

# METTLER TOLEDO APPLICATION NOTE

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## Lye Peeling Of Fruits And Vegetables

### BACKGROUND

Many fruits and vegetables are prepared for peeling and canning by exposure to caustic (NaOH). To ensure adequate and consistent peeling, the concentration of caustic in the treatment bath must be maintained at an effective strength. At the same time, if the caustic bath is too strong the fruit or vegetable can be damaged.

### THE PROCESS

The typical process consists of an open tank of caustic heated to 170-220°F (76-105°C) by live steam. The target caustic concentration can vary from 3 to 15%. Exposure time for the product is usually five minutes or less, after which product is placed on moving grates and washed by high pressure nozzles to remove entrained caustic.

The product carries out a significant amount of caustic, so the bath must be continually replenished to maintain an adequate volume of caustic solution and a caustic concentration at the target value. Depending on the particular operating characteristics of the lye peeler, this could involve level control and, conceivably, the addition of water as well as make-up caustic, based on the conductivity measurement.

### INSTRUMENTATION

Due to its resistance to fouling, toroidal conductivity is the best choice for this measurement. Depending upon how heavily the bath is loaded with dirt, peels, and other suspended contaminants, we recommend the InPro® 7200 or InPro® 7201 toroidal conductivity sensor.

As the bath ages, there is a buildup of salts which are leached out of the peels and carried in with dirt and other suspended contaminants.

There is an increase in the background conductivity as a consequence of this leaching and build-up. Since conductivity measurements are non-specific, this background conductivity cannot be distinguished from that due to the caustic, although the effect will be less pronounced at higher caustic concentrations.

### *Concentration Measurement*

In general, when concentration is derived from conductivity using a percent concentration analyzer (Model Condl 7100), the conductivity versus concentration curve will not be the same as the standard curve shown for caustic (NaOH) in distilled water due to build-up of salts in the bath. The curve must be developed from operating data, i.e., conductivity and titrated caustic concentrations. Data should be taken over the life of at least 3 baths; the age of the bath and any additions to the bath should be noted, in addition to the conductivity and titrated caustic concentration. Once a curve has been developed, the on-line measurement can usually be corrected for salt build-up by standardization following a routine laboratory titration.

### IMPORTANT CONSIDERATIONS

1. Select the toroidal sensor based on how heavily the bath is loaded with entrained solids.
2. When evaluating how to control bath concentration and volume, both the behavior and manual control of the bath should be thoroughly examined.
3. When setting up a concentration measurement using the Condl 7100, data should be taken over the life of three baths to determine the relationship between conductivity and concentration.

## PRODUCTS

### Model Condi 7100 Toroidal Conductivity Analyzer

- Measures conductivity, resistivity and % concentration
- Detachable front panel and plug-in terminals for ease of installation
- All functions accessible through the keypad for increased ease of use
- Continuous sensor and transmitter diagnostics to monitor performance
- FM certification for Class I, Div 1 & 2 Environments
- 3 year warranty

### InPro® 7200 Toroidal Conductivity Sensors

- Recommended for high accuracy measurement in high conductivity processes
- Choice of materials of construction for increased chemical compatibility
- High temperature range option suitable for CIP and Boiler Blowdown applications
- FM approved for electrical safety

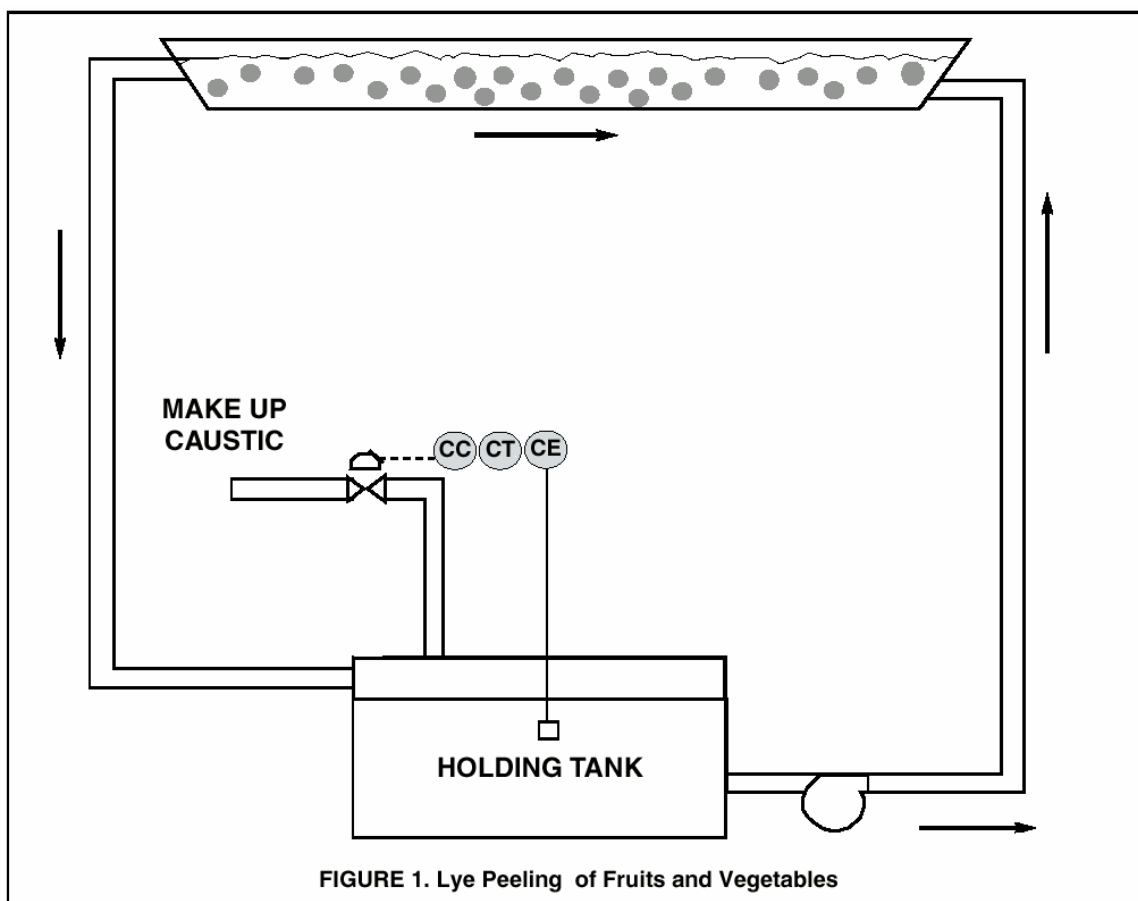


FIGURE 1. Lye Peeling of Fruits and Vegetables

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