was significantly ($p<0.05$) higher in leaves than in soft twigs, cellulose was found to be greater in soft twigs than in leaves. Both constituents were relatively high in samples at 2 m growth. Crude protein contents were threefold higher in leaves than in soft twigs. At 0.5 m height CP of leaves (25.8%) and its phosphorous content (0.38%) was significantly ($p<0.05$) higher than in all other growth stages. Non-fibrous sugar was significantly ($p<0.05$) greater in 1 m height soft twig than in all other parts of the plant and growth stages (Table 1).

Table 1 Nutrient contents in leaves and soft twigs of *M. oleifera* at different growth heights

Plant height (m)	Plant parts	Chemical composition (%DM)							
		OM	Ash	P	CP	Lipids	H-cell	Cell	Non-fibrous sugar
0.5	Leaves	89.3	10.7	0.38	25.8	5.5	12.7	20.2	15.6
	Soft twigs	88.9	10.1	0.20	22.2	6.5	12.4	21.1	17.5
1.0	Leaves	90.5	9.5	0.12	8.2	2.4	7.6	40.2	22.7
	Soft twigs	89.3	10.7	0.32	22.4	5.8	13.6	21.5	14.9
1.5	Leaves	89.6	10.5	0.24	9.4	2.7	7.8	40.6	17.9
	Soft twigs	89.8	10.1	0.27	20.8	5.7	13.8	26.6	16.4
2.0	Leaves	90.2	9.8	0.18	8.5	2.6	7.9	42.2	18.1
	Soft twigs								

Conclusion Results of the present study indicates that in the Western Highland of Cameroon, *Moringa oleifera* grows relatively well and crude proteins and phosphorous contents of leaves are highest in plants of 0.5 m height, whereas the fibrous contents increases with the age in leaves and soft twigs.

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