

Dextrose Purification Nanofiltration

Dextrose is a form of glucose, or simple sugar, derived when starchy plants such as corn (and less commonly, wheat or rice) are broken down into monosaccharides using enzymes. About 20% less sweet than sucrose, dextrose is one of the most commonly used ingredients in packaged and processed foods because of its affordability and wide availability. It is used in sauces, cookies, cake mixes, candies, energy drinks and frozen desserts. It may also be used in savory foods like cured meats, canned foods, pretzels, pickles and crackers. Dextrose also helps dough rise and brown, is known to enhance and stabilize food colorings and can also extend the shelf-life of packaged foods.

Dextrose is also used in the pharmaceutical industry. Because dextrose has a high glycemic index, meaning it quickly raises blood sugar levels, it is commonly used in intravenous (IV) preparations and injections in hospital settings for low blood sugar and dehydration, and IV feeding.

Due to its high demand in the food and pharmaceutical industries, dextrose manufacturing companies are looking at more efficient and economical manufacturing processes rather than the conventional centrifugation, ion exchange, evaporation, freeze concentration, freeze-drying or other dewatering techniques used. Membrane filtration is quickly gaining acceptance in the sugar, starch and sweetener industry with producers benefiting from improved yields, reduced costs, more efficient use of power and natural resources and the opportunity of producing specialty products.

DEXTROSE PURIFICATION (OR DEXTROSE ENRICHMENT) PROCESS

One of the largest membrane applications in the sweetener industry is dextrose purification, also referred to as dextrose enrichment. This process involves a separation of monosaccharides (sugars with a degree of polymerization of 1, also referred to as DP1s), most commonly dextrose (molecular weight: 180 Da), from disaccharides (sugars with a degree of polymerization of 2, also referred to as DP2s) most commonly sucrose (molecular weight: 342 Da). The desired result of this separation is a product with a dextrose purity of around 99.5%.

Dextrose purification typically uses nanofiltration membranes rated in the 200 Dalton (Da) molecular weight cut-off (MWCO) range. The process is most commonly run in the 24-31 bar (350-450 psi) range with a pH in the 4-5 range, since the peak stability pH for dextrose is 4.5. There are two common temperature ranges used in dextrose purification: 45-50°C (113-122°F) and 65-70°C (149-158°F).

MANN+HUMMEL Water & Fluid Solutions has two nanofiltration membranes that have proved successful in dextrose purification applications. For more information, please contact your MANN+HUMMEL Water & Fluid Solutions sales professional.

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