

Analysis of organic and conventional beetroot juice assortment in Warsaw shops and consumer evaluation of selected products

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Abstract

Many studies show that organic food as vegetables, fruits and preserves contained more dry matter, C and B group vitamins, total sugar, indispensable amino acids, and minerals. At the same time organic plant foods usually have been in general better evaluated in terms of taste and smell than conventional ones. The aim of this study was to analyze the assortment of beetroot juice from organic and conventional stores in Warsaw, Poland and to perform a consumer sensory evaluation of selected products. Analysis of the products was carried out in the grocery stores in terms of the origin of the products - organic vs. conventional. The results showed that the market of beetroot juices was diverse - organic juices were available mainly in specialist organic stores, while conventional juices were available in all analysed places. Consumer sensory evaluation showed that consumers did not have an explicit preference for the taste, smell, colour and consistency of beet juice due to the origin of the product.

Introduction

A growing risk of lifestyle diseases, e.g. hypertension, atherosclerosis, obesity, diabetes, and most of all cancers, stimulate the society to take steps towards rational nutrition with high-quality products. Informed consumers are more often looking for organic food, the production process of which guarantees high quality, which is confirmed by corresponding certificates. In addition, it is really vital to consume fruit and vegetables regularly. To encourage the society to do so, producers better and better provide the Polish market with fruit and vegetable products. One can see the growing popularity of beetroot juice as a source of betalains, phenolic acids, flavonoids and other antioxidants vital in health prevention (Gawlik-Dziki 2004, Young et al. 2005, Majewska and Czczot 2009, Kazimierczak et al. 2011, Georgiev et al. 2010).

The aim of the study was to analyze and compare the assortment of organic and conventional beetroot juices and to perform a consumer sensory evaluation of selected products.

Material and methods

The research material consisted of beetroot juice from organic and conventional production, available in retail stores in Warsaw, Poland. The study on the available assortment of beetroot juice was carried out in selected conventional retail chains, small local shops and organic food stores. A semi-consumer sensory evaluation of selected products was performed among students living in Warsaw, in the age group 20-25 years.

An assortment analysis was performed by the field study. The study included ten retail chains, taking into account the division in terms of floor area and specific character of available products. Among the large space stores there were selected: Alma, Auchan, Biedronka, Carrefour, Leclerc, Lewiatan, MarcPol, Piotr i Paweł, Real, and Tesco. The stores of smaller floor area included: Super Sam, Perełka, Fresh Market, Skarbek, Top Market, Tradycyjne Jadło, przy Fontannie, u Małgosi, Żabka, Odido. In turn, the organic shops where the study was conducted are as follows: Organico, Organic Farma Zdrowia, Żółty Cesarz, Eko-Kraina, Eko-Żywność, Free Delikatesy Ekologiczne, Bio Sfera, Smaki Natury, Rajski Ogród, Zielarska Medycyna Ziolo.

To assess the assortment of beetroot juice there was prepared an author's questionnaire containing certain analysis determinants. They included: the store name, product/producer name, product volume, expiry date, storage conditions, the form of product preservation, and the name of the certification authority (in the case of organic produce). Attention was also drawn to the type of packaging and the location among other food products.

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A semi-consumer sensory evaluation of selected juice was performed by linear scaling method in order to express quantitatively the quality differentiation (ISO 4121:1998). The analysis was performed using a 9-point graphic scale with the edge markings: undesirable (I don't like it very much) and very desirable (I like it very much). The evaluation embraced 50 respondents, including 38 women and 12 men. They were obliged to mark the place on the scale corresponding to their impression at the time of the samples evaluation for colour, odour, taste, consistency and overall palatability. Each respondent received for assessment eight properly encoded samples of previously purchased juices (four organic and four conventional samples) and assessment questionnaires. The juices of different producers were purchased, choosing pure beetroot juices and one type of beet and apple juice – both of organic and conventional quality – due to limited assortment of taste variants.

Statistical analysis

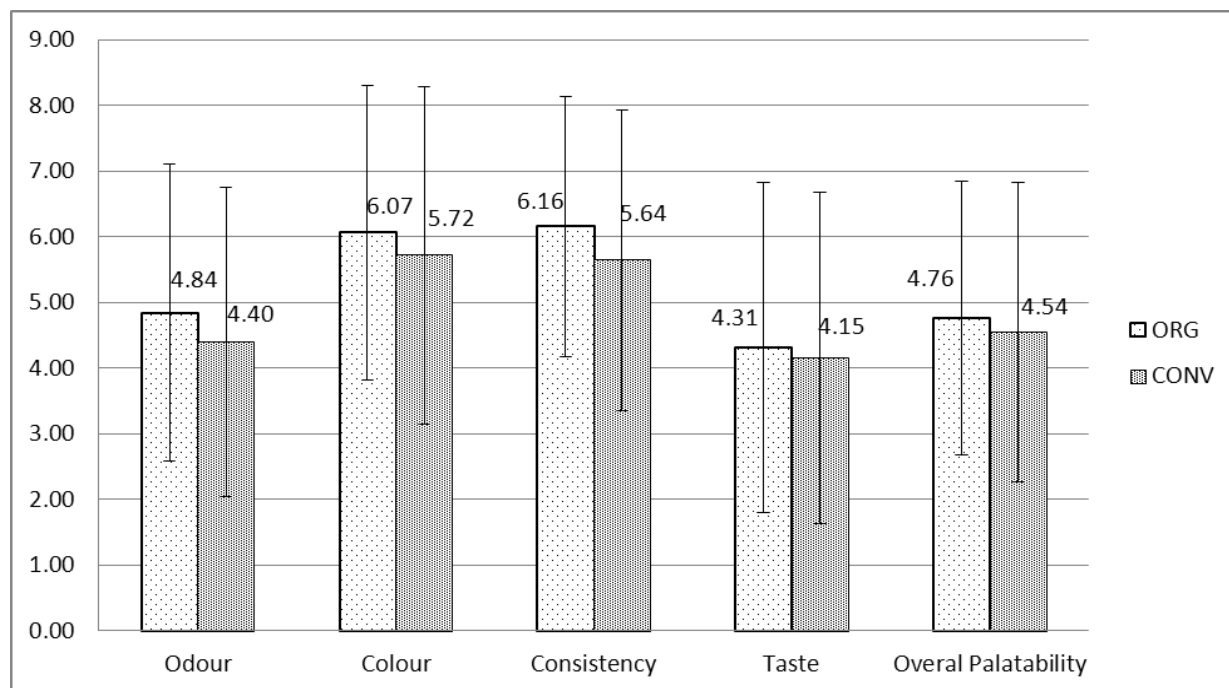
STATGRAPHICS 5.1 program was used for a statistical analysis of the semi-consumer evaluation results; a one-way analysis of variance (ANOVA) was performed using the Duncan non-parametric test ($\alpha = 0.05$). An examined factor was the origin of beetroot juice (organic and conventional processing). The p – values are given below the figure. If the p-value was ≥ 0.05 , the result was determined as 'n.s.' (not statistically significant). In addition, the standard deviations for the samples tested were calculated.

Results

Organic beetroot juices were available in all organic food stores and only in two conventional commercial chains – MarcPol and Carrefour. In the first of them, they were placed in the sector of organic products and world cuisines, while in the second one – among organic products. In organic stores, the tested juices were located among other fruit and vegetable products. In conventional stores one could find beetroot juices among other vegetable or fruit juices or fruit and vegetable juices. In a few stores there were refrigerated counters with the juice of some brands, such as one-day juice by Marwit and Ogrody Natury. The juice was sold in glass bottles of different capacities. Organic juices were available in the bottles of 300 ml, 700 ml and 750 ml. Conventional juice packaging was smaller, i.e. 225 ml and 250 ml. All packaging of juices for sale had a label with the information required by law.

All organic food stores offered beetroot juices of at least one producer. Most often there were juices made by: Bio Food, Voelkel Rote Bete Saft and Rabenhorst. A Polish producer Bio Food as the only one offered more than one taste variant of juices, i.e. pure beetroot juice and combined with celery or apple. Smak Natury, offering products of all organic and conventional brands as well as all flavours of beetroot juice, was a top-stocked shop among organic food shops. In conventional stores one could find most often the juice made by: Ogrody Natury, Marwit and Cymes Smaki Victorii. The chains like Lidl, Kaufland and Polomarket did not sell beetroot juice.

A semi-consumer sensory evaluation of beetroot juices showed insignificantly higher marks in terms of odour, colour, taste and overall palatability for organic juices. Only consistency of organic juices was rated significantly higher than of the conventional ones by the respondents. (Fig. 1).



p-value	Odour	Colour	Consistency	Taste	Overall Palatability
juice origin	n.s.*	n.s.	0.0062	n.s.	n.s.

* n.s. – not statistically significant ($\alpha \leq 0,05$)

Fig. 1. Results of semi-consumer sensory evaluation of beetroot juice from organic (ORG) and conventional (CONV) production

Discussion

A range of beetroot juices in stores, especially organic ones, is limited to a single brand. Łuczka-Bakuła and Smoluk-Sikorska (2009) confirm this phenomenon on the domestic market, explaining that a vital role is played by such factors as profitability, expected costs and revenues, and the result margin achieved from sale. Żakowska-Biemans (2011) emphasizes that the domestic market for organic products is in its infancy, which results in poor range of processed products. It was found that both organic and conventional beetroot juice had not received a high sensory assessment from consumers. According to statistics, consumers are more likely to choose fruit juice than the vegetable one – they prefer orange, carrot and apple juices and nectars (The AIJN Report, 2010). Consumers find no fundamental sensory differences between organic and conventional juices. This is confirmed by other sensory studies on fruit and vegetable products, which may result from minor experience in organic food consumption by the majority of consumers (e.g. Bourn and Prescott 2002, Zhao et al. 2007, Hallmann and Rembiałkowska 2010).

Conclusion

Regular consumption of organic vegetable juice by Polish society should be promoted. At the same time, producers, both organic and conventional ones, should strive to improve the taste and odour of beetroot juice.

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