Nutritional Profile of Moringa Stenopetala Species Samples Collected in Different Places in Ethiopia and their Comparison with Moringa Olifera Species

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Abstract

The primary objective of the present research was to investigate the nutrients composed in Moringa leaves from different provinces in Ethiopia and to determine its potential as a nutritional supplement.

Materials and Methods

Plant Samples

Fresh green leafy vegetable were obtained from farming area in 11 different provinces in Ethiopia i.e. Kewote , Dewa cheka 1 , Dewa cheka 2 , Kallo 1, Kollo 2, Alamat, Mekele zu- ria, Taitat Kororo, Kaffa Humera and Bahir Dar Zuria. The leaves of M. stenopetala were collected from Northern tropical parts of Ethiopia on Dec., 2013.

Chemical analysis of the ingredients and diets

Proximate analysis procedure including the percentage of moisture content, crude protein, crude fat, ash contents and crude fiber in the sample were determined by The Association of Official Analytical Chemists methods (AOAC, 1990). Ascorbic acid was determined by photometric method using methods of Vitamin assay. Phosphorus was estimated according to the method of Fiske and Subbarow. Tannin was determined by Maxson and Rooney method.

Result and Discussion

Whereas, the mean value of Crude fiber content of the samples was 11.62% with samples from SNPPNR having the highest crude fiber content of 12.92% along with Tigray (11.24%) and Amhara (12.22%). The carbohydrate content of the samples collected gave an average value of 38.49% where samples from Oromia registered the highest, 41.66%. With a mean value 274kcal, the energy values of the samples collected all regions has no statistically significant difference among each other except samples SNPPNR which has a significantly lower energy value.

Mineral content

The amounts of Iron in the 19 samples collected from all over Ethiopia had an average mean value of 54.85mg/100g. A statistically significant difference was observed with the iron content of samples collected from Dire Dawa, 83.6mg/100g, and Amhara region, 34.85mg/100g while the mean values of Iron content for samples collected from the other three regions was observed to be statistically similar. Whereas, samples from SNPPNR had the highest mean value of Zinc (2.44mg/100g) compared to the other regions while the mean value of Zinc of the all five regions was 2.26mg/100g.

The content of potassium of the collected samples has been found appreciable with a mean value of 2,094.5 mg/100g where as the sodium content was found to be 214.10mg/100g. Samples from all regions has statistically significant similarity in potassium content except samples from Tigray which is slightly lower than the others. Whereas, samples from SNPPNR have registered to have a statistically higher sodium value along with samples from Oromia and Tigray region making samples from Amhara and Dire Dawa a little lower with a mean values of 100.68mg/100g and 207.14mg/100g respectively. The mean ratio of potassium to sodium was found to be 9.78 which is another good characteristic if consumed by individuals with hypertension and heart problems.

Antinutritional factors and Vitamin Content

The average phytate content of the samples collected all over the country was found to be 378.44mg/100g with samples from Amhara having the smallest phytate content of 302.53mg/100g. The other regions have a statistically significant similarity on their phytate content. Similarly, the mean value of tannin of the collected samples was 358.89mg/100g with all regions having a statistically significant similarity. The molar ratio of phytate to iron, zinc and calcium was analyzed to be 0.67, 17.56 and 0.012 respectively. Since the phytate to zinc molar ratio is above 15, its bioavailability was observed to be low. The mean values of all nutrition composition parameters between study regions was 2.26mg/100g.

Conclusion

• Nutritional variations was observed among the samples obtained from different regions
• Could be attributed to the genetic background of the plant, in terms of ecotype and cultivar, environmental factors
• This include the soil and climate (Sanchez-Machado et al., 2009)
• M. stenopetala leaves are rich in nutrients and has potential to be used as protein and mineral resource for animal and human food formulations
• Drying the leaves assists to concentrate and reduce some of the anti-nutritional factors
• M. stenopetala leaves in Ethiopia has comparable and artistic nutritional profile to M. Olifera
• Processing is required to reduce the phytate content so that minerals like Zinc can be used by the body during consumption
• Statistically significant difference in the mean values of all nutrition composition parameters between study regions
Secondary Heading

Customer Meeting

The joint project team was comprised of specialists from the main project, the sub-projects, and the coordinating organization. The team included: Dori Tennis, Director of Sales; Michel Black, Project Manager; and Alastair Sitwell, Chief Executive Officer. The team worked as follows:

1. Dori was responsible for the overall strategy, planning, and execution of the project.
2. Alastair was invited to speak along with the CEO of another company.
3. Michel Black worked as a consultant in another company.