

At the forefront of baby food production

By Vagn Westergaard



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To sustain its position as one of the leading companies in China, Heilongjiang Bright-Songhe Dairy Co. Ltd. has invested in a new milk and baby food powder plant.

The Heilongjiang Province in the north-east of China with its bitterly cold winters and relatively short, but warm summers, is one of the most important areas in the country when it comes to milk production:

- ◆ The province covers 4.7% of China's total area of 9,600,000 m².
- ◆ It accounts for 2.8% of the total population of 1.3 billion.
- ◆ 16% of a total amount of 4,890,000 dairy cows live here.
- ◆ 9% of China's milk production of 8,270,000 tons/year comes from here.
- ◆ And they produce 18% of China's total milk powder production of 829,000 tons/year.

About 30 big dairy companies have their headquarters or affiliates in this province. They produce mainly long-life products like UHT milk and milk powder to be sent to the larger cities in the south for reconstitution and distribution. The Fuyu Dairy Factory has operated their factory in Heilongjiang for many years, with their own production of milk powder on processing lines from Niro A/S Denmark.



The Fuyu Dairy factory site.

Shanghai Bright Dairy and Food Co. – with Shanghai Dairy Corporation as a big shareholder and their own Niro milk and baby food plant in Shanghai – has together with Fuyu in 1996 formed a joint-venture company: *Heilongjiang Bright-Songhe Dairy Co. Ltd.*, known for their brand names “Bright” and “Songhe”. The joint-venture is occupying an area of more than 65,000 m². Their main production lines are several UHT plants, as well as two milk and baby food powder processing lines from Niro A/S. The growth of the new joint-venture – which is already ISO9002 certified – is enormous and close to 0.5 million l/day. 95% of the milk is collected from milk collection systems by road tankers, and the milk is checked for antibiotics and paid according to quality. To sustain its position as one of the leading companies in China, the “Bright-Songhe” joint venture invested in a new and modern milk and baby food powder plant including milk reception, pre-treatment, standardizing and wet mixing equipment as well as an evaporator and a spray drying plant. The equipment to receive and process an additional 500,000 l/day of milk (now bringing the total milk reception up to almost 1 million l/day) as well as a modern wet mixing equipment for baby food concentrates were designed and installed by the joint-venture's own projecting team.

The contract for the evaporator and spray dryer was awarded to Niro A/S,

Denmark in 2001. All design work was done in close collaboration between Niro A/S, Niro branch offices in Shanghai and Beijing and the joint-venture company's own project team (see flow sheet).

Evaporator

Special focus was made on the design of the evaporator. Four different products with different solids content, both in the product to be evaporated, but also in the resulting concentrate. This, together with a requirement of different water evaporative capacities, almost 7-fold, to match that of the spray drying plant was a challenge, and so was the energy consumption. A four-effect evaporator with one thermo-compressor placed between the second and third effect, and another after the fourth effect, ensured the overall flexibility and low steam consumption (as low as 0.155 kg steam/kg evaporation including steam also for pasteurising). When the plant is processing skim milk and whole milk, all four

effects are used. When whole milk with 20% sugar is processed, only the last three effects are used, and for baby foods only the last two effects are in use.

The product to be evaporated is preheated before being pasteurised in a direct steam pasteuriser with a regenerative section working as a flash condenser with no heating surface. This serves two purposes: Reduced energy consumption and the possibility to operate the plant for 20 h before cleaning. To ensure top quality products, the steam used in the direct pasteuriser is generated from milk condensate in a "culinary steam boiler". After pasteurisation the product is passed through holding tubes for controlled time and temperature treatment, before the actual evaporation takes place.

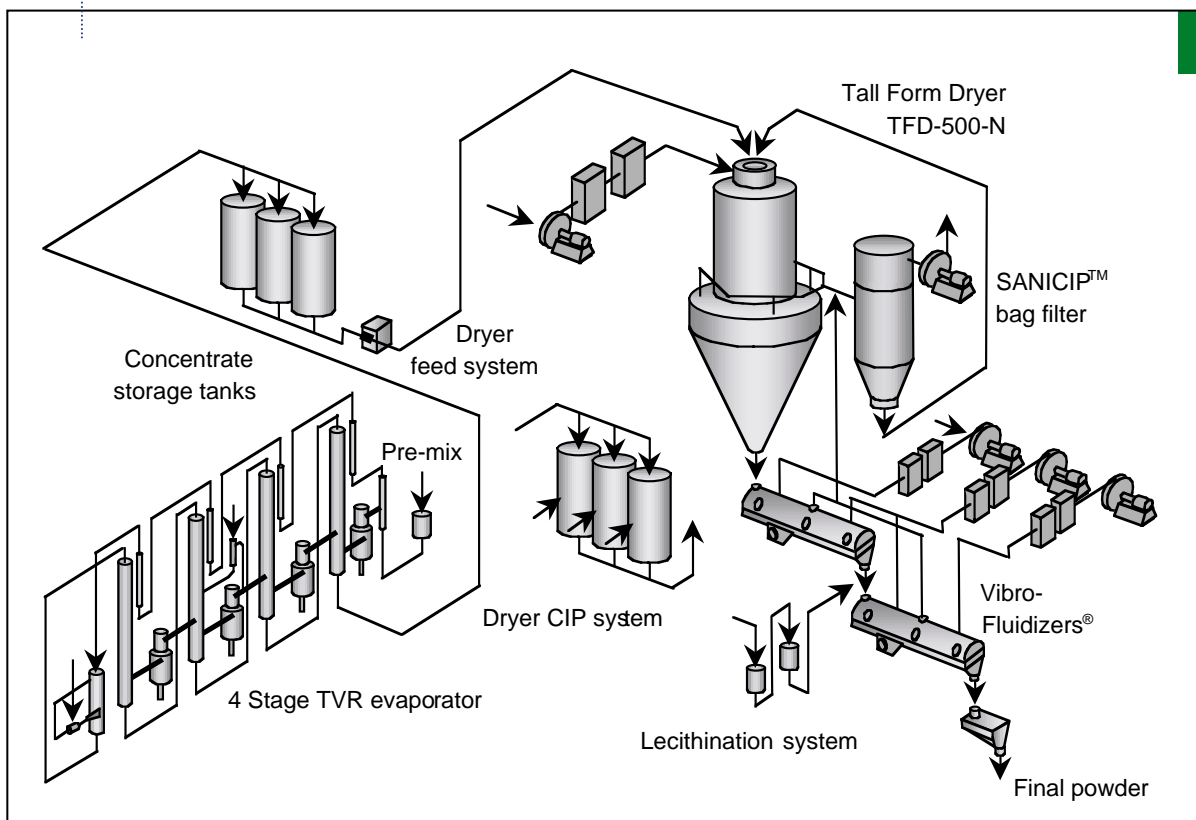
Spray Drying Plant

The spray drying plant chosen by Bright Songhe was a Niro Tall-Form Dryer, used also by all other international major producers of

baby food powders. All process air is filtered in accordance with the strict international requirements for baby food. The main drying air is introduced into the drying chamber through a specially designed air distributor, which ensures optimum mixing of the drying air and the concentrate atomized by means of nozzles. The semi-dry powder is finally dried and cooled in Vibro-Fluidizers where also lecithin can be sprayed onto the powder to produce instant whole milk powder, soluble in cold water.

The air used for drying in the drying chamber and Vibro-Fluidizers contains fines particles, and is therefore passed through powder separators. Bright Songhe is the first company in China to include a CIP-able Bag Filter in their new installation (see photo overleaf). No cyclones are necessary, and a recovery well below the requirements by the authorities is obtained. This also adds to the plant output. The Niro SANICIP™ CIP-able Bag Filter offers many advantages: ➤

Processing line for production of 1.6 t/h of baby food powder.





Sanitary Bag Filter
– SANICIP™.

- ◆ A cylindrical bag housing with spiral-shaped air inlet, which protects the filter bags from severe mechanical (air) impact.
- ◆ A conical bottom with fluidized powder discharge.
- ◆ The bags are purged individually by means of a specially designed reverse jet air nozzle (patented) positioned above each bag (see photo). This results in a very even discharge of powder. The frequency and duration of the purging se-

- quence can be adjusted to suit actual running conditions. The result is a low pressure drop across the filter.
- ◆ Reduced energy consumption and reduced noise emission.
- ◆ The bags are wet-cleaned from the inside towards the dirty outside (patented) by means of clean water.

The bag filter fraction is returned to the nozzle unit for production of agglomerated powders, or to the



Reverse jet air nozzle for individual purging/CIP-cleaning of filter bags.

Vibro-Fluidizer® for regular non-agglomerated powder.

Automation

The plant is fully automated requiring no operator involvement when the plant is started from a complete standstill until the plant operates on product. Automatic report facilities enable management to get a full picture of process parameters at any time, as well as filing of production data like capacity/unit of time.

The new plant started production in August 2002, as planned. With this new investment, Heilongjiang Bright-Songhe Dairy Co. Ltd. has positioned themselves in the forefront of baby food production. The products will be produced at lowest costs in an environmentally correct top quality. With this new plant Heilongjiang Bright-Songhe Dairy Co. Ltd can therefore comfortably take up competition on the domestic market as well as internationally. ■

Vagn Westergaard, Deputy Division Manager,
Food & Dairy Division, Niro A/S,
vw@niro.dk



Vibro-Fluidizers® for powder after treatment: drying and cooling.