Not Really Super- “Superfoods” Moringa, Barley grass and Wheatgrass

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Introduction

The so called „superfoods“ such as moringa leaves, barley grass, wheatgrass, goji berries and chia seeds have become a trend in western countries. Advertisements promise: eat daily a portion of a „superfood“, and you’ll stay fit and healthy. CVUA Stuttgart surveyed these products to see whether they are as healthy as their name suggests as far as the use of synthetic pesticides is concerned.

Analysis

Since 2013, CVUA Stuttgart analyzed more than 40 samples of such products for residues of more than 650 different pesticides and metabolites using the QuEChERS and QuPPe method [1,2]. The surveyed products were mainly labelled as organically grown.

As there were no special maximum levels established for Moringa oleifera leaves during the time of the survey, they were classified as herbal infusions from leaves and herbs (e.g. mate leaves) as regards the MRLs. This classification was at that time a consensus among most laboratories also because moringa leaf powder is used in amounts similar to teas and herbal infusions; with the main difference being that moringa leaves are consumed entirely.

For wheatgrass and barley grass MRLs do exist (cresses and other sprouts and shoots), and a processing factor of 8 was used for the calculations.

Results

Moringa oleifera

From 2013 to 2017 only 12 out of 37 (32 %) samples of Moringa oleifera met the legal provision set for pesticide residues. Between the periods 2013-2015, 2016-2017 there was hardly any change in the residue situation (see Table I).

Table I Number of samples exceeding the MRL

	Year	Number of Samples	Number of samples exceeding the MRL
Moringa oleifera	2013-2015	13	9 (69 %)
	2016	11	9 (82 %)
	2017	13	7 (54 %)
Barley grass, Wheatgrass	2017	8	3 (38 %)

In total 51 different pesticides were found (the most frequently found ones are shown in Figure I). One sample in 2016 was considered dangerous to human health due to a high level of nicotine (16 mg/kg), exceeding the ARfD. The pesticides most frequently exceeding the MRLs were trimethylsulfonium cation (most probably a processing contaminant), cypermethrin, chlorate, permethrin, methomyl and ametryn.

Seven out of seventeen samples labelled as organic were judged to be fraudulent in the years 2013-2017, due to the presence of synthetic pesticides not authorized for use in organic farming.

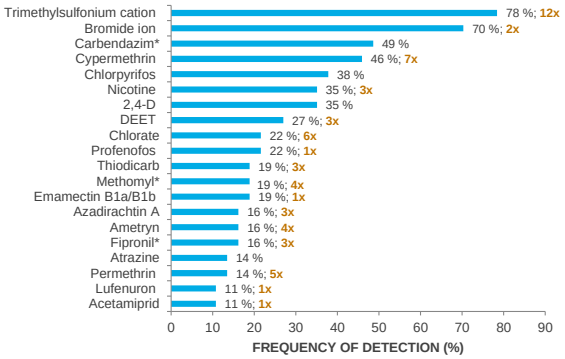

Figure I Detection frequency > 10 % of pesticides and number of MRL-exceedances per pesticide in 37 samples of Morlnga oleifera 2013-2017; *sum parameter

There was little difference between conventional and organically grown moringa as regards the number of pesticide residues detected per sample (see Figure II).

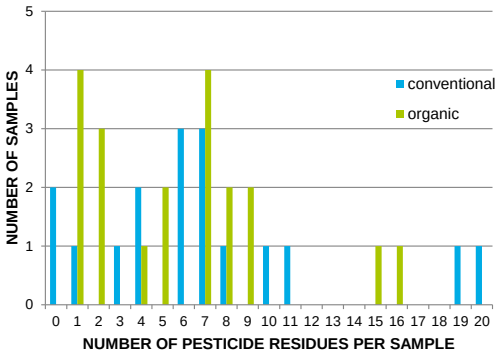

Figure II Number of pesticide residues detected per sample in Moringa oleifera (2013-2017); compounds of natural origin included

Barley grass, Wheatgrass

Eight samples of barley grass and wheatgrass powders were surveyed in 2017. The most frequently found compounds were trimethylsulfonium cation (most probably a processing contaminant), bromide (a naturally occurring compound) and chlorate (most probably originating from irrigation). Two out of three MRL-exceedances concerned chlorate and one nicotine.

Summary

Our results show that similar to past surveys on goji berries, superfoods such as Moringa oleifera, barley grass and wheatgrass powders often do not meet the provisions set for pesticide residues. From 2013 to 2017 hardly any change in the residue situation was noticed concerning Moringa oleifera. Only little differences were found between conventional and organic grown moringa. The results for barley grass and wheatgrass powders surveyed in 2017 showed a slightly better picture.

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Reference

[1] ASU L00.00-115/1; Foods of plant origin - Determination of pesticide residues using GC-MS and/or LC-MS/MS following acetonitrile extraction/partitioning and cleanup by dispersive SPE (QuEChERS modular), March 2015
[2] Quick Method for the Analysis of numerous Highly Polar Pesticides in Foods of Plant Origin via LC-MS/MS involving Simultaneous Extraction with Methanol (QuPPe-Method), Version 9.3, August 2017

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