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Faculty of Agrobiology and Food Resources
Institute of Biodiversity Conservation and Biosafety
Department of Genetics an Plant Breeding
Excellent Centre for the Conservation and Sustainable Use of Agrobiodiversity
Research Centre AgroBioTech

and

M.M. Gryshko National Botanical Garden of National Academy of Sciences of Ukraine, Kyiv, Ukraine

Department of Fruit Plants Acclimatization

Book of Abstracts

of the

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September 11–13, 2019

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AgroBio*Net*

International Network

within the implementation of the International Program

'Agrobiodiversity for Improve the Nutrition, Health and Quality of Life'

in the form of solved research, education and development projects and research stays

Authors and author collectives present at the international conference in lectures, posters and publications also results and knowledge obtained from the solution

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TABLE OF CONTENTS

ORAL PRESENTATIONS

https://doi.org/10.15414/2019.9788055220703

https://doi.org/10.15414/2019.9788055220703

POSTER PRESENTATIONS

https://doi.org/10.15414/2019.9788055220703

https://doi.org/10.15414/2019.9788055220703

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ISOMERS OF ESSENTIAL OILS COMPONENTS AND THEIR OPTICAL CHARACTERISTICS

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In recent years in the world, a comprehensive study of optical isomers (enantiomers) of organic compounds has been carried out. The main reason for this interest is due to the important role that optical isomers play in the functioning of living systems and manifestations of biological activity. The physicians have proved that differences in the biological effects of optical isomers on the human body are due to different recognition of them at the molecular level. Among the volatile plant substances that make up the smell of plants, there are many examples of these biological manifestations, since odor recognition also occurs at the molecular level.

Optical isomerism plays an exclusive role in the technologies of the processing of essential oils since the enantiomers of one substance usually differ greatly in their flavor tonality and strength. In particular, d (R) – Carvone has a fortifying odor, while l (S) – Carvone – a smell of mint.

In essential oils, one of the forms of enantiomers predominates most often. It is proved that d (R) – limonene predominates in essential oils of orange, lemon, mandarin, lime, grapefruit, bergamot, cumin, dill, fennel, parsley. At the same time, l (S) – limonene is found in essential oils of conifers, fir, stellate anise, peppermint. The value of optical activity may not be large. However, according to this information, you can check the naturalness of essential oils.

It should be noted that so far not all enantiomers of essential oils have been identified, the structure of a number of substances has been sorted out relatively recently, and their characteristics, including aromaticity, even have opposite meanings in the literature.

The subject of research was the optical isomers of Carvone, which was obtained by adapted preparative method from Dill (*Anethum graveolens* L.), Cumin (*Carum carvi* L.) and Mint (*Mentha spicata)* essential oils. We have been established their belonging to “dR – (+)” or “lS – (-)” of the optical series, determined the value of the angle of rotation, and also performed sensory analysis. The maximum isolation and collection of Carvone enantiomers were provided by a high-performance preparative self-produced column.

The composition purity of the selected enantiomers was verified by gas-solid chromatography on a self-made chromatographic column 3500 mm long, 3 mm in diameter, HP – D-mannitol, solid support – W 80–100 mesh chromosorb (1.5–2.0 m).

According to our data, d (R) – Carvone (right-rotating form) is included in the composition of Dill and Cumin, with a specific rotation of the plane of polarization [α] D + 62.5+0.05; [A] D + 61+0.03. Essential oil of *Mentha spicata* contains l (S) – carvone (left-rotating form) with a specific rotation of the [α] D polarization plane – 63.2+0.05.

The reliably several of the aromatic characteristics of Carvone enantiomers was determined by organoleptic analysis. So: d (R) (+) – Carvone dill, has a spicy aroma of fresh dill, d (R) (+) cumin has a sharp cumin flavor. l (S) – Carvone mint *Mentha spicata* has a mild spicy aroma with a mint shade.

Keywords: essential oils composition, enantiomers, aromatic characteristics.