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ABSTRACT BOOK

PO17 - Evaluation of the effectiveness of weak oscillating magnetic fields during freezing carried out in systems of different complexity

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Abstract

In the last decade, magnetic freezer has been introduced in the market for its potential cryoprotective activity but the published results are confusing and even sometimes contradictory and, therefore, its effects have not been scientifically proven. This work represents a contribution to the current discussion about the potential effect of the application of weak oscillating magnetic fields (OMFs < 7 mT at 50 Hz) during freezing process (about -23 °C) in systems of different complexity. The influence of OMFs was analysed through both the temperature evolution during freezing and properties of the frozen materials after being thawed, in three complementary studies: a) the freezing curves of a ferric chloride solution, b) Lactate dehydrogenase (LDH) enzymatic activity, and c) viability of *Anisakis simplex* larvae and water holding capacity of muscle in experimentally infected hake. No major supercooling or any other variation in the freezing curve of a ferric chloride solution was obtained. LDH enzymatic activity did not show any substantial improvement and the characteristics of frozen/thawed hake muscle in terms of water holding capacity were similar to the controls, whereas all *Anisakis* larvae were found non-viable both with or without OMF freezing. Our study carried out in different complexity systems shows no advantages of OMFs (low intensity and frequency in the order of those mainly employed in commercial OMF freezers) either in the freezing process or in the quality preservation of the samples. Further studies should be

interesting using larger magnetic field strengths and wider frequency ranges of the electromagnetic spectrum, by the employment of adequate technological devices.

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