



2006-09-01

A comparison of the taste, texture and appearance of Irish Grown organic and conventional tomatoes.

Clare Gilsenan

Dublin Institute of Technology, clare.gilsenan@dit.ie

Roisin Burke

Dublin Institute of Technology, roisin.burke@dit.ie

Catherine Barry-Ryan

Dublin Institute of Technology, Catherine.Barryryan@dit.ie

Follow this and additional works at: <http://arrow.dit.ie/tfschcafcon>

 Part of the [Food Science Commons](#)

Recommended Citation

Gilsenan, Clare; Burke, Roisin; and Barry-Ryan, Catherine, "A comparison of the taste, texture and appearance of Irish Grown organic and conventional tomatoes." (2006). *Conference papers*. Paper 16.
<http://arrow.dit.ie/tfschcafcon/16>

This Working Paper is brought to you for free and open access by the School of Culinary Arts and Food Technology at ARROW@DIT. It has been accepted for inclusion in Conference papers by an authorized administrator of ARROW@DIT. For more information, please contact yvonne.desmond@dit.ie, arrow.admin@dit.ie.



A COMPARISON OF THE TASTE, TEXTURE AND APPEARANCE OF IRISH GROWN ORGANIC AND CONVENTIONAL TOMATOES

C.Gilsenan¹, R.M. Burke¹, and C Barry-Ryan²

¹ School of Culinary Arts and Food Technology, Faculty of Tourism and Food, DIT, Cathal Brugha Street, Dublin 1, ² School of Food Science and Environmental Health, Faculty of Tourism and Food, DIT, Cathal Brugha Street, Dublin 1

ABSTRACT

In the last decade the consumer demand for organic food has grown. Proponents of organic foods claim that it is better tasting and fresher. The aim of this study was to examine if there are differences in the taste, texture and appearance of Irish grown organic and conventional tomatoes (*cv Amoroso*). Three batches were tested, one of organic and one of conventional, each week for three weeks using sensory, chemical and physical analysis. Sensory analysis trials (taste, texture and appearance) were carried out using 14 semi-trained panellists. pH (n=8), Instron (n=8) and Colorflex (n=32) measurements were also recorded. A comparison between both types of tomato found no significant differences ($P < 0.05$) for the sensory attributes of taste, texture and appearance. Acidity values of $4.22 \pm .01$ and $4.24 \pm .012$, Instron values (puncture probe 7mm) of $.017\text{KN} \pm .002$ and $.027\text{KN} \pm .005$ and Hunter a^*/b^* values of $1.39 \pm .034$ and $1.35 \pm .034$ were recorded for organic and conventional tomato samples respectively.

INTRODUCTION

The market for organic food in Ireland has grown considerably in the last decade. This is due to the fact there is a widespread belief that organic food is substantially tastier and fresher than conventional food, and consumers are willing to pay significant price premiums to obtain it^{1,2,3}. This perception is mainly due to the principles associated with organic farming. Organic farming is a system of farming that avoids or largely excludes the use of synthetic fertilisers, pesticides, growth additives and other chemicals⁴. The objectives of this study were to compare the taste, texture and appearance of Irish grown organic and conventional tomatoes.

MATERIALS AND METHODS

Irish grown organic and conventional tomatoes (*cv. Amoroso*) harvested at the red ripe stage were selected for sensory, physical and chemical analyses.

Sensory analysis trials for taste, texture and appearance were carried out using 14 semi-trained panellists, (9 female and 5 male). Panellists were trained according to the guidelines set out in ISO 8586-1⁵. Questionnaires were designed and delivered using Compusense *five* (Compusense, Guelph, Ontario, Canada). The panellists evaluated the size and the shape of the tomatoes, finger feel firmness, juiciness and overall taste, texture, aroma and appearance acceptability of the tomatoes. An eight point scale was used for each category⁶. Instrumental analysis were performed for colour (Colorflex)⁷, texture (Instron 4464)⁸, pH (Jenway 4330 pH meter)⁹ and α_w (AquaLab). Instrumental and sensory analysis were performed in triplicate during the month of July 2006.

RESULTS AND DISCUSSION

A comparison between both types of tomato found no significant differences ($P > 0.05$) for the sensory attributes of taste, texture and appearance. Sensory analysis overall appearance acceptability values of 5.04 ± 1.07 and 5.41 ± 0.85 (where '0' is 'extremely dislike' and '7' 'extremely like'), overall texture acceptability values of 4.55 ± 1.35 and 4.94 ± 1.2 (where '0' is 'extremely dislike' and '7' 'extremely like'), overall taste acceptability values of 4.34 ± 1.44 and 4.90 ± 1.2 (where '0' is 'extremely dislike' and '7' 'extremely like') and overall aroma acceptability values 4.47 ± 1.08 and 4.79 ± 1.10 (where '0' is 'extremely dislike' and '7' 'extremely like') were recorded for organic and conventional tomato samples respectively. For appearance and texture attributes, size of the tomato values of 4.98 ± 0.322 and 4.97 ± 0.294 (where '0' is 'extremely small' and '7' 'extremely big'), shape of the tomato values of 6.04 ± 0.301 and 6.12 ± 0.312 (where '0' is 'extremely uneven' and '7' 'extremely even'), juiciness values 6.50 ± 0.36 and 6.44 ± 0.66 (where '0' is 'extremely dry' and '7' 'extremely juicy') and finger feel firmness values of 3.26 ± 0.550 and 3.16 ± 0.753 (where '0' is 'extremely soft' and '7' 'extremely firm') were noted for organic and conventional tomato samples respectively.

For instrumental analysis, pH values of 4.22 ± 0.01 and 4.24 ± 0.012 , a_w values of 0.994 ± 0.005 and 0.988 ± 0.004 and Hunter a^*/b^* values of 1.39 ± 0.034 and 1.35 ± 0.034 were recorded for organic and conventional tomato samples respectively. Instron values (puncture probe 7mm) of $kN 0.017 \pm 0.002$, for organic, and $kN 0.027 \pm 0.005$, for conventional, were documented. Similar findings were reported on studies of organic and conventional spinach.¹⁰

CONCLUSIONS

The results showed no significant differences in the taste, texture and appearance of Irish grown organic and conventional tomatoes. Further studies should focus on the interaction of aroma compounds with sugars and acids and the identification of volatile compounds as quality markers for Irish grown and conventional tomatoes.

ACKNOWLEDGEMENTS

Technical support has been received from the School of Food Science & Environmental Health, D.I.T and Statistical Support from Dr. Dominic Dillane, School of Hospitality Management & Tourism, D.I.T.

REFERENCES

- ¹Bourne, D. and Prescott, J. 2002. *Critical Reviews in Food Science and Nutrition*. 42:1-34
- ²Magnusson, M.K., Arvola, A., Hursti, U.K., Aberg, L. and Sjöden, P. 2003. *Appetite*. 40:109-117
- ³Hutchin, R.K. and Greenhalgh, L.A. 1995. *Nutrition and Food Science*. 6: 11-14
- ⁴Codex Alimentarius Commission. 2001. Guidelines for the Production, Processing, Labelling and Marketing of Organically Produced Food. Rome: Joint Food and Agriculture Organisation/World Health Organisation (FAO/WHO) Food Standards Programme. Available online: <http://www.fao.org/organicag/doc/glorganicfinal.pdf> (accessed May 30, 2006)

⁵ISO 8586-1.1993. Sensory Analysis- General Guidelines for the Selection, Training and Monitoring of Assessors- Part 1. International Organisation for Standardisation, Geneva, Switzerland.

⁶Meilgaard, M., Civille, G.V. and Carr, B.T. 1999. *Sensory Evaluation Techniques*.3rd Edition. CRC Press. London.

⁷Brandt, S., Pek, Z., Barna, E., Lugasi, A. and Helyes, L. 2006. *Journal of the Science of Food and Agriculture*. 86: 568-572

⁸Batu, A. 2004. *Journal of Food Engineering*. 61: 471-475

⁹Wrolstad, R.E., Acree, T.E., Decker, E.A., Penner, M.H., Reid, D.S., Schwartz, S.J., Shoemaker, C.F., Smith, D.M. and Sporns, P. 2005. *Handbook of Food Analytical Chemistry*, Wiley-Inter Science, New Jersey

¹⁰Maga, J.A., Moore, F.D. and Oshima, N. 1976. *Journal of the Science of Food and Agriculture*. 27: 109-114