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142. Influence of low-intensity millimeter waves on lipid peroxidation and antioxidant enzymes activity in male Wistar rats

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Electromagnetic waves of millimeter range (MM EMW) correspond to the extremely-high-frequency (EHF) electromagnetic irradiation (EMI) band ($f = 30–300\,GHz$) always exist in surrounding environment and intensively influence living organisms. It has been suggested that initial cellular event affected by exposure to EMI might be the increase of free radical level, which may enhance lipid peroxidation (LPO) and antioxidant enzymes activity (Ramundo-Orlando, 2010). The investigation concerned with the effect of low-intensity MMW on whole body exposure of male Wistar rats. Twenty rats were divided into two groups: sham-exposed (control) and experimental (10 animals each). Animals were exposed with 50.3 GHz frequency EMI (power flux density 64 μWt/$cm^{2)}$ for 1 h/day, for 5 days (day after day). As a source of monochromatic EMI EHF generator G4-141 type with working interval of 37.50–53.57 GHz (State Scientific-Production Enterprise Istok', Russia) was used. The whole body specific absorption rate (SAR) was 0.05 W/kg. Exposure took place in a ventilated plexiglas cage, where rats could move inside given space. After completion of each exposure period, rats were sacrificed to analyze malondialdehyde (MDA)-rate and enzyme activity (catalase and glutathione peroxidase) in brain, liver, heart and skeletal muscle. Our findings indicate a significant increase ($p < 0.05$) in level of MDA and CAT activity in brain of EMI-exposed group of animals as compared to sham-exposed, depending on EMI exposure duration. At the same time, we recorded slightly elevated MDA-rate in experimental animals liver in comparison with the control group. The MDA values concerning heart and skeletal muscles remained at the same levels in the EMI- exposed rats and did not differ significantly from control. Data show a significant decrease of GPX activity in experimental rats brain ($p < 0.001$) and liver ($p < 0.05$), whereas CAT activity significantly increased in the same organs compared to control. Studied indexes may indicate possible health implications of such exposure and should be taken into account.

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143. Nitrogen limitation triggers lipid synthesis of *Torulaspora globose* on various carbon substrates

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It is well known that the nature of the growth-limiting component has a significant effect on lipid synthesis in microorganisms with a typical diphase process. The limitation of yeast growth by mineral components of nutrition medium (for example, nitrogen) stimulates the intensive storage of lipids by the lipid-producer yeast, while with a carbon source deficiency, microorganisms synthesize a negligible amount of lipids (Dourou et al., 2018; Lazar et al., 2018).

The purpose of this work was to study the effect of the nature of the growth-limiting component on biomass composition and lipid synthesis of yeast *Torulaspora globose* VKPMY-953, cultivated on ethanol or glucose.

The selected strain *T. globose* VKPM Y-953 has a unique feature—the ability to intensively synthesize lipids in parallel with the growth of the culture, unlike the classical producers of lipids, in which intensive synthesis of lipids occurs after the completion of active growth.

As seen from Table 1, in the medium with ethanol as a carbon source under conditions of limitation of *T. globose* growth by nitrogen, a lipid synthesis was higher (43.8% of the biomass) than with an ethanol deficiency (17.8% of the biomass). Conversely, with ethanol deficiency, the biomass was characterized by a higher protein content (23.4% of biomass) and a biomass yield from the consumed substrate ($Y_{X/S}$) (54.4%) than with nitrogen limitation (16.7% of biomass and 31.1%, respectively); under these conditions, the lipid yield ($Y_{L/S}$) was higher by 27% than with a nitrogen deficiency. It is considered that lipids synthesized by microorganisms under deficiency of carbon substrate perform mainly a functional role in metabolism (take part in transport processes, regulate the activity of enzymatic systems, etc.). The purpose of growth-coupled lipid synthesis in *T. globose* is still unknown. It is possible that the studied strain is characterized by a higher proportion of functional lipids than other types of yeast.