

ABSTRACT SUBMISSION

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Innovative Freezing Processes assisted by external electro – magnetic fields and assessment of freeze damage in frozen foods; an overview.

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During freezing, ice crystals formation yields mass diffusion of water towards the ice crystals whereas the solutes diffuse in opposite directions; the corresponding charges displacement induces a tiny current in the crystallization domain. Electrical double layer located at cell membranes may also interfere with ice formation. Therefore, any external causes inducing electrical charge may interact with freezing. Several innovative freezing technologies assisted by external fields (magnetic, electric, electromagnetic) have been developed with the objective of reducing the size of ice crystals and the freeze damage. An overview of these technologies will be proposed. Specific applications made on fruits, vegetable, meat and seafood will be presented using static electric field and electromagnetic waves (MW and RF) including a review on techniques to assess freeze damage (NMR, CRYO-SEM, XRays MiroCT, Mass diffusion etc).

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