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Effect of brine and temperature in sterilization using nanosecond pulsed electric field for packaged fresh foods

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We have investigated sterilization of packaging foods. In sterilization methods of the packaging foods, there is pulsed discharge sterilization and high frequency pulsed electric field sterilization[1][2]. The pulsed discharge sterilization is suitable for solid fresh foods. The high frequency pulsed electric field sterilization is suitable for liquid fresh foods. However, many liquid fresh foods are difficult to sterilize by the pulsed electric field for having high electrical conductivity like containing salt. In this study, sterilizing properties of the brine of the high conductivity by nanosecond pulsed electric field have been investigated. Target microorganism was Saccharomyces cerevisiae that is detected generally in foods. In experiments, the salinity and temperature of the brine with S.cerevisiae was changed as parameters. As experimental results, by applying the pulsed electric field in the sample temperature of 50℃, processing time to reduce the number of S.cerevisiae two digits has been about one-fifth of that of the room temperature. In the evaluation of the sterilization ratio by difference of the salinity, the sterilization ratio at the salinity of 3% has been more than that of 0.3%.

[1]Takafumi Onuma, Daichi Ota, Yasushi Minamitani, "Investigation of non-thermal sterilization method of packaged fresh foods using pulsed barrier discharge", Proc. of 2014 IEEE International Power Modulator and High Voltage Conference, pp. 427-430 (2014)

[2]Takato Higuchi, Yoshie Kuramochi, Tsukasa Saito, Yasushi Minamitani, "Investigation of non-heating sterilization method of packed fresh foods by pulsed electric field", Proc. of 2012 IEEE International Power Modulator and High Voltage Conference, pp. 496-499 (2012)

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