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Abstract of the doctoral thesis

entitled: ” THE ISOMERISATION OF COMPOUNDS OF NATURAL ORIGIN ON TITANIUM-SILICATE CATALYSTS AND SELECTED POROUS MINERALS”

This work presents research on the obtaining of essential oils from orange peels and caraway waste. The main component of the oil obtained from orange peels is limonene (R-limonene), while the main components of the oil obtained from caraway waste are: S-carvone and limonene (R-limonene). As a result of the conducted research, the best method of obtaining orange and caraway oil from the above-mentioned waste plant biomass was selected and an effective method of separation of the main components of caraway oil was developed. Compounds such as limonene and S-carvone have become valuable substrates in the isomerization process. As a result of their transformation, even more valuable compounds for medicine and the cosmetics industry were obtained, such as: α-terpinene, γ-terpinene, terpinolene, p-cymene and carvacrol. In the isomerization reactions, titanium-silicate catalysts were used, such as: Ti-MCM-41, Ti-SBA-15, Ti-SBA-16 and, for comparison, natural and synthetic clinoptilolite (which also contains titanium in its structure). Before being used in isomerization processes, these catalysts were subjected to instrumental tests. The research conducted on the isomerization process allowed to propose mechanisms of the isomerization of limonene and S-carvone and to determine the most favorable conditions for obtaining limonene and S-carvone isomerization products.

In the last stage of the work, creams containing both terpenes, which are raw materials for the isomerization process, and compounds being products of isomerization of these compounds were prepared, and microbiological tests of the obtained creams were carried out. Research on the antioxidant properties of these compounds was also carried out separately using the DPPH method. These studies indicated the great potential of these compounds as potential components of therapeutic creams or dressings.

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