The nutritional value of *Moringa oleifera* Lam. leaves: what can we learn from figures?  
Mélanie BROIN – Scientific Assistant – Moringanews Network (melanie.broin@wanadoo.fr)

**Introduction**

There are quite a lot of data available in the literature, on the Internet and from other sources about the nutritional value of *Moringa oleifera* Lam. (M.o) leaves. However, it can sometimes be quite hard to find one’s way through, since there can be considerable variation amongst data. In this context, we thought it might be useful for fieldworkers and for efficient communication about *Moringa*, to have reliable average figures on the nutritional value of M.o leaves. The objective of this work was to gather available information about *Moringa* leaves nutritional value, to identify potential sources of errors in data, to discard irrelevant data, and to find a consensus on average nutritional values.

**Methodology**

We did an exhaustive search for data on the nutritional value of M.o leaves through literature databases, the Internet, and the Moringanews Network. All the data collected were compiled in a Microsoft Excel spreadsheet for further analyses. When there were several analyses in one reference, they were compiled in order to give the same weight to each reference. All the data collected, whether from fresh or dry leaves, were transformed to obtain a value for 100g of dry matter, using the water content given in the analysis if available, or using the average water content for fresh or dry leaves, accordingly. If not, data for vitamin A were all converted to International Units (IU) using a conversion factor beta-carotene to retinol of 1/6 and 1UI=0.3 mg retinol, except in Figure 3 where a conversion factor of 118 has been used to avoid overestimation. For vitamin C, only values for fresh leaves have been considered, since there is a loss a vitamin C when the leaves are dried, except in Figure 3 where we used the value for dry leaves, since this Figure is dealing with leaf powder.

We then calculated, for each nutrient, the mean, the standard deviation and the ratio of the maximal to the minimal value. In order to eliminate irrelevant variations, we discarded outliers for each nutrient. We then recalculated the mean and the standard deviation for the data kept. So obtained mean values were then compared to other foods and to the recommended allowances.

**Results**

1. **Source data**

In total, we collected 32 references dealing with M.o nutritional values, 11 of them were from peer reviewed journals, 5 from books or reports, 5 from unpublished analyses, and 2 from an internet source (FAQ).

2. **Variability of source data**

The variability of the maximal to the minimal value in initial data varied from 1.0 to 514 (%), illustrating the very high variability of source data. Furthermore, the high variability of source data is illustrated by Figure 1, which shows the standard deviation for each nutrient.

3. **Selection of relevant data**

Table 1 shows the ratios of maximal to minimal values obtained after having discarded outliers (the number of figures kept is indicated in parentheses). Figure 1 illustrates the remaining variability of selected data, by showing the standard deviation for each nutrient.

4. **Possible sources of variation amongst data**

Table 2 illustrates the possible sources of variation amongst data. While there is generally an acceptable range of variation due to differences in the genetic background, the environment, the cultivation methods and the sample analytical method, attention must be drawn on variations due to the methods of preparation and conservation of samples that can seriously affect the vitamin contents. Errors of human origin are commonly encountered as far as possible identified and the values not taken into account.

**Methodology**

We did an exhaustive search for data on the nutritional value of M.o leaves through literature databases, the Internet, and the Moringanews Network. All the data collected were compiled in a Microsoft Excel spreadsheet for further analyses. When there were several analyses in one reference, they were compiled in order to give the same weight to each reference. All the data collected, whether from fresh or dry leaves, were transformed to obtain a value for 100g of dry matter, using the water content given in the analysis if available, or using the average water content for fresh or dry leaves, accordingly. If not, data for vitamin A were all converted to International Units (IU) using a conversion factor beta-carotene to retinol of 1/6 and 1UI=0.3 mg retinol, except in Figure 3 where a conversion factor of 118 has been used to avoid overestimation. For vitamin C, only values for fresh leaves have been considered, since there is a loss a vitamin C when the leaves are dried, except in Figure 3 where we used the value for dry leaves, since this Figure is dealing with leaf powder.

We then calculated, for each nutrient, the mean, the standard deviation and the ratio of the maximal to the minimal value. In order to eliminate irrelevant variations, we discarded outliers for each nutrient. We then recalculated the mean and the standard deviation for the data kept. So obtained mean values were then compared to other foods and to the recommended allowances.

**Results**

1. **Source data**

In total, we collected 32 references dealing with M.o nutritional values, 11 of them were from peer reviewed journals, 5 from books or reports, 5 from unpublished analyses, and 2 from an internet source (FAQ).

2. **Variability of source data**

The variability of the maximal to the minimal value in initial data varied from 1.0 to 514 (%), illustrating the very high variability of source data. Furthermore, the high variability of source data is illustrated by Figure 1, which shows the standard deviation for each nutrient.

3. **Selection of relevant data**

Table 1 shows the ratios of maximal to minimal values obtained after having discarded outliers (the number of figures kept is indicated in parentheses). Figure 1 illustrates the remaining variability of selected data, by showing the standard deviation for each nutrient.

4. **Possible sources of variation amongst data**

Table 2 illustrates the possible sources of variation amongst data. While there is generally an acceptable range of variation due to differences in the genetic background, the environment, the cultivation methods and the sample analytical method, attention must be drawn on variations due to the methods of preparation and conservation of samples that can seriously affect the vitamin contents. Errors of human origin are commonly encountered as far as possible identified and the values not taken into account.

**Methodology**

We did an exhaustive search for data on the nutritional value of M.o leaves through literature databases, the Internet, and the Moringanews Network. All the data collected were compiled in a Microsoft Excel spreadsheet for further analyses. When there were several analyses in one reference, they were compiled in order to give the same weight to each reference. All the data collected, whether from fresh or dry leaves, were transformed to obtain a value for 100g of dry matter, using the water content given in the analysis if available, or using the average water content for fresh or dry leaves, accordingly. If not, data for vitamin A were all converted to International Units (IU) using a conversion factor beta-carotene to retinol of 1/6 and 1UI=0.3 mg retinol, except in Figure 3 where a conversion factor of 118 has been used to avoid overestimation. For vitamin C, only values for fresh leaves have been considered, since there is a loss a vitamin C when the leaves are dried, except in Figure 3 where we used the value for dry leaves, since this Figure is dealing with leaf powder.

We then calculated, for each nutrient, the mean, the standard deviation and the ratio of the maximal to the minimal value. In order to eliminate irrelevant variations, we discarded outliers for each nutrient. We then recalculated the mean and the standard deviation for the data kept. So obtained mean values were then compared to other foods and to the recommended allowances.

**Results**

1. **Source data**

In total, we collected 32 references dealing with M.o nutritional values, 11 of them were from peer reviewed journals, 5 from books or reports, 5 from unpublished analyses, and 2 from an internet source (FAQ).

2. **Variability of source data**

The variability of the maximal to the minimal value in initial data varied from 1.0 to 514 (%), illustrating the very high variability of source data. Furthermore, the high variability of source data is illustrated by Figure 1, which shows the standard deviation for each nutrient.

3. **Selection of relevant data**

Table 1 shows the ratios of maximal to minimal values obtained after having discarded outliers (the number of figures kept is indicated in parentheses). Figure 1 illustrates the remaining variability of selected data, by showing the standard deviation for each nutrient.

4. **Possible sources of variation amongst data**

Table 2 illustrates the possible sources of variation amongst data. While there is generally an acceptable range of variation due to differences in the genetic background, the environment, the cultivation methods and the sample analytical method, attention must be drawn on variations due to the methods of preparation and conservation of samples that can seriously affect the vitamin contents. Errors of human origin are commonly encountered as far as possible identified and the values not taken into account.