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The impact of ecological and conventional technologies on
strawberry fruit quality (*Fragaria × ananassa* Duch.)

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Abstract: The objective of the research was to comparatively analyze the quality of fruits in two strawberry varieties grown on the farm, under identical pedoclimatic conditions, through ecological and conventional technologies, through psycho-sensory analyzes, using the nine-point hedonic assessment scale.



• Introduction

Strawberries (*Fragaria × ananassa* Duch.) are fruits of high economic value, normally eaten fresh or processed, appreciated by consumers in particular for their attractive sensory characteristics, including aroma, taste, shape and color.

• Material and method

Experimental location: Codrea farm - Draguseni locality (47°54'19"N 23°04'40"E), Satu-Mare county.

Cv. Aprica - an Italian variety (C.I.V.) with an average ripening duration at the beginning of the season. The fruit ripens about four days after Clery. The fruits are bright red, large, cone-shaped, with beautiful gloss and large individual profile, which is also why it is often preferred by growers

Cv. Clery- Italian variety (C.I.V.) with a maturing duration at the beginning of the season. The fruits have a regular, elongated-conical shape, very uniform in size, with firm pericarp, carmine-red color, with characteristic shine. The pulp is light red, very juicy, firm, moderately fragrant

Soil characteristics

The analysis of soil samples was carried out within the Office for Pedological and Agrochemical Studies Satu-Mare, the methods used being standardized. 5 soil samples were collected from the 0.89 ha of experimental field.

Parameter	pH (H ₂ O: 1:2,5)	P-mobile (ppm)	K-mobile (ppm)	Humus (%)	IN	Hydrolytic acidity (me/100)	Sum of exchangeable bases (me/100)	V (%)
value	7,2	69,6	234	2,15	2,2	1,68	10,12	96,89
interpret	neutral	low	good	low	low	very low	low	eubasic

Analytical traits determined: fruit firmness (penetrometer) and total soluble sugars (refractometric).

Methods of psycho-sensory assessment of strawberry fruit quality

The consumer panels were conducted in the laboratory of Plant Physiology, of the "King Mihai I" University of Life Sciences from Timisoara. The members of the group (11 women, 12 men) were recruited from students and teachers of the Faculty of Engineering and Applied Technologies from Timisoara, having prior training and knowledge of descriptive analysis techniques for fresh products. The participants were volunteers aged between 21 and 59 and generally liked strawberries before tasting. Before the sensory sessions, they received additional information to explain the descriptive and scaling characteristics specific to this study.

During the session, the 23 panelists used individual booths to evaluate the samples. Two whole strawberries and two half-sectioned strawberries of each of the four randomly coded and ordered experimental variants were offered to each panelist. The samples were served at room temperature (25 °C) in 100 ml plastic cups, with strawberries from each variety and technological variant being coded with three-digit numbers.

Consumers were asked to rate hedonic attributes (taste preference, flavor, and texture) on the global scale of hedonic intensity, which was associated with the most intense pleasure ever experienced at the bottom (0) and the most intense antipathy ever experienced at the top (8). 9-point hedonic scale for taste rating: 0- extremely pleasant; 1-very pleasant; 2-moderately pleasant; 3-slightly pleasant; 4-dislike; 5-slightly unpleasant; 6-moderately unpleasant; 7-very unpleasant; 8-extremely unpleasant.

The order of presentation of samples for tasting was randomized for each consumer and the nine-point hedonic scale was used to assess acceptance. Participants' purchase intent relative to strawberries was assessed using a three-point scale, where: 1 = yes; 2 = no and 3 = don't know.

For all determination were calculated the average and standard deviation using basic function of Microsoft Excel

• Results and discussions

Common quality characteristics of strawberries intended for consumer acceptance are appearance (color, shape and dimensions), firmness and aroma perceived by combining the senses of taste and smell. Sugars (fructose, glucose and sucrose), organic acids (predominantly citric acid) and phenolic compounds (anthocyanins and flavonoids) give strawberry its characteristic taste, while more than 360 volatile compounds distinguish its aroma

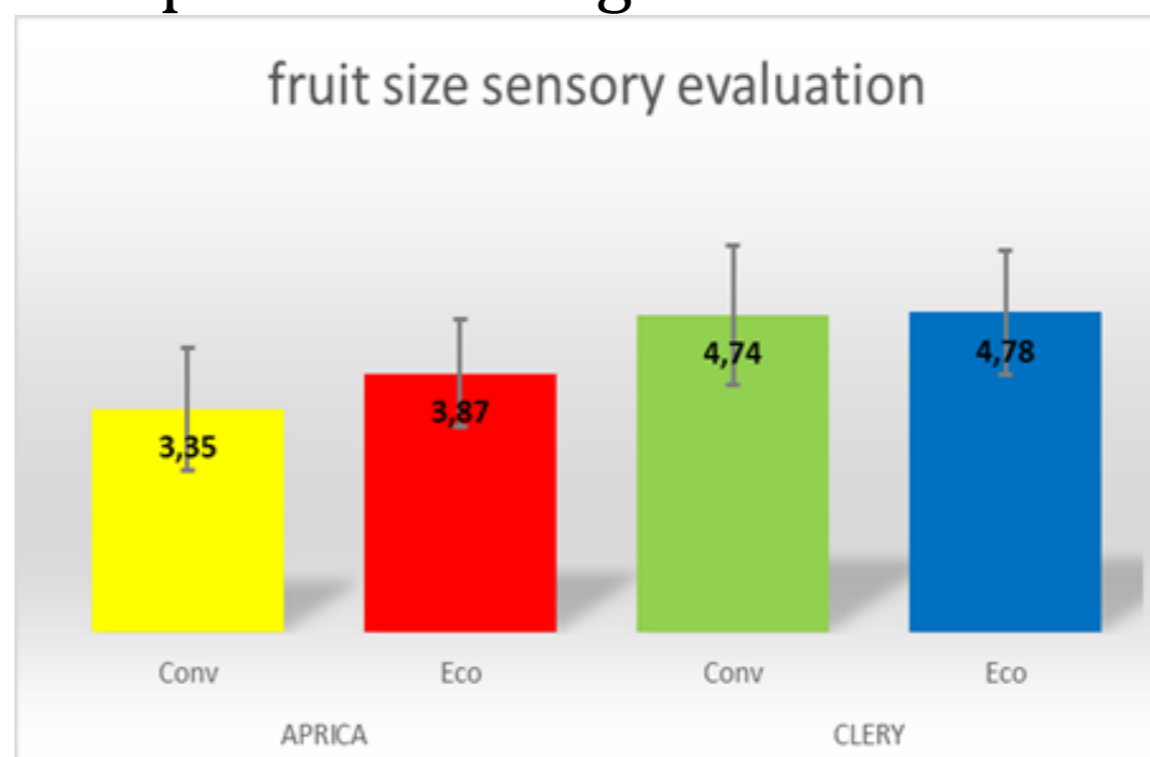


Fig. 1. The sensory evaluation on strawberry fruit size (Conv- conventional; Eco-Ecologic technology)

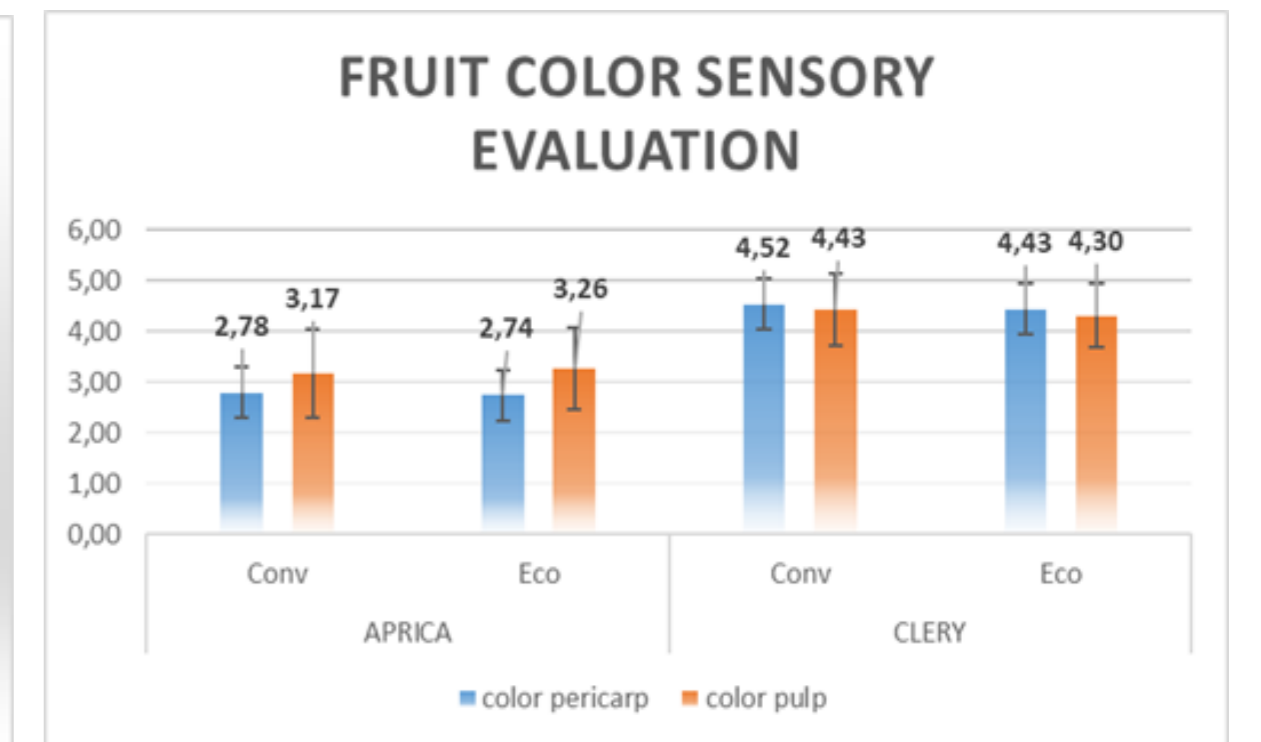


Fig.2. The sensory fruit color evaluation

The obtained data (fig. 1) show that the evaluators awarded a better score for the Aprica, compared to Clery, and the conditions of conventional technology ensured a slight superiority in the case of the Aprica variety. For Clery, sensory evaluation of fruit size determined that both those obtained by conventional and ecological technologies are relatively equal. However, according to the 9-point hedonic scale, the average fruit size scores ranged from 3 to 4 for Aprica, which means slightly pleasant to unpleasant, and between around 5 for Clery, which means slightly unpleasant.

Hedonic assessments were performed in the panel regarding the color of the pericarp and strawberry fruit pulp (fig.2). For these parameters, the best scores were obtained in the case of the Aprica, which achieved an average of 2.74 ± 0.85 points for pericarp color in organic and 2.78 ± 0.93 points in conventional, compared to 4.43 ± 0.77 points in Clery in organic and 4.52 ± 0.71 in conventional for the same character

The comparative evaluation of strawberry fruit firmness by instrumental determinations and sensory analysis showed that there is a direct correlation between the two techniques (fig.3). Fruit firmness was higher in the Aprica compared to Clery. By comparing fruits from organic and conventional technologies, eco-fruits are less firm in both cultivars.

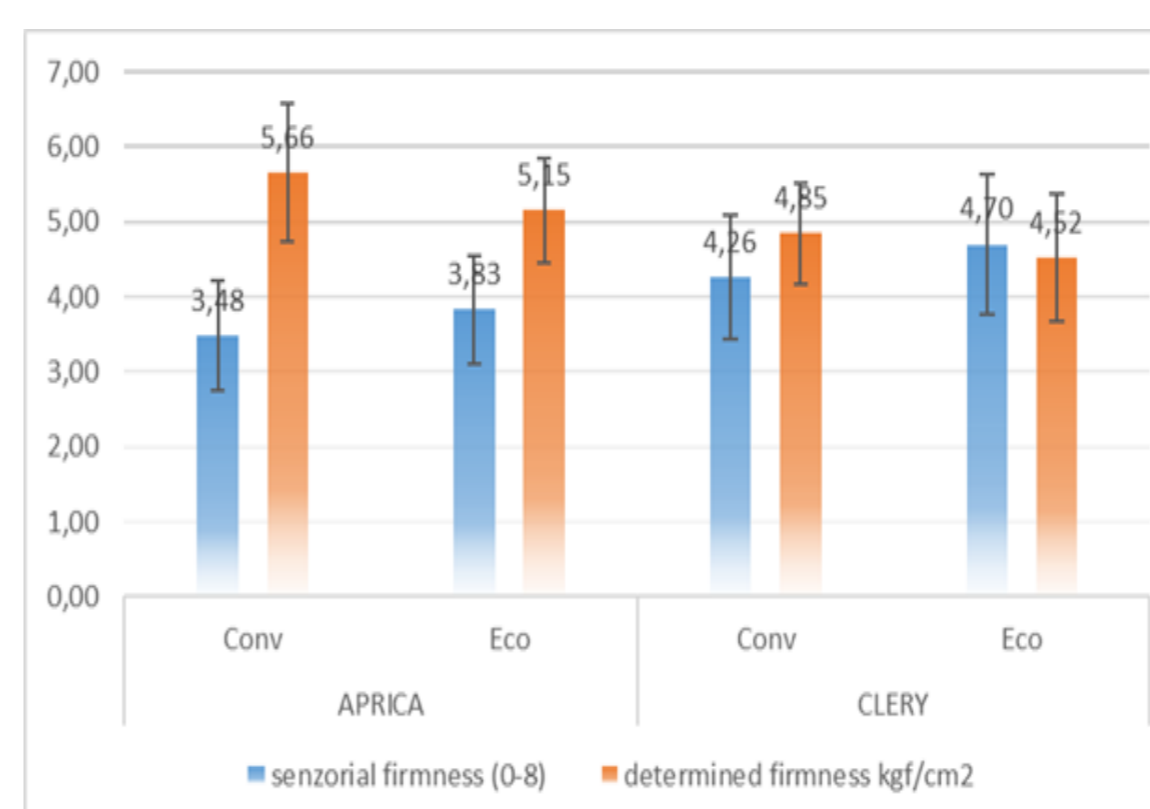


Fig. 4. Comparative analysis of fruit firmness (sensorial and determined)

• Conclusions

Organic growing conditions have a favorable impact on the taste, aroma and sweetness of strawberry fruits, essential features of attractiveness and purchase customer intention. The firmness of organic fruits is lower, hence their greater sensitivity to handling, transport and storage.

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