Effects of Deep Seawater and Its Salt on Food Quality in Food Processing

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Summary

Recently, deep seawater (DSW) has been popular in the preparation of various foods, being said to improve food quality and taste. However, scientific studies of the effects of DSW and its salt are very few at the present time. The current body of accepted knowledge of fundamental reactions among food constituents has been established using ordinary water. The question here is whether some other interaction which would affect food quality takes place when DSW is used as the medium for food processing. This study aims to elucidate the characteristics of DSP and its salt.

Sample water media were DSW, surface seawater (SSW), DSW desalted by means of ultra filtration (DDS), 3.5% (w/w) saline (SAL) and Milli-Q water (MQW). Vitamin C was observed to be more stable in DSW and SSW than in the other salt free waters. Browning based on amino-carbonyl reaction proceeded more strongly in seawater. This may have been the result of buffering action of the seawater.

Agar is widely used as an important ingredient in food industries. In the present experiment hardness and strength of agar gels constructed by the following ingredients were examined: 0-1.5% agar and 0-40% of glucose, fructose and sucrose. The physical properties of DSW agar gels, on the whole, inclined to be superior to those of others. The hardness and strength of DSW gel reached maximum at 30% sugar content. It was suggested that factors such as pH and phosphate content were causative factors in the enhanced property of DSW gels, as compared with SAL gels.

The effects of DSW and its salt on the volatility of vinegars were examined by headspace analysis of acetic acid using a solid microextraction method. The volatility of acetic acid in vinegars was the highest in MQW, decreasing in the order of DDS, SSW and DSW. The volatility of acetic acid in vinegars was also more suppressed in the presence of the salt from DSW than in the refined salt.

Nitrosodimethylamine (NDMA) is a strong carcinogen. The effects of water media on the reaction forming NDMA were examined. The reaction to NDMA was accelerated under all the waters used in this experiment. It was, however, substantially inhibited by a small addition of *Citrus junos* essential oil, where the NDMA inhibition ratio reached 90% in DSW and SSW.