

2. ABSTRACT

The freezing process mediated by static magnetic fields (SMFs) is an emergent freezing method which involves the application of SMFs in the freezing of food. Many studies suggests that this method allows to enhance subcooling, accelerate freezing and improve the quality of freezed foods, but the reported results are not always consistent, casting serious doubts on the reliability of the conclusions drawn.

Therefore, in this Master's Final Project a new study carefully designed has been carried out to evaluate the effects about the application of SMFs ensuring reproducible results. To this effects, potatoe samples were freezed in the presence or not of two magnets separated by a distance such that an intensity of either 40 mT or 150 mT was reached in the geometric center of the sample. The results obtained showed that at the evaluated intensities, the SMFs application during freezing did not affected to subcooling or freezing kinetics. In this way, the subcooling degree reached before nucleation, the moment in which it occurred, the precooling, phase change and tempering stages time and the characteristic and total freezing times were similar in the frozen samples with and without SMFs. The SMFs intensities analised in this Project, neither had any effect on the thawed potatoes quality. There were no significant differences on drip loss, texture or color in all the samples freezed under different conditions. The results suggests that the application of SMFs on food freezing does not provide any advantages. Moreover, a larger amount of studies about freezing food is necessary, involving food of different composition and different SMFs intensities to draw definitive findings.

Keywords:

Freezing, Static Magnetic Fields, subcooling, freezing kinetics, food quality, potatoe.