Plasma activated water

Potential in meat products manufacture

Recently, applications of this technology have been used in food products such as fresh produce, grains and meats with the aim of inactivating enzymes and foodborne pathogens. Nitrites have been used as a curing agent since they were discovered to play a role in the development of the distinctive cured meat colour, in the inhibition of lipid oxidation, and in the control of spoilage and pathogenic microorganisms.

The growing concern among consumers about the potential carcinogenic risks of synthetic curing agents, and the increased popularity of ‘all-natural’ and ‘clean-labelled’ food products, have led the food industry to search for alternative curing methods and ingredients. Teagasc researchers are investigating the application of plasma technology as a potential source of nitrite for viable application in the meat industry. A study carried out by Teagasc researchers examined the quality characteristics of plasma-cured beef jerky, and evaluated its suitability as an alternative nitrite source in the production of cured meat products (Figure 1).
Results showed that brine solutions produced by the air plasma system contained sufficient nitrates to be used as a nitrite source for curing beef jerky. When beef jerky was cured with air plasma, no differences were observed in the texture and lipid oxidation of jerky compared to the control samples cured with higher concentrations of added, chemical-based nitrates. In terms of colour, a significant increase in the redness of plasma-cured jerky was observed.

The research also monitored the effect of the plasma curing on meat inoculated with *Listeria innocua* during the curing process. A significant reduction of 0.85 log CFU/g in the spiked population of *L. innocua* was achieved in jerky produced in plasma brine, compared to the traditionally cured jerky (Figure 2). These results showed that plasma technology has the potential to be used as an alternative nitrite source with minimal impact on product quality; moreover, the results of the microbiological study showed that further optimisations of plasma technology could be a successful strategy for meat decontamination.

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**References**


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