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Storage of foods under mild pressure (hyperbaric storage) at variable (uncontrolled) room: A possible new preservation concept and an alternative to refrigeration?

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Since some foods were found in consumable conditions after 10 months at a depth of 1,540 m (~15 MPa) at 3–4 °C, following the sinking and rescue of the research submarine Alvin in the nineties, the possibility of food storage under mild pressure (hyperbaric storage) at cold temperatures, for shelf life extension compared to refrigeration at atmospheric pressure, was proposed. Still, this possibility requires temperature control throughout storage with the inherent energetic costs.

More recently, Segovia-Bravo et al. (2012) showed the possibility of hyperbaric storage (25/100/220 MPa) at 20 °C, for an acidic product (strawberry juice). In parallel, our research group showed the feasibility of preserving a highly perishable food (non acidic and with high water activity, using watermelon juice as case-study), at naturally variable (uncontrolled) room temperature (RT) conditions (18–21 °C). Additionally, the same work showed that watermelon juice could be preserved above RT (30 °C). These results opened promising results to preserve foods at naturally variable (uncontrolled) RT conditions, and so with basically no energetic costs throughout storage, since energy would be only required to generate the pressure and decompress. This possible novel food preservation methodology can slow down microbial growth (50-75 MPa), similarly to refrigeration, with the additional advantage of some microbial inactivation (100 MPa and above) up to 37 °C.

This and more recent results on hyperbaric preservation of foods will be presented and the possible use of this novel food preservation methodology, basically energetically costless, to substitute refrigeration, will be discussed.

Biography

Jorge A Saraiva completed his PhD at the age of 26 years from College of Biotechnology (ESB), Portuguese Catholic University (UCP) at Portugal. He coordinates the technological multidisciplinary high pressure platform and co-coordinates the agro-food platform, both of Aveiro University (UA). He is director of the BSc in Biotechnology at UA. He is elected member of the executive committee of the Non-thermal Processing Division (NPD) of institute of food technologists (IFT). He has published more than 75 papers in ISI/SCOPUS indexed journals and serves as referee in more than 20 scientific periodicals.

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