

学 位 論 文 要 旨

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題 目	Study on properties and utilization for food manufacturing of functional water (機能水の物理化学特性と利用に関する研究)
<p>This study was conducted to survey physicochemical change of water by electrolysis and develop utilization method of functional water for organism and agricultural product.</p> <p>1. Physicochemical properties of Alkaline electrolyzed water (AIEW) were investigated. Surface tension of AIEW was lower than pure water (PW), NaOH water and nano-bubble water. It was proved that low surface tension of AIEW contributes to high detergency. Penetration of AIEW was higher than PW, NaOH water and nano-bubble water. Therefore, penetration of AIEW doesn't contribute to high detergency. Moreover, it was proved that AIEW has high saturation solubility. Therefore, AIEW dissolves more fertilizer and chemicals.</p> <p>2. Removal effect of AIEW was investigated for sweet potato stain. AIEW had removal effect as high as chemical detergent. AIEW can be used for sweet potato stain cleaner instead of chemical detergent.</p> <p>3. Silver ionized water (SIW) and ice (SII) were evaluated with regards to its antibacterial effect. SIW had antibacterial effect for <i>Escherichia coli</i>. Moreover, SIW suppressed growth of <i>Aspergillus niger</i> within 1~2 log cfu/mL than pure water at 48 hour. Bacteria was presence in ice machines of restaurants. However, Bacteria was not detected from the ice machine generating SII of 60ppb. Therefore, SIW can be utilized as antimicrobial agent and SII can be used for hygiene maintenance of ice machine.</p> <p>4. SIW and circulation electrolyzed water (CEW) were evaluated with regards to its antibacterial effect on immersion process in soybean processing compared to PW. Ten grains of soybean were soaked in 50 mL of immersion water with various time responses (2, 6, 12 h). SIW and CEW had the most efficient (<90%) in suppressing bacteria monitored at 12 h compared with PW. At 2 and 6 h, there were slightly antibacterial effect (70%). In addition, mass and hardness of soybeans as measure before and after immersing were comparable among samples, indicating no quality deterioration. The results revealed the possibility of functional waters can be utilized as immersion water in soybean processing.</p> <p>5. Utilization of SIW and CEW for <i>Brassica rapa</i> var. <i>perviridis</i> in plant factory was investigated. Number of leaves, leaf length, root length, Fresh weight, dry weight, moisture content were no significant difference Among sample waters. However, it was proved that SIW and CEW have antibacterial effect and it is known that these reduce algae. Therefore, SIW and CEW have an alternative value as solutions of plant factory cultivation.</p>	