EDITORIAL

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Processing soymilk: the dairy alternative for the health conscious

There is currently a large and growing market for soymilk, both as a dairy alternative and, particularly in the Far East, as a nutritious sweetened soft drink. Dairy alternatives are attracting an increasing interest for a number of powerful reasons, including health concerns, the growth in vegetarianism, interest in organic foods, regulatory pressures, concerns about genetically modified foods and animal welfare issues. Soymilk is low in fat, sugar and in gluten. It does not contain any cholesterol or lactose, but it is high in fibre, contains calcium and is known to promote bone health. Therefore, it is little wonder that it appeals strongly to a great many people.

SPX Flow Technology has over 30 years of experience in soy processing gained in the course of manufacturing, installing and supporting major projects in a variety of countries around the world. The SPX recommended process is designed to use available commercial soybeans to produce a high yield of soymilk with a universally acceptable taste and mouth feel whilst maintaining a high nutritional value. A wide variety of final products can be formulated from the soymilk base. These also include fermented products similar to yoghurt and frozen product in the style of ice cream.

However, SPX understands it is critical that the product formulation of soymilk is tailored to the specific market at the processing stage. For example, being a common customer requirement, there is the option of inactivating the oxidizing enzymes that cause a bitter, bean-like taste. There is also the option of producing a formula with lower/higher fat or sugar depending on the expectations in different

countries or regions. This is because a typical soymilk formulation for sale as a non-dairy milk alternative in Europe, the USA, Korea, Japan, Latin America or Australia would contain from 3-4% protein, 2-2.5% fat, with up to 2% or no added sugar. In contrast, the soy-based soft drinks popular in Malaysia, Thailand, Singapore, China and Vietnam usually contain 5-15% added sugar and a lower protein content.

The soy processing steps are adapted to the needs of each particular application and the desired outcome, however the following is typical of the numerous plants already installed by SPX:

Soy Processing

Early in the process, the soybeans are dehulled (this is desirable to avoid off flavours and to improve yields), they must then be blanched immediately to avoid oxidation. In the SPX process, blanching is carried out in a solution of sodium bicarbonate at a relatively high temperature to hydrate the soybeans for easier grinding to inactivate undesirable enzymes. This is also where the oligosaccharides are washed out as well as any residual sand or dust. Grinding takes place in a highly efficient 2-stage grinder and further water or thinned soymilk may be added at this stage to give the desired protein content in the finished product.

Removal of insoluble fibres is essential to give good mouth feel in the finished product and a decanter centrifuge that removes up to 99.8% of the sediment solids accomplishes this. A second stage process further reduces the level of soluable solids carried by the very hygroscopic fibres to improve the overall yield of soymilk.

Direct steam heating followed by flash cooling and vacuum deodorization is then used to inactivate enzymes, kill bacteria and remove unwanted volatile flavours.

At this point the process changes from continuous to batch, using three formulation tanks, one filling, one emptying and one holding the batch being formulated by the addition of water, sweeteners, other flavouring agents and possible fortification ingredients such as vitamin B12 and additional calcium.

To improve stability and prevent fat separation, a stabilizer and emulsifier is then added after which the product is homogenized by forcing it through tiny orifices under great pressure. This breaks down the fat into small, evenly distributed particles that give a smoother and creamier texture to the finished product.

The SPX UHT process uses either direct steam injection or infusion followed by flash cooling to heat the soymilk to 138-145°C for a precisely controlled time of a few seconds. Since this type of UHT process contributes a further effective stage of deodorization to eliminate the final traces of “bean flavour”, an alternative process is used for markets such as Malaysia where a stronger flavoured drink is preferred. UHT soymilk formulated as a dairy alternative has a shelf life of 6-12 months at ambient temperature, removing a lot of the distribution and logistic issues of a fresh product. Final packaging will depend on the product and the intended distribution channels.

SPX is uniquely positioned to implement soymilk production lines for a number of compelling reasons. Firstly, the vast range of process plant and machinery brands within the group portfolio enables the company to supply the total system. The modular, pre-engineered and packaged plant reduces risk and time to production, which is a significant customer benefit and SPX project engineering teams have extensive worldwide experience in both the process and the relevant utility fields. Finally the pilot plant and application expertise centres in Singapore and Denmark are a unique benefit enabling prospective users to test product recipes and process plant, supported by SPX experts, before committing to a project.

As major suppliers of food processing machinery and a strong emphasis on liquids handling, the many SPX brands are brought together by experienced project engineering teams. They are supported by two specialist application centres with dedicated pilot plants, one in Denmark and one in Singapore. Plant designs are customized to suit the precise needs of each particular application, but by basing the design around highly proven SPX process plant elements, risk is low and the time from conception to production is significantly reduced. Experience shows that plants need to have a capacity of at least 4000 l/hr (equivalent to 700kg/hr of soybeans) to be cost effective. At this size, a payback time of around two to three years on new investment is typical.

About SPX Flow technology:

The SPX Flow Technology segment designs, manufactures and installs highly engineered solutions used to process, blend, meter and transport fluids, in addition to solutions for air and gas filtration and dehydration. The segment supports global food and beverage, dairy, pharmaceutical, oil and gas, energy, and industrial markets. SPX (NYSE: SPW) is a global Fortune 500 multi-industry manufacturing leader with over $5 billion in annual revenue, operations in more than 35 countries and over 18,000 employees. For more information, please visit www.spx.com.

About SPX:

Based in Charlotte, North Carolina, SPX Corporation (NYSE: SPW) is a global Fortune 500 multi-industry manufacturing leader with over $5 billion in annual revenue, operations in more than 35 countries and over 18,000 employees. The company's highly-specialized, engineered products and technologies are concentrated in three areas: Flow Technology, infrastructure, and vehicle service solutions. Many of SPX's innovative solutions are playing a role in helping to meet rising global demand for electricity, processed foods and beverages and vehicle services, particularly in emerging markets. The company's products include food processing systems for the food and beverage industry, power transformers for utility companies, cooling systems for power plants; and diagnostic tools and equipment for the automotive industry. This description of SPX does not contemplate the pending sale of the Service Solutions business. For more information, please visit www.spx.com.

PHOTOS:

SPX Soymilk Processing Plant