

## 酸性電解水と酸化還元電位

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酸性電解水の殺菌要因としての酸化還元電位の妥当性について検討した。そのために必要な事項として、物質の構造と化学反応、酸化と還元、酸化還元電位の意味と測定法、ネルンストの式、pH、電位-pH図、有効塩素濃度について解説した。

酸性電解水模擬液を用いての実験結果をもとにした考察から、酸性電解水の殺菌要因に関して以下の結論を得た。(1) 主に HClO 態および Cl<sub>2</sub> 態の有効塩素に依存する (酸性領域では有効塩素濃度に置き換えられる)。(2) pH は、HClO 態および Cl<sub>2</sub> 態の有効塩素の存在比に影響する形で関与するだけで、殺菌力には直接影響しない。(3) 酸化還元電位 (ORP) が直接関与することはない。

## A Critical Review on the Oxidation-Reduction Potential as a Possible Bactericidal Factor of Acidic Electrolyzed Water

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The oxidation-reduction potential (ORP) of acidic electrolyzed water was reviewed in terms of its possible role as a bactericidal factor. In connection with this, the substance structure and chemical reaction, oxidation and reduction, significance and measuring method of ORP, Nernst's equation,  $E_h$ -pH relationship, and available chlorine necessary for understanding ORP were outlined.

Based on the results obtainable with an arbitrarily-prepared aqueous solution having almost identical physicochemical properties with those of acidic electrolyzed water, the following concluding remarks on the bactericidal activity of the acidic electrolyzed water were obtained. 1) Bactericidal activity is mainly dependent on available chlorine concentration in the form of HClO and Cl<sub>2</sub>. 2) pH has no direct contribution to bactericidal activity except for its effect on the ratio of HClO and Cl<sub>2</sub>. 3) ORP has no direct role as a bactericidal activity.