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CHANGES IN CAROTENOID CONTENT OF ORGANIC TOMATO POWDERS DEPENDING ON DRYING PARAMETERS

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INTRODUCTION

Currently, there is a growing interest and industry demands for the development of new natural products to be used as functional foods. Powder products from fruits and vegetables were the mostly used functional ingredient in the formulation of food products because of easily preservation, transport, store, and process (Cuq et al. 2011). Drying is one of the most important stages for the production of powders.
On the other hand, the utilisation of organic products as edible sources for natural ingredients has been a great preoccupation in recent years due their enhanced nutritional/environmental values. Organic tomatoes are known as a natural source rich in carotenoids.
The aim of the present work is to investigate the effects of different drying treatments (hot air at 40 and 70 °C) on the carotenoid content of powders obtained from organic tomatoes (var. *Tigrella,* organic farm in conversion "Nasul Roșu").

METHODOLOGY

Drying treatments for tomatoes (var. *Tigrella*)

Samples:

1. **tomato juice** (crushing of fresh tomatoes for 50 s at 9000 rpm in a knife mill)

2. **slices of tomatoes**

Drying treatments

- hot-air drying at 70 °C
- Blanching at 95 °C for 1.5 min
  - hot-air drying at 40 °C
  - hot-air drying at 70 °C

Tomato powders

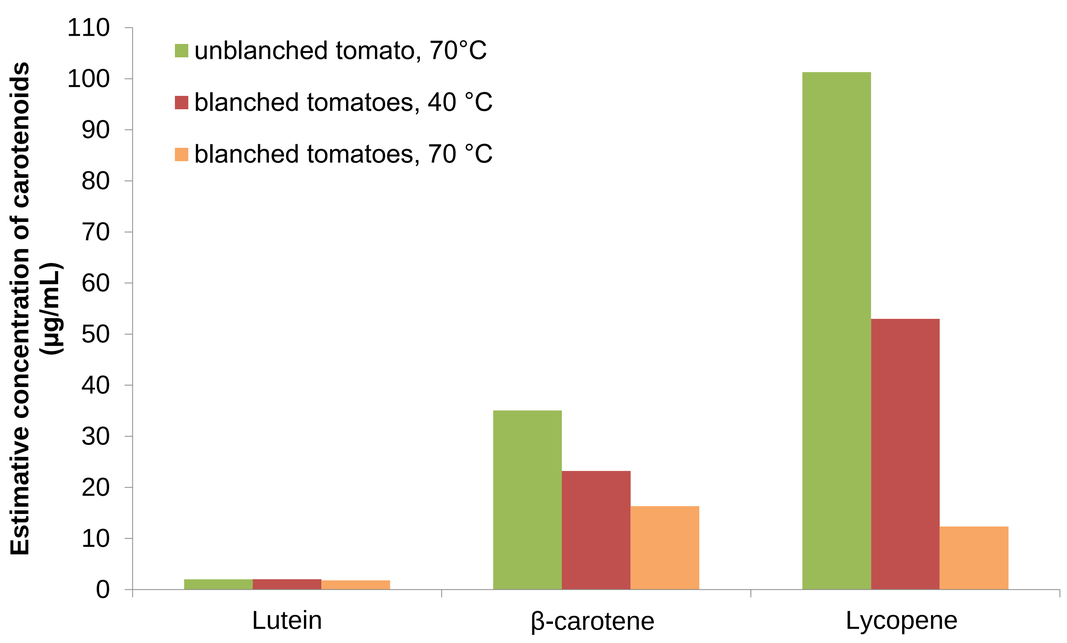
Extraction and analyses of carotenoids

- **Identification and quantification of carotenoids by UPLC-PDA analysis**

- Extraction: 200 mg powder + 0,9 ml of water +2 vol. MeOH + 2 vol. DCM → shaken at 300 rpm for 15 min. → centrifugation 5 min. at 10 °C, 2500 rpm → concentration under N_2 flow → dissolution in MeOH/Tetrahydrofuran.
- Separation on a 250 x 4.6 mm i.d. YMC C30 column (35 °C), at 444 and 459 nm
- The mobile phase: gradient of methanol (A), methyl tert-butyl ether (B), 0.7 mL/min
- Waters ACQUITY UPLC chromatograph (Waters, Milford, MA) equipped with an UV-PDA detector

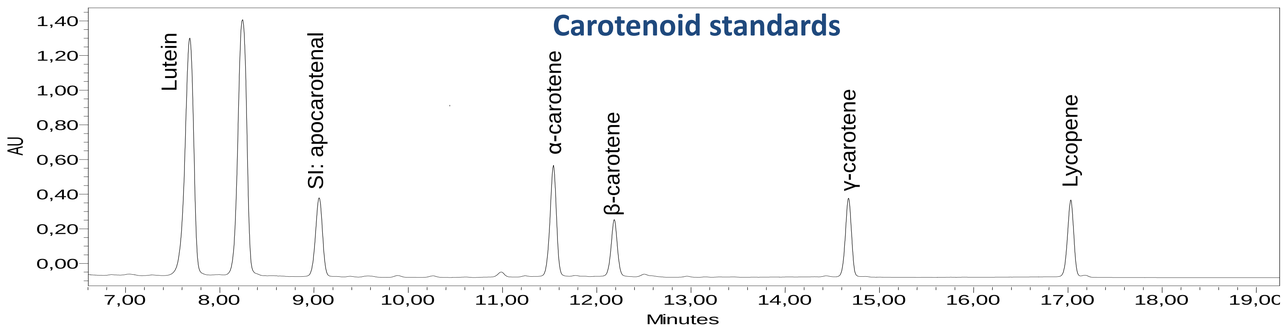
RESULTS AND DISCUSSIONS

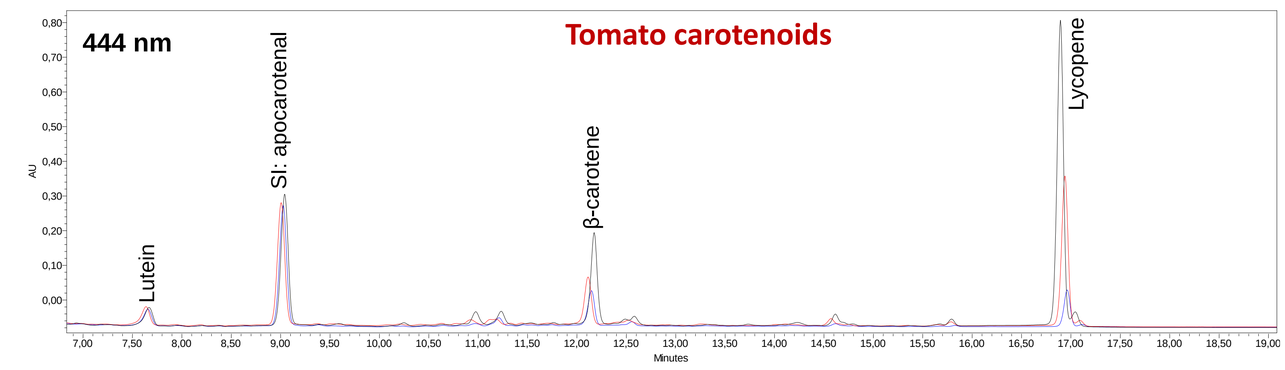
Variation of carotenoids content in organic tomatoes



- The results showed the predominant content of lycopene followed by β-carotene.
- Lutein appeared in lower concentrations. It concentrations is almost similar in all tomato powders.
- The higher lycopene and β-carotene contents was in unblanched tomatoes at 70 °C while in blanched tomato at 70 °C, both lycopene and β-carotene, appear in low concentrations that in blanched tomato at 40 °C:
  → heat induces the isomerization of carotenoids from trans to cis, which is more susceptible to oxidation.

Chromatographic profile of tomato carotenoids





Unblanched tomatoes, 70 °C: **black**; Blanched tomatoes, 40 °C: **red**; Blanched tomatoes, 70 °C: **blue**.

- Similar carotenoids profiles were found for all tomato powders.
- Lutein, β-carotene and lycopene were identified in powders of tomatoes.
- Lycopene was the predominant carotenoid in all tomato powders.

CONCLUSIONS

✓ **This study reports that there are variations in carotenoid contents which depend on both drying method and the form of raw material to be processed.**

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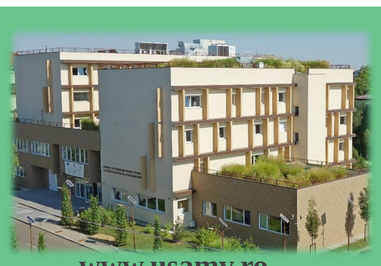

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Eurodrying'2019
7th European Drying Conference
Politechnico di Torino
Italy - July 10-12, 2019

Acknowledgements:
"The authors acknowledge the financial support for this project provided by transnational funding bodies, being partners of the H2020 ERA-net project, CORE Organic Cofund, and the cofund from the European Commission."
„This work was supported by a grant of the Romanian Authority for Scientific Research and Innovation, CCCDI - UEFISCDI, project number 4/2018 ERANET-COREORGANIC SusOrgPlus, within PNCDI III."
We gratefully thank Violeta Alexandra Ion (University of Agronomic Sciences and Veterinary Medicine of Bucharest) for their respective contribution in UPLC analyses.