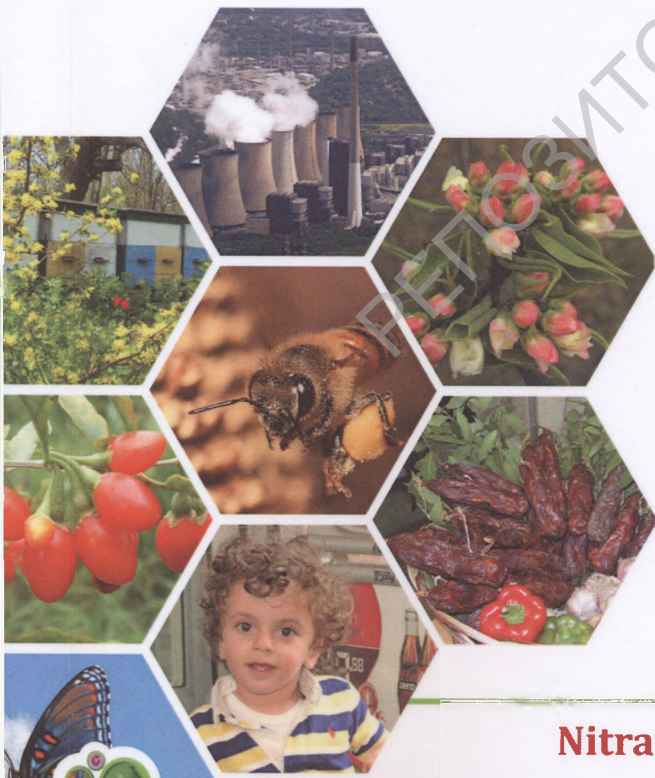


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ELECTROMAGNETIC RADIATION INFLUENCE ON FOOD QUALITY OF SEEDS AND PRODUCTIVITY OF *NIGELLA SATIVA* L. PLANTS

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Nigella sativa L. is a valuable medicinal plant of the Ranunculaceae family. It is important for Belarus to look for optimal conditions and methods for cultivating *Nigella sativa* plants. Thus it is necessary to use stimulating factors to increase the agro-technical characteristics of plants. For that purpose, we chose the electromagnetic treatment of the millimeter range of low-intensity (EMR) which had proved itself well in a number of vegetable crops both in Belarus and abroad.

The effect of EMR on the morphobiometric parameters, productivity and the oil composition from *Nigella sativa* seeds immediately after exposure (EMR1) and at the end of the vegetative period (EMR2) has been estimated. The physical effects on the seeds of the EMR of the regimes: Regime1 (frequency 53.57–78.33 GHz) with 20 minutes treatment exposure (R1), Regime 2 and Regime 3 (frequency 64.00–66.00 GHz) with processing exposures of 12 minutes (R2.1) and 8 minutes (R2.2) respectively have been selected for study. Seed treatment has been performed at the Institute for Nuclear Problems of the Belarusian State University. Extraction of the oil from the *Nigella sativa* seeds was carried out with hexane in the Soxhlet apparatus for two hours, which corresponded to 6 cycles. Qualitative and quantitative analysis of the oil from the *Nigella sativa* seeds was performed by gas chromatography.

The vegetation period of the *Nigella sativa* in the conditions of the central agro-climatic zone of Belarus is about 145 days. The pre-sowing treatment by EMR contributed to the appearance of more friendly shoots and stimulated growth processes especially at the beginning of the juvenile period. This was reflected on the productivity elements formation of this culture and in the control, it was 39.59 g/m² and depending on the regime of exposure was from 9.32 to 45.24 g/m². According to the obtained data, unsaturated fatty acids predominated in the *Nigella sativa* seeds' oil and their content hesitated depending on the year of cultivation and the EMR regime. The main component was linoleic acid (56.4–61.9 %) and then was the content of oleic (13.4–16.8 %), eicosadienoic (2.8–3.6 %) and linolenic (0,36–0.68 %) acid. The change in the quantitative composition of fatty acids as a result of pre-sowing EMR exposure has been noted. Changes in the composition of fatty acids of *Nigella sativa* seeds' oil after EMR1 has been associated with a decrease in the amount of linolenic and arachidonic acids. In the case of EMR2, a significant decrease in the amount of stearic acid and rise of unsaturated fatty acids content has been noted. It was revealed that the EMR in the *Nigella sativa* seeds' oil had reduced the amount of timokhinone in all studied cases. At the same time, the treatment by P2.1 resulted in the lowest content of timochinone in the oil. This dependence persisted in different years of research.

So EMR influences on the morphobiometric indicators and the composition of the active metabolites of *Nigella sativa* seeds has been established.

Keywords: electromagnetic radiation of microwave range, *Nigella sativa* L., fatty acids, thymoquinone.

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