controlling water quality & cost

mark bosley, systems sales support manager, highlights the importance of water purification in food process applications

Water Purification Systems UK

controlling water quality & cost

Purified water is one of the most important raw materials used in the food and beverage sector. It forms a vital base constituent in the formulation, blending or washing of many different food items, and is also used both for clean in place (CIP) and general wash-down duties.

Food processing and preparation companies draw their raw water supplies either direct from boreholes or, more commonly, main supplies. In each case, however, the composition of raw water can vary considerably in terms of the presence of added chemicals and the quantity and variety of dissolved minerals and particulate matter, all of which can, unless otherwise treated, have an influence on the consistent taste and appearance of finished food and drink products. The need for consistent product quality is put into stark focus when one considers the massive budgets spent globally on brand building and product promotion.

In essence, raw water can introduce a number of variables into food production processes that by their very nature need to be as consistent and precisely controlled as possible. By purifying the water feed stream it is, therefore, possible to remove or control these variables.

There are a number of purification technologies available, ranging from sand and other media filters for the removal of particulates, to activated carbon filtration systems for the removal of the organic contaminants and chlorine compounds that can be responsible for variations in colour taste and odour. Specialised membranes are used in ultra-filtration for pre-treatment and reverse osmosis for the removal of ionic contaminants. In addition, ion exchange technology is applied for water softening or deionisation purposes, with UV and sterile filtration, or chemical dosing, commonly being added to maintain the microbiological integrity of the water.

This wide choice of technologies enables food and beverage producers to select the best system for each application, either at the point at which raw water is drawn, or within the process itself. Additionally, it allows companies to ensure that the characteristics of the water source can, where required, be retained, and standardised globally, and to construct purification systems that help both to minimise water usage at a time of rising costs and meet increasingly stringent food hygiene and safety legislation.

The majority of applications for water purification systems are for conditioning raw water feeds to remove chlorine, bacteria and other pathogens and particles held in suspension.

Carbon filtration is a common pre-treatment for water used in food or beverage production. The adsorption properties of carbon make it ideal for use in the removal of the organic contaminants responsible for colour or

controlling water quality & cost

chlorine by-products from the feedwater. The latter is often required to eliminate unwanted taints that combined chlorine compounds may introduce to the final product, or as a pre-treatment required before RO systems.

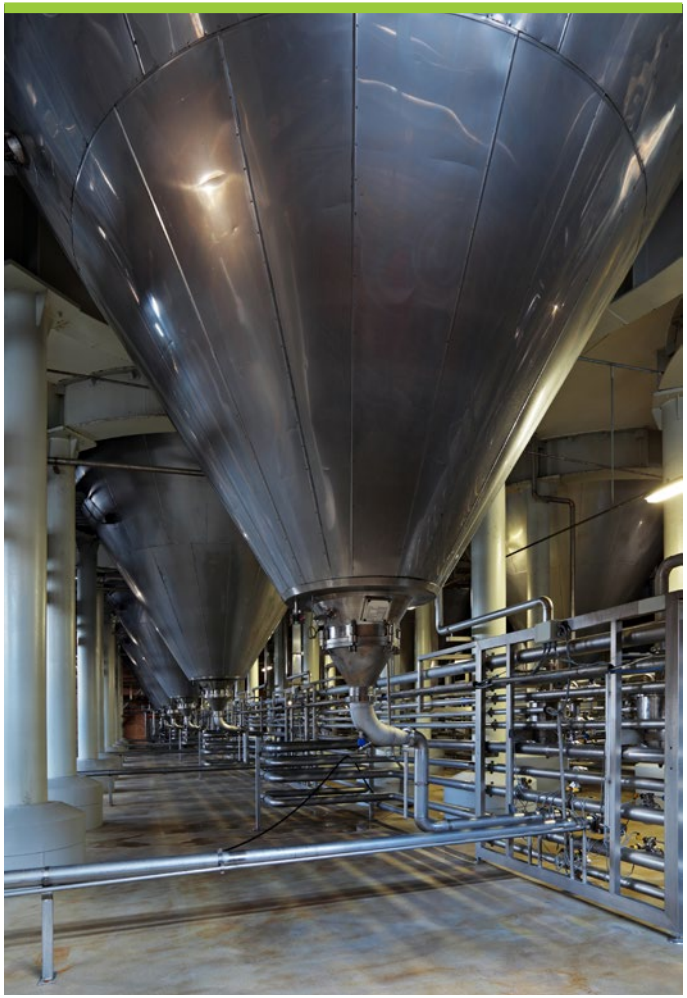
Reverse osmosis (RO) is a commonly used technology incorporating specialised semi-permeable membranes through which pressurised feed water is passed to remove inorganic ions and dissolved organic contaminants. This process enables up to 98% of the dissolved minerals and salts contained in the raw water supply to be rejected, together with silica, organic compounds and bacteria; typically, over 99% of micro-organisms can be eliminated.

Purified water forms a vital base constituent in the formulation, blending or washing of many different food items, and is also used both for clean in place (CIP) and general wash-down duties

The latest RO systems incorporate thin film membrane modules that are typically constructed from aromatic polyamides (PA) coated on extremely stable polysulfone substrates. These systems are easy to sanitise, offer high rates of flow and removal efficiencies and are generally compact, self-contained and incorporate sophisticated PLC devices that can, where appropriate, be linked directly to higher level process control architectures.

In applications where raw water is being abstracted from a deep drawn borehole, then the use of reverse osmosis plant, together with suitable pre-treatment, is an ideal solution for reducing both ionic and microbiological contaminants, with the resulting feed stream subsequently being disinfected using ultraviolet, or chemical processes.

Where it is important to retain the characteristics of the original water source, for example in the production of whisky, then an alternative method is to use a process known as ultrafiltration (UF), which effectively removes colloidal and organic contaminants without affecting the mineral properties of the water. The latest ultrafiltration technology uses physically and chemically stable hydrophilic polyether sulphone hollow fibres; these enable contaminants between 5000 and 150,000 Daltons



controlling water quality & cost

to be removed, including particulates, micro-organisms, inorganic colloids and organic macromolecules including pyrogens.

RO systems can also be used to treat water for CIP duties, providing a supply of purified water for the final rinse stages to remove any residual CIP chemicals that might otherwise contaminate food or beverage products. In addition, high purity water can be used for cooling purposes or for cleaning cans, bottle tops, or storage vessels to ensure that bacteria or contaminants present in the water cannot affect product quality.

Finally, it is worth noting that the rising cost of both raw water and water disposal is generating considerable interest in the potential for recycling waste water for use in non-critical duties. Similarly, treatment processes can be employed to reduce the volume of waste water discharged or to remove some components of the waste stream. In each case, effective results can be achieved using the latest membrane technology in conjunction with traditional separation methods, to remove oils, fats and dissolved solids.

Effective control over the purity of the water used for equipment cleaning and as a constituent part of the final product is a vital element in the food and beverage preparation and production process.

With modern treatment and filtration technology, companies now have the ability to make significant improvements to water quality while simultaneously reducing costs and maintaining product consistency through better use and treatment of raw water and the recycling of waste waters.

Companies now have the ability to make significant improvements to water quality while simultaneously reducing costs and maintaining product consistency

Contact

SUEZ Water Purification Systems UK
Purite Ltd, Bandet Way, Thame, Oxon OX9 3SJ

Tel: +44 (0)1844 217141 | **Fax:** +44 (0)1844 218098
Email: mail@purite.com | **Web:** www.purite.com