# TECHNICAL BULLETIN

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# HYDROGEN PEROXIDE
## FOOD PROCESSING GUIDE

**Uses of HYDROGEN PEROXIDE**
**and Food Maximum Treatment Level**
**(from 21 CFR 184.1366)**

Sterilization Aseptic packaging <0.5 ppm $H_2O_2$ in distilled water packaged under production conditions
Antimicrobial agent for cheesemaking - 0.05%
Whey - 0.04%
Starch - 0.15%
Oxidizing/reducing agent Dried eggs, dried egg whites- Amount sufficient for the purpose and dried egg yolks
Wine Amount sufficient for the purpose
Corn syrup - to remove SO2 - 0.15% in finished product
Starch (to remove excess SO2) - 0.15%
Antimicrobial agent Wine vinegar (remove SO2 - amount sufficient for the purpose - from wine prior to fermentation to produce vinegar)
Bleaching agent Tripe - amount sufficient for the purpose
Emulsifiers containing fatty acid - 1.25%
esters (hydroxylated lecithin)
Beef feet - amount sufficient for the purpose
Herring - amount sufficient for the purpose
Instant tea - amount sufficient for the purpose
Coloured (annatto) cheese whey - 0.05%
Starch - 0.95%
Lecithin - amount sufficient for the purpose

**Typical Use Conditions**
There is no standard method for treating food produce. A general guide for washing salad vegetables is:
Wash off loose dirt with potable water
Rinse with 1.5 % **PEROXIDE** solution at room temperature

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Drain or spin
Rinse with potable water

**Variations on this procedure may include**
The addition of food acids to the **PEROXIDE** washing solution to increase the reactivity of peroxide. Food grade acids such as acetic acid and lactic acids at 1.5% may be used although acetic acid may give a slight vinegary aftertaste. A pH to 4-5 is optimum.

A temperature increase to 40-50$^{o}$C increases the reactivity of the **PEROXIDE** and allows a reduced contact time to achieve similar results at a lower temperature.

Re-use of the peroxide solution. Additional peroxide is added to maintain the level at 1.5% (and food acid for improved results). **PEROXIDE** level and pH may be determined with paper strip indicator paper. Re-use cannot continue indefinitely because of the buildup of organic material which will increasingly consume **PEROXIDE**.

The residence time. Half an hour will kill most pathogens. 5-10 minutes contact time with peroxide is suitable in many circumstances. The appropriate residence time should be determined by microbiological examination before and after treatment. A 4 or 5 log reduction of typical pathogenic bacteria is generally considered satisfactory. However spores will survive this treatment indefinitely.

**HYDROGEN PEROXIDE advantages**
• **No toxic residu**e. When **HYDROGEN PEROXIDE** is used in food applications, dosing is controlled to minimize the amount of residual $H_20_2$. This excess normally decomposes into oxygen and water in subsequent processing stages, such as drying. Testing for residual $H_2O_2$, where required, is easily accomplished using standard analytical techniques or test strips.
• **Ease of handlin**g. **HYDROGEN PEROXIDE** is infinitely soluble in water, so aqueous solutions of the proper strength to meet food processing needs are easily prepared. As a water-based solution, the product is compatible with most common processing techniques, such as spraying, dipping or batch mixing. Properly handled, **HYDROGEN PEROXIDE** is a safe and easy-to-use chemical.

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• **Effectiveness**. When activated, **HYDROGEN PEROXIDE** brings the power of the hydroxyl radical (OH+) and perhydroxyl ion (OOH-) to bleaching and sanitizing of food products. Very powerful oxidizers, the OH+ radical and OOH- ion perform better than most alternative products with the added benefit that $H_2O_2$ is an environmentally compatible chemical.

**The following is portion of a literature reference:**
http://www.griffin.peachnet.edu/cfs/Pages/ConsumerResearch.html
**Inactivation of Pathogens on Produce by GRAS Chemicals (2000)** *C.-M. Lin, H. Bailey, K. McWatters, S. Walker, S. Moon, and M. P. Doyle*
Iceberg lettuce with 1.5% lactic acid plus 2.0% $H_2O_2$ at 23°C for 5 min produced a 5 $\log_{10}$ of *E. coli* O157:H7 and *S*. Enteritidis were inactivated, and up to a 4-$\log_{10}$ reduction for *L. monocytogenes* was achieved. However, this treatment adversely affected the sensory quality of lettuce. High temperature-short time treatment (blanching) was applied to individual lettuce leaves to improve the sensory quality of treated lettuce. Lettuce leaves treated with 2% $H_2O_2$ at 50°C for 90 sec reduced pathogen populations by ca. 4 $\log_{10}$ cfu/leaf for *E. coli* O157:H7 and *S*. Enteritidis and by 3 $\log_{10}$ cfu/leaf for *L. monocytogenes*. Sensory evaluation of lettuce leaves treated with 2% $H_2O_2$ at 50°C for 90 sec was done using single leaves. After treatment, a lettuce leaf was rinsed by cold (22-23°C) tap water for 3 min and dried using a salad spinner. The dried leaves were stored at 4°C up to 15 days. Both treated and control samples maintained acceptable visual quality for up to 15 days. No significant difference in visual quality between control and treated lettuce leaves was observed for up to 7 days of storage

**IMPORTANT NOTICE TO CUSTOMER**

*Since the use of this product is beyond the control of either seller or manufacturer, their only obligation shall be to replace any quantity of product which is proven defective. They cannot assume any risk or liability in excess of the purchase price of the product itself, which does not include labour or any consequential damages resulting from the use of this product. Determining the suitability of this product for any intended use shall be solely the responsibility of the user.*
**ALWAYS TEST FIRST.**