HOW SENSORY ANALYSIS HELPED TO IMPROVE THE QUALITY OF VIRUS-RESISTANT-TRADITIONAL TOMATO CULTIVARS

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INTRODUCTION

Tomato cultivars of the highest organoleptic quality are available in Spain; however, they are highly susceptible to several viruses, making its commercial cultivation non-viable. During a breeding program for the introduction of genetic resistance into traditional tomato cultivars, several virus-resistant breeding lines were produced. The **GLOBAL AIM** of this program was to demonstrate that **genetic improvement for disease resistance, if organoleptic quality is considered, does not reduce the quality of traditional tomatoes**.



PANEL Training

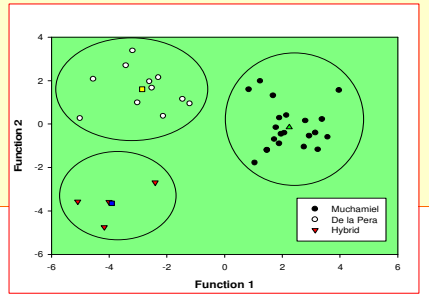
A non-destructive system, dynamic headspace, was used to quantify volatile compounds in traditional ("*Muchamiel*" and "*de la Pera*") and hybrid ("*Ulises*") tomato cultivars from eastern Spain. Samples from "*de la Pera*" cultivar got the highest values of odor and aroma intensities in the sensory tests conducted using a **trained panel especially screened, trained and validated for the analysis of tomatoes**. The same cultivar showed significantly higher concentrations of all volatiles under study.



Carbonell-Barrachina *et al.* **2006**. *Eur. Food Res. Technol. 222*: 536-542.

Volatiles: SENSORY-Instrumental (I)

A purge-and-trap system was used to quantify **volatile compounds** from two traditional Spanish tomato cultivars ("*Muchamiel*" and "*de la Pera*") and one hybrid cultivar ("*Odissea*"). Samples from both traditional cultivars presented higher intensities of **fresh tomato odor and aroma** according to a **trained panel** and were more accepted by a **consumer panel** than samples from the hybrid cultivar. Finally, a mathematical model was developed, using discriminant analysis, that was able to discriminate among tomato cultivars using concentrations of 6 volatiles.



Alonso *et al.* **2009**. *Food Sci. Technol.* 15: 47-55.

Volatiles: SENSORY-Instrumental (II)

Main fresh tomato volatile compounds (*cis*-3-hexenal, hexanal, *cis*-3-hexanol, etc.) were found at similar concentrations in traditional and virus-resistant fruits, confirming the success of the breeding program.

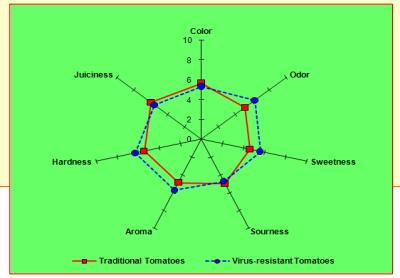
Several extraction methods for the volatile compounds were considered and compared with sensory data, from a trained panel; the main conclusions was that **HEADSPACE solid-phase-micro-extraction** was positively correlated with **fresh tomato ODOR**, while **DISTILLATION techniques** were better correlated with **fresh tomato AROMA**. A **trained pan**el was used for proper quantification of the intensity of fresh tomato odor and aroma.



Alonso *et al.* **2009**. *Eur. Food Res. Technol.* 230: 315-323.

Shelf Life: SENSORY

One of the present preoccupations of tomato breeders is to associate high fruit firmness, long shelf life, good flavor and many disease resistance genes in the same variety. Then, the **storage and shelf life of the breeding lines** was evaluated considering changes of the main tomato sensory properties (**color, odor, sweetness, sourness, aroma, hardness and juiciness**). A **trained pan**el was used. The organoleptic quality of the virus-resistant tomatoes was, at least, as good as that of traditional tomatoes, reaching best scores in odor, aroma and hardness at the end of the shelf life (13 days at 10 ºC).



Alonso *et al.* **2010**. *J. Sci. Food Agric.* 90: 1056-1062.

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