

Consumer liking of “Elstar” apples with slight skin defects

C. Brugger¹, J. Kienzle²

Abstract

Quality grading of apples is made upon external quality parameters including the absence of larger skin defects. To date, no study has been researched whether skin defects lower aroma and taste quality and hence consumer liking. Within Germany, 4 apple varieties of Elstar have been evaluated by 1713 consumers upon hedonic sensory liking. It can be concluded that the external skin defects do not lead to a reduction of the sensory quality and liking of the apple, even if the slice with the skin defect on it is tasted.

Keywords: Apple skin defects, hedonic liking, apple quality, sensory preference

Introduction

Quality grades for apples are mainly based on external characteristics. In particular, skin defects such as russeting (if not typical for the variety), scab, and smaller skin defects due to insect feeding currently are not allowed in class I according to Regulation (EU) 543/2011. in organic fruit growing. However, it is good practice to accept these skin defects as it is regulated in class II of this Regulation. This is part of the concept of plant health care and allows minimising the input for direct control measures as much as possible. With the growing conventional mindset in the organic market, the need was felt to explore if these external quality “flaws” also have olfactory and gustatory disadvantages or, according to initial experience reportings, even have positive effects when it comes to aroma, taste and texture properties. In a pilot study carried out in 2018, difference tests and descriptive tests were carried out on the basis of 7 variants (different apple varieties, different skin defect types). In the pilot study, the skin defect “russeting” had a significant positive effect on the difference between the varieties and on sensory properties such as acid, the friction behavior on the middle of the tongue and, for the Ladina variety, on aroma properties such as “fruity citrus” (Brugger et al. unpublished). It has not been investigated yet, whether skin defects on apple result in different consumer sensory liking and perception. To evaluate consumer liking of apples with different skin defects a large consumer study has been conducted throughout Germany.

Material and Methods

Four variants of the variety “Elstar” were tested in comparison to a control with flawless skin in Germany by 1713 consumers. The representative survey was carried out in Germany West (Dortmund), East (Dresden), South (Stuttgart) and “North” (Berlin). Directly recruited at the point of sale, consumers were presented with four slices, being served monadically and randomized. The four variants were: Elstar control (without skin defects), Elstar with russeting, Elstar with small scab spots as allowed according to class II, Elstar with defects due to the feeding of winter moth larvae not exceeding the 2,5 cm². For the test, only the corresponding slice with the skin defect on it was used. The apple slices were tested blind and evaluated on a 9pt hedonic scale (9=like very much; 1=dislike very much). To compare shopping locations and to increase the representativeness, surveys were carried out in organic food stores, classic food retailers as well as in discounters for each region respectively. As surveys were carried out over a longer period, apples with scab spots developed storage scab, most probably influencing the results for the region “North” - Berlin,

¹ Christine Brugger, Aroma/Reich, CH-8424 Embrach, christine.brugger@aromareich.ch

² Jutta Kienzle, Apfelblütenweg 28, D-71394 Kernen, jutta@jutta-kienzle.de

hence these results were evaluated separately. as stock scab may result in different sensory properties including musty flavour.

Results and Discussion

Elstar varieties with skin defects do not show significant lower hedonic likings in comparison to Elstar control combining South, West and East Germany. All varieties received high liking scores and were highly liked overall (Graph 1 and Table 1).

The final study conduction in Berlin has shown a slight preference of Elstar variety with rust was preferred to the Elstar as compared to Elstar with scab, the latter however not being significantly different from the control (see Table 2).

Table 1: Hedonic liking of the four Elstar variants Germany South, West & East. Indication of the mean values (analysis of variance ANOVA with post-hoc test pairwise comparison of Tukey's HSD). (N = 1276; p <0.05)

Elstar Variant	Mean	Grouping
Elstar rust	6.724	A
Elstar control	6.714	A
Elstar winter moth	6.592	A
Elstar scab	6.586	A

Table 2: Hedonic liking of the four Elstar variants Germany North. Indication of the mean values (analysis of variance ANOVA with post-hoc test pairwise comparison of Tukey's HSD). (N = 432; p <0.05)

Elstar Variant	Mean	Grouping 1	Grouping 2
Elstar rust	6.627	A	
Elstar winter moth	6.512	A	
Elstar control	6.396	A	B
Elstar scab	6.192		B

It can be concluded that the external skin defects do not lead to a reduction of the sensory quality and liking of the apple, even if the slice with the skin defect on it is tasted.

Acknowledgements

We acknowledge financial support of BMEL/BLE (BOELN 2815OE086). Many thanks to DLR Rheinpfalz, Jürgen Zimmer and colleagues for their commitment to collect the apples. Many thanks also to all retailers for the opportunity to conduct data collection in their stores.

Citation of the full publication

The citation of the full publication will be found on Ecofruit website as soon as available.