



POSSIBLE WAYS OF DECREASING OXALATE CONTENT IN RED BEET FOODS

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Abstract

The oxalate contents in red beetroot juice can be decreased effectively by the treatment with ray seedlings containing natural oxalate oxidase. The high variation of oxalate contents in red beet indicates the possibility of breeding a special sort of red beet with the low oxalate contents.

Keywords: red beet, oxalate contents, variability, selection.

Introduction

Taking red beetroot foods, for example: beetroot juice boost physical and mental energies, enabling a person to show good performance for a longtime and to survive an illness[1].

The red beetroot juice contains betanin which was identified as powerful natural antioxidant [3]. The red beetroot juice stimulates our brain and eliminates toxins that can accumulate in this organ, being very much useful to maintain a good mental health and to prevent premature aging. However, researchers notes that the red beetroot products are of high oxalate foods. Therefore people suffering from a tendency to develop calcium-oxalate kidney stones or gallstones should avoid eating it.

The aim of this study was to look through various ways of decreasing oxalate content in red beet foods. Reduction of the oxalates in the diet can be achieved by cooking methods. Addition of calcium can make soluble oxalates unavailable for absorption in the intestinal tract and thereby decreases the risk of kidney

stone formation[4]. Biodegradation of oxalates in the red beetroot juice is an alternative method. The selection of a special sort of red beet with low oxalate content is the other idea to be implemented. The latter two said approaches to the decreasing oxalate content in red beet foods were estimated in this study.

Materials and methods

The red beets (*Beta bulgaris*) were grown from commercial seeds cultivated in Mongolia. Demonstrated[2] that rye seedlings containing a natural oxalate-specific oxalate oxidase can be applied to carry out the biodegradation of oxalic acid effectively. The rye seedlings were prepared from commercial seeds and fine sliced. The amounts of oxalates in red beet juice samples were estimated by method of potassium permanganate (KMnO₄) titer.

Results and discussion

The contents of oxalates in red beetroot juice samples were decreased (Table1.) significantly after treatment with ray seedlings preparation.

Table1.

Oxalate content changes in red beetroot juice treated with ray seedlings

Red beet from	Oxalate contents(%) in juice		Ratio of decreases
	Before treatment	After treatment	
Field	5.03±0.33	3.55±0.24	1.41
Green house	2.34±0.40	1.68±0.27	1.39



The red beetroot juice was treated with the fine sliced ray seedlings (10:1) for 40 minutes under 35°C. The results of this treatment of the red beetroot juice with the fine sliced ray seedlings (Table 1) indicate that the ray seedlings containing natural oxalate oxidase may be effectively used to decrease the oxalate contents in high oxalate foods. The added to the high oxalate food calcium is believed decreases the soluble oxalates with forming the insoluble oxalate calcium in the intestinal tract, thereby decreasing the absorption of the soluble oxalates. The absorbed oxalates are

appeared to be a source of kidney stone precipitation. The lowering dietary oxalates is more safety approach to this problem. Because the processing of diet goes outside the human organism.

The other way is selection of a special sort of the red beet with low oxalate content. Recently the amino acid, protein, vitamin and mineral contents of the red beet cultivated in Mongolia were studied [6]. The oxalate content was not determined. In order to estimate a selection success the oxalate content variability in red beet population was calculated (Table 2).

Table 2

Oxalate content variability in red beet population

Sample	Oxalate content (%)	average	Variability (%)
1	4.94±0.14	3.68	39.4
2	5.04±0.16		
3	5.29±0.18		
4	4.86±0.13		
5	1.92±0.22		
6	2.34±0.15		
7	2.92±0.08		
8	2.52±0.13		
9	2.02±0.19		

Obtained data (Table 2) revealed the highest variability of oxalate contents in red beet population. It depends strongly on the environmental conditions of cultivating the red beet. The percentage coefficient of variation for pigment components of red beet extracts was recorded as 15-20% [5]. The high percentage coefficient (39.4%) of variation of the red beet oxalate contents in the studied population indicates the possibility of breeding a special sort of red beet with low oxalate contents by methods of special selection.

Conclusion

Decreasing the oxalate contents in red beet foods may be achieved with different methods.

Treatment of the red beet root juice with rye fine sliced seedlings containing natural oxalate oxidase effectively decreases its oxalate contents.

A breeding of special sort of red beet with low contents of the oxalates by the methods of selection is proposed. These two approaches are believed economic and human health friendly.

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