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AN EVALUATION OF THE SENSORY PROPERTIES OF IRISH GROWN ORGANIC AND CONVENTIONAL CARROTS AND MUSHROOMS

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ABSTRACT

There is a general belief among consumers that organically farmed foods are superior in sensory quality when compared to conventionally produced foods. The aim of this study was to establish whether perceptible sensory differences exist between Irish grown organic and conventional carrots and Irish grown organic and conventional mushrooms. Three batches of organically farmed carrots and mushrooms and three batches of conventionally produced carrots and mushrooms were tested. A semi-trained panel (n=10) evaluated the sensory properties of fresh raw carrot (appearance, aroma, texture, taste) and fresh raw mushroom (appearance, aroma, texture). Data acquisition and analysis was performed using Compusense *five*®. A comparison between both types of carrot found no significant differences ($P \geq 0.05$) for the sensory attributes of appearance, aroma, texture and taste. Sensory evaluations conducted on organic and conventional mushrooms found no significant differences ($P \geq 0.05$) for cap colour, firmness, and appearance, aroma and texture acceptability values. However, our sensory data indicated that the organic mushroom samples had darker gills ($P \leq 0.05$) and a stronger mushroom aroma ($P \leq 0.05$). Overall, Irish grown organic and conventional carrots and mushrooms did not show any significant differences in all studied sensory acceptability categories.

INTRODUCTION

The organic food market in Ireland has grown considerably in the past two years[1]. Its popularity is attributable to the strong reassurances provided by its producers, regarding how the products have been produced[2]. Organically farmed vegetables are cultivated without the use of synthetically produced fertilisers, fungicides, herbicides, insecticides and pesticides[3]. Whereas, conventional farmers rely on pesticides and other chemical substances to maintain high yields[4]. The objective of this study was to establish whether perceptible sensory differences exist between Irish grown organic and conventional carrots and Irish grown organic and conventional mushrooms.

MATERIALS AND METHODS

Sensory evaluations were conducted by a semi-trained panel (*n*=10) on three batches of organic and conventional carrots[a] (*cv. Nairobi*) and three batches of organic and conventional mushrooms[b]. Carrot sensory attributes (appearance, aroma, texture and taste) and mushroom sensory attributes (appearance, aroma, texture and taste[c]) were selected from those previously reported in the literature[5,6]. Sensory evaluations were carried out in individual booths under incandescent light. The samples were presented on white paper plates and coded with 3-digit random numbers. All samples were presented in a randomized order to the panelists.

[a] Organic carrots were treated with green manures, liquid seaweed and compost teas. Conventional carrots were fed with NPK fertiliser, Amistar and Folicur (fungicides) and Karate (pesticide)
[b] Organic mushrooms were treated with pasteurised organic compost and nemasys. Conventional mushrooms were treated with pasteurised compost, Sporgon (fungicide) and Dimilin (insecticide).
[c] For food safety reasons, it was necessary to cook the mushrooms, before allowing the panelists to taste them. The mushrooms were steamed for 15minutes prior to consumption.

Questionnaires were designed and delivered using Compusense *five*® (Compusense, Guelph, Ontario, Canada). The panelists recorded their results on nine-point line scales (for sensory attributes:1= low intensity and 9=high intensity; and for acceptability attributes:1=dislike extremely and 9=like extremely).

RESULTS AND DISCUSSION

The sensory profiles did not differ greatly for the organic and conventional carrots or the organic and conventional mushrooms. For carrot appearance and aroma, intensity of colour values of 6.67±1.06 and 6.07±1.23, and intensity of aroma values of 3.97±1.07 and 3.83±1.42 were documented for the organic and conventional carrot samples respectively. For carrot texture and taste, hardness values of 5.97±0.93 and 5.80±1.06, crunchiness values of 6.30±1.09 and 6.63±0.93, juiciness values of 5.47±1.46 and 5.50±1.68, sweetness values of 4.53±1.41 and 4.30±1.09, and bitterness values of 1.97±0.96 and 2.13±1.01 were observed for the organic and conventional carrots respectively. A comparison between the organically farmed carrot sample and the conventionally produced carrot sample found no significant differences ($P \geq 0.05$) for the sensory acceptability attributes of appearance, aroma, texture and taste. Sensory evaluations conducted on organic and conventional mushrooms found no significant differences ($P \geq 0.05$) for cap colour, firmness, and appearance, aroma and texture acceptability values. However, our sensory data indicated that the organic mushroom samples had darker gills ($P \leq 0.05$) and a stronger mushroom aroma ($P \leq 0.05$). For mushroom appearance, gill colour values of 7.00±0.88 and 6.00±1.14 were recorded for organic and conventional mushrooms respectively. For mushroom aroma, intensity of aroma values of 6.00±1.10 and 4.00±1.05 were documented for organic and conventional mushroom samples respectively.

CONCLUSIONS

The results of the carrot study showed no significant differences for the sensory attributes of appearance, aroma, texture and taste. Whereas, the results of the mushroom study found no differences for cap colour, firmness, and appearance, aroma, texture and taste acceptability values, but a difference in gill colour and intensity of mushroom aroma was documented. The organic mushrooms were perceived to have darker gills and stronger mushroom aroma. Overall, Irish grown organic and conventional carrots and mushrooms did not show any significant differences in all studied sensory acceptability categories.

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