METTLER TOLEDO APPLICATION NOTE

pH Control To Maximize Yield In Algin Production

BACKGROUND

Kelp is harvested from the ocean as a source of protein for use in a variety of foodstuffs ranging from ice cream to mayonnaise to pet food. pH control is used to ensure that a maximum yield of protein (algin) is obtained from the kelp.

THE PROCESS

Algin is obtained from kelp in a two-step process. First, the kelp is digested at a pH of 12.5. The mixture is then acidified to a pH between 1.2 and 1.5. In that pH range, the algin is precipitated and can be separated from the reaction mixture. The acidification must be carefully controlled to produce the maximum yield. If the pH falls below approximately 0.9, the algin will be destroyed. If the pH is higher than approximately 2, not all of the algin will be precipitated.

INSTRUMENTATION

During the precipitation process, the mixture is a thick slurry so that the algin tends to form clumps around stationary objects. However, pH can be measured successfully by using a flow-through pH electrode chamber in a recirculation loop. If the flow rate in the loop is maintained above five gallons per minute, the electrodes will remain clean and will continue to operate, and the chamber will not become clogged. A non-metallic pH electrode chamber must be used because of the low pH during the precipitation. The patented Mettler-Toledo Xerolyt® reference system has a high resistance to clogging due to its open annular junction. Therefore, maintenance costs and downtimes typically associated with cleaning sensors are reduced.

The recommended analyzer is the Model 2100 pH Analyzer and the pH sensor is the InPro® 4200 in an InFlow® style housing. Alternatively the InPro 4200 may also be used in conjunction with the InTrac® 777-SL Retractable housing.

PRODUCTS

2100 pH Analyzer

- 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 and CSA General Purpose Approval
- 3 year warranty

InPro® 4200 Solid Polymer pH Electrode

- Patented Xerolyt® solid polymer reference system maintains a stable potential for accurate and repeatable pH measurement and low maintenance
- Open junction eliminates reference clogging and extends sensor life
- High pressure resistance eliminates requirement for pressurizable housing
- Integral RTD for higher measurement accuracy
- Rugged IP67 rated quick connect VarioPin connector

InFlow® 700 Series Flow Through Housing

- For in-line mounting in small pipes
- Choice of materials of construction for chemical compatibility

InTrac® 777-SL Retractable Housing

- Rugged 316L SS or PVDF construction for maximum chemical resistance
- Flushing chamber for automatic cleaning and calibration reduces overall system downtime
- Patented immersion tube design isolates the sensor on retraction and guarantees complete separation of the process from the outside environment.
- Safety interlocks prevent sensor removal from housing while in measuring position
- Manual or pneumatic operation for maximum use

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