

探討酸性電解水對於去除食材中造成食因性疾病危害因子之效果

李建璋 (5110)

09/23/2015

大綱

一、前言

二、魚肉及禽畜類肉品表面經酸性電解水處理對於食品病原菌之殺菌效果

三、探討經酸性電解水處理之蝦子於不同儲存溫度下物化特性與抗菌效果

四、探討酸性電解水去除花生中黃麴毒素之效果

五、結論

摘要

食因性疾病亦稱為食物中毒，常因食材遭微生物汙染所導致，近年來，消費者對於食品中添加化學合成藥劑接受度降低，因此開發方法降低或去除食因性疾病危害因子成為食品工業上重要之課題。Acidic electrolyzed oxidizing water (AcEW；酸性電解水) 是將含有電解質之溶液，利用電解裝置電解再經陽離子交換膜後產生之溶液，具有 pH 值低、Oxidation reduction potential (ORP；氧化還原電位) 高、Available chlorine concentration (ACC；游離氯離子濃度) 高等特性，研究顯示，當應用於鮭魚、雞肉、牛肉表面可使 *Escherichia coli* O157:H7 (*E. coli* O157:H7；大腸桿菌) 減少 1-2 log₁₀ CFU/g；*Salmonella Typhimurium* (沙門氏菌) 減少 0.7-1.5 log₁₀ CFU/g；*Listeria monocytogenes* (單增李斯特菌) 減少 1.1-1.2 log₁₀ CFU/g；而使用 AcEW 處理蝦子表面使 *Vibrio parahaemolyticus* (腸炎弧菌) 減少 2.12-3.11 log₁₀ CFU/g；*L.monocytogenes* (單增李斯特菌) 減少 1.69-1.96 log₁₀ CFU/g，具有顯著的殺菌效果，此外 AcEW 應用於花生對於 *Aspergillus flavus* 所產生出的 Aflatoxins (AFB₁；黃麴毒素)，有效去除 85% 之效果。而 AcEW 之殺菌效果會受溫度、有機物質含量、濃度、時間、游離氯離子存在之形式以及作用於食材表面平滑粗糙程度皆有影響。AcEW 經過一段時間後，其 ORP 值與 ACC 會逐漸下降並且轉化成水，因此無化學藥物殘留，不會造成任何產生食因性危害之風險，可作為去除食因性危害因子方法作為殺菌劑之潛力。

1 參考文獻

- 2 Al-Holy, M. A., & Rasco, B. A. (2015). The bactericidal activity of acidic electrolyzed
3 oxidizing water against *Escherichia coli* O157: H7, *Salmonella* Typhimurium, and
4 *Listeria monocytogenes* on raw fish, chicken and beef surfaces. *Food Control*, 54,
5 317-321.
- 6 Bajpai, V. K., Baek, K. H., & Kang, S. C. (2012). Control of *Salmonella* in foods by
7 using essential oils: A review. *Food Research International*, 45(2), 722-734.
- 8 Galvano, F., Galofaro, V., De Angelis, A., Galvano, M., Bognanno, M., & Galvano, G.
9 (1998). Survey of the occurrence of aflatoxin M1 in dairy products marketed in
10 Italy. *Journal of Food Protection®*, 61(6), 738-741.
- 11 Groopman, J. D., & Eaton, D. L. (Eds.). (1994). The toxicology of aflatoxins: human
12 health, veterinary, and agricultural significance. Academic Press.
- 13 Hotta, K., Kawaguchi, K., Saitoh, F., Saito, N., Suzuki, K., Ochi, K., & Nakayama, T.
14 (1994). Antimicrobial Activity of Electrolyzed NaCl Solutions: Effect on the
15 Growth of *Streptomyces* spp. *日本放線菌学会誌*, 8(2), 51-56.
- 16 Huang, Y. R., Hung, Y. C., Hsu, S. Y., Huang, Y. W., & Hwang, D. F. (2008).
17 Application of electrolyzed water in the food industry. *Food control*, 19(4),
18 329-345.
- 19 Kramer, J. M., Frost, J. A., Bolton, F. J., & Wareing, D. R. (2000). *Campylobacter*
20 contamination of raw meat and poultry at retail sale: identification of multiple
21 types and comparison with isolates from human infection. *Journal of Food*
22 *Protection®*, 63(12), 1654-1659.
- 23 Li, F. Q., Yoshizawa, T., Kawamura, O., Luo, X. Y., & Li, Y. W. (2001). Aflatoxins and
24 fumonisins in corn from the high-incidence area for human hepatocellular
25 carcinoma in Guangxi, China. *Journal of agricultural and food chemistry*, 49(8),
26 4122-4126.
- 27 Nakagawara, S., Goto, T., Nara, M., Ozawa, Y., Hotta, K., & Arata, Y. (1998).
28 Spectroscopic Characterization and the pH Dependence of Bactericidal Activity
29 of the Aqueous Chlorine Solution. *Analytical Sciences*, 14(4), 691-698.
- 30 Ribeiro, M. H., Manha, S., & Brito, L. (2006). The effects of salt and pH stress on the
31 growth rates of persistent strains of *Listeria monocytogenes* collected from
32 specific ecological niches. *Food research international*, 39(7), 816-822.
- 33 Su, Y. C., & Liu, C. (2007). *Vibrio parahaemolyticus*: a concern of seafood safety.
34 *Food microbiology*, 24(6), 549-558.
- 35 Suzuki, T., Noro, T., Kawamura, Y., Fukunaga, K., Watanabe, M., Ohta, M., ... & Hotta,
36 K. (2002). Decontamination of aflatoxin-forming fungus and elimination of
37 aflatoxin mutagenicity with electrolyzed NaCl anode solution. *Journal of*

- 1 agricultural and food chemistry, 50(3), 633-641.
- 2 Wild, C. P., & Turner, P. C. (2002). The toxicology of aflatoxins as a basis for public
3 health decisions. *Mutagenesis*, 17(6), 471-481.
- 4 Xie, J., Sun, X. H., Pan, Y. J., & Zhao, Y. (2012). Physicochemical properties and
5 bactericidal activities of acidic electrolyzed water used or stored at different
6 temperatures on shrimp. *Food research international*, 47(2), 331-336.
- 7 Zhang, Q., Xiong, K., Tatsumi, E., & Liu, H. J. (2012). Elimination of aflatoxin B 1 in
8 peanuts by acidic electrolyzed oxidizing water. *Food control*, 27(1), 16-20.
- 9

