

## Sugar Content of Carrot Roots as Influenced by the Culture Technology

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**Abstract.** The amount of sugar in carrots has an obvious influence upon the perception of the sweet taste and can also hide the bitter taste. In the experiment conducted in 2011, the amount of sugar in the roots of the carrots was taken into consideration for the varieties studied, Flakker and Nantes, depending on the time of sowing and the fertilizer used. The values obtained for the varieties studied registered sugar content between 8.70 and 10.93 mg/100 g.s.p.

**Keywords:** sugar, cultivar, sowing time, carrot

**Introduction.** The carrot is the main root vegetable that is consumed throughout the year. The amount of sugar in carrots has an obvious influence upon the perception of the sweet taste and can also hide the bitter taste. As it is known, fructose, glucose and sucrose are the major sugars in carrots, researches on their content for different varieties were undertaken by Alasalvar *et al.* (2001) and Lee *et al.* (2011). Researches that reported high levels of sugar, at high temperatures, were elaborated by Nilsson (1987) and Rosenfeld *et al.* (1998).

**Aims and objectives.** The aim of the present study is to determine, through the experiment conducted in 2011, the amount of sugars in the roots of the carrots for the varieties studied ('Flakker' and 'Nantes') depending on the time of sowing (March and May) and the fertilizer used (chemical and organic).

**Materials and methods.** The analysis through which the sugar content of carrot juice was determined was performed using High Performance Liquid Chromatography (HPLC). After the filtering of the aqueous solution, the sugar content is determined using HPLC with RI detection (Refractive index). The picks are identified on the basis of their retention times. The quantification is performed based on the peak area or peak height. The method can be applied to any matrix that contains sugars in the chemical composition. The standard solutions of each sugar are injected separately into the HPLC in order to determine the specific retention time. Afterwards, the mix of standards is injected in order to verify the appropriate separation of the picks at the baseline. In order to achieve the calibration curve the following solutions were prepared (Tab.1):

Tab. 1

Solutions prepared in order to achieve the calibration curve

|              |      |     |    |    |    |     |    |    |
|--------------|------|-----|----|----|----|-----|----|----|
| Fructose (%) | 5    | 10  | 20 | 30 | 35 | 40  | 45 | 50 |
| Glucose (%)  | 4.5  | 10  | 20 | 25 | 30 | 35  | 40 | 45 |
| Sucrose (%)  | 0.25 | 0.5 | 1  | 3  | 5  | 7.5 | 10 | 15 |

**Results and Discussion.** The values obtained for the varieties studied registered sugar content between 8.70 and 10.93 mg/100 g fresh matter (f.m.) (Tab. 2.).

**Conclusion.** The culture established in March recorded the highest values of sugar content for the two cultivars studied. A high content of sugars can be noticed in the 'Nantes'

variety sown in March and organically fertilized (10.93 mg/100 g f.m.). The results of the current study indicate that organic fertilization has a positive influence on the total sugar content.

Tab. 2

The combined influence of the variety, sowing time and method of fertilization on the content of the main carbohydrates (Cluj-Napoca, 2011)

| Variety   | Sowing dates | Fertilization | The content of:                 |                         |                         |                        |
|-----------|--------------|---------------|---------------------------------|-------------------------|-------------------------|------------------------|
|           |              |               | Total Fructose/<br>% from total | Glucose<br>% from total | Sucrose<br>% from total | Total<br>mg/100 g f.m. |
| 'Nantes'  | Early        | Chemical      | 2.42                            | 3.48                    | 2.80                    | 8.70                   |
| 'Nantes'  | Early        | Organic       | 1.48                            | 2.94                    | 6.19                    | 9.92                   |
| 'Flakker' | Early        | Chemical      | 2.13                            | 3.48                    | 2.68                    | 7.75                   |
| 'Flakker' | Early        | Organic       | 1.66                            | 2.37                    | 5.88                    | 9.91                   |
| 'Nantes'  | Late         | Chemical      | 1.32                            | 2.23                    | 5.17                    | 8.72                   |
| 'Nantes'  | Late         | Organic       | 1.50                            | 2.59                    | 6.84                    | 10.93                  |
| 'Flakker' | Late         | Chemical      | 1.08                            | 1.58                    | 5.81                    | 8.47                   |
| 'Flakker' | Late         | Organic       | 0.26                            | 0.40                    | 7.26                    | 7.92                   |

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