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EGYPT'S PIONEERS FACTORY OF THE YEAR

Taking the dairy industry into the 21st century





Raw milk from big dairy farms arrives in road tankers at the plant and is thoroughly tested before it is fed into the storage area



UHT milk filling at Beyti Dairy on an aseptic linear Asbofill machine



A state-of-the-art milk bottle conveying and handling system was supplied by Krones

No milk mirage

Beyti Dairy tackles the Egyptian food market with major new processing & packaging installation

In Western eyes, one of the more unlikely places in which to find an ultra-modern dairy processing plant is in the Egyptian desert, about 70 kilometres south of Alexandria. Unlikely maybe, but a fact, nevertheless. The Egyptian IGI Group has built the new dairy at Noubaria, right beside the desert highway. The privately-owned company has several different types of business in its portfolio and only recently entered the dairy industry. It plans to become Egypt's leading supplier of yoghurt and long-life milk within two years. In the case of yoghurt, IGI has concluded an alliance with Yoplait, while the company will market its own brand long-life milk in HDPE bottles. Further products will be introduced in a later phase.

Freely translated the name Beyti has the dual meaning of "my home" and/or "home-made", and embraces both the brand concept and the dairy that form the basis for these ambitious expansion plans. So far, IGI has had little experience with dairy products, but on the other hand it has enormous marketing expertise and is a major player in the Egyptian economy, turning over an annual 600 \$ million in businesses such as electronics, construction, tourism, exports and oil. The IGI corporation's Vice Chairman Mr Hesham Sheta explained the reasons for building a dairy processing plant: "For many years we have been doing business with Dallah in Saudi Arabia. Back in 1986 they purchased some land to

produce milk and set up a dairy processing plant. In 1995 they decided to dispose of their dairy business and invited us to take it over. We accepted their offer for good underlying strategic reasons." At present, about 85 per cent of Egypt's milk is sold by street traders and small retailers ladling from a churn. However, the population is growing by almost a million people a year. There is increasing awareness of the importance of hygiene and the government is steadily tightening up requirements all round, with the consequence that milk is now increasingly subjected to processing on an industrial scale before it reaches the consumer. In addition, the Beyti site is located only 150 and 70 km respectively from the rapidly growing cities of Cairo (population 19 million), Alexandria and the Nile delta. So this 200 \$ million investment is very well placed to take advantage of a growing market.

It is only by visiting the site that the project's size becomes clear. The dairy area is almost rectangular and covers 7,000 acres alongside five kilometres of the Cairo to Alexandria desert motorway. The dairy processing plant is in the southernmost corner of the land, which is now being transformed into verdant pasture by irrigation. At a later stage of development, the plan is to maintain a herd of 5,400 dairy cattle, supported by a breeding programme and the production and processing of animal feed. The IGI farm has a plentiful supply of water drawn from the nearby Alexandria canal, which is in turn fed by the River Nile and the huge lakes of central Africa. The



Deputy Chief Executive Salah Hafez (left) and General Manager Shamel Abaza are planning a turnover of 40 – 50 \$ million for Beyti Dairy by the year 2003

site already has dwellings for 110 employees, houses for management staff, two hotels and an animal feed mill which was acquired from Dallah. The existing Dallah dairy processing plant is not at present in use, but Mr Sheta is exploring the possibility of its conversion for the production of fruit juice and white cheese.

Set up for expansion

The plan is that Beyti Dairy should eventually process between 600,000 and 1,000,000 litres of milk a day. During the start-up phase which began in July, the initial throughput was 500,000 litres, supplied almost exclusively by big farms, which justified the use of tanker trucks. Milk packing capacity is presently 200,000 l/d, but this can easily be extended at any time because the plant was planned with



In front of the new Beyti Dairy: Eng. Mohamed Sheta (middle), Chairman of IGI, with his sons and IGI Vice Chairmen Hesham (left) and Khaled

an eye to future expansion with plenty of extra space. Beyti's deputy chief executive Mr Salah Hafez told EDM that the buildings can easily be extended almost without interruption to existing production: the production tract extends along a main east-west axis towards the north. The individual processing departments stand apart. The steel-framed buildings have special wall panels supplied by Paroc of Finland, with the result that they can be extended in any direction. The central utilities supply centre



Beyti Dairy manufactures its own plastic bottles



Located right beside the milk treatment department, the process milk tanks can hold up to 335,000 litres



The application of sleeve labels to the plastic bottles is carried out on a Krones Sleeveomatic machine

(electrical energy, treated water, compressed air and steam) is located on the south east side of the main works axis, and has enough space for the installation of additional capacity. Mr Hafez says that at the appropriate time this demand will be met using a "plug & play" installation. The requisite electrical and plumbing connections have already been installed. The very first piece of scheduled expansion took place in August, when a second blow-moulding machine for HDPE bottles was installed by Techne.

100 per cent redundancy

The new Beyti dairy processing plant was set up right from the word go with a view to expansion. In addition, the company has adopted a policy of 100 per cent redundancy with respect to energy supplies and all other key installations. Electricity comes from the 66 kV public network with individual step-down transformers for each department; the electricity company has guaranteed a maximum interruption to supplies of four hours a year. Incoming water is of potable quality but is nevertheless further treated in a double ring pipe by UV-emitters and ozone. Steam is generated by two 7.8-ton boilers supplied by Cleaver Brooks of the USA, one of which is continually on stand-by operation. There is also 100 per cent redundancy for supplies of compressed air (Atlas Copco).

The dairy

The Beyti Dairy building was erected by an IGI subsidiary to a design by Shepherd Design which has achieved an excellent blend of industrial aesthetics and functionality. The overall contractor for the technical installations was GEA with Tuchenhausen Dairy Systems.

The milk is supplied by large farms (> 500 cows) under contract to Beyti and delivered by tanker trucks to a covered milk reception point. Here, milk is discharged automatically through four lines. The quality of the raw milk is good, with a bacteria count in the range 50,000 to 100,000/ml. A strict regime of farm inspections is imposed by the Beyti-QC

team. Each batch is routinely tested for inhibitors (Charm MRL beta-lactam test), a process pioneered in the Egyptian dairy industry by Beyti. The laboratory chief microbiologist is Ahmed Fahmy who has the best possible facilities for modern QC. The lab can test everything from viscosity to the milk constituents and freezing point using equipment from suppliers such as Foss and Funke Gerber. The microbiological laboratory is similarly well equipped, and is capable of testing for pathogenic germs if required. There is a carefully arranged sampling system including the storage of sample specimen, providing a continual chain of proven quality control and product traceability. Hygiene is the first commandment at Beyti. Workers can only enter the production areas through hygiene access locks; within the process plant, access to certain zones is limited to particular members of staff to prevent cross-contamination.

Milk processing

After receipt, the raw milk is held in outdoor silos (total capacity 240,000 litres) for passing to a 15,000 litre/h GEA line with a separate cream heater.

Fat content is standardised by a Tetra Alfast installation, while homogenisation is on a Niro Soavi machine. The process milk then goes directly to a tank store (3 x 80,000 litres, 2 x 40,000 litres, 1 x 15,000 litres) inside the factory, from which it is then passed either to the GEA Finnah UHT installation or to the yoghurt department. All processes including milk acceptance are controlled from a single control centre which uses modern visualisation technology for direct intervention in all stages of the process.

Yoghurt

Before introduction to the yoghurt milk, dry additives such as

stabilisers and flavour ingredients are dissolved in a Scanima unit which is located in its own discrete zone. The yoghurt department was set up by the specialist French company Goavec, and has four tanks for incubation plus a further four for the finished product. The process uses DVS cultures supplied by Chr. Hansen to produce stirred yoghurt, set curd yoghurt, both unflavoured and with fruit. The fruit is admixed in a hygienic high-tech assembly, which can simultaneously dose two different fruit varieties. The finished pure or mixed product is then packed by an FFS machine supplied by GEA Finnah, operating with packaging sterilisation at speeds up to 18,000 cups an hour. Depending upon the type of product, the filled six-packs (stirred yoghurt) are then placed in an incubation chamber holding up to 32 pallets, or transferred to the store via a cooling tunnel, after having been packed into cartons by a Schäfer + Flottmann machine. The German manufacturer Still supplied all of the indoor industrial lifting and handling trucks; this represents the company's first major sale to Egypt.

Long-life milk

After flowing through the tubular heater, long-life milk (skimmed milk plus 3 % fat) passes through a sterile buffer tank to the GEA Asbofill fully aseptic machine

Egypt's capital Cairo with its 19 million consumers is one of the main sales areas for the new Beyti brand



installation. Bottles are held at readiness in eight climate-controlled silos in another part of the plant, and are fed to the bottling station under pneumatic power. The three-laminate HDPE bottles arrive from the bottle blower in a closed and sealed condition and are then opened by a knife blade. The off-cuts are then returned and recycled into fresh granulate (sourced from Solvey). Beyti produces the bottles (250, 1,000 and 1,500 ml) using a Techné blow-moulder, operating at speeds of 2,700 to 2,900 bottles per hour, depending upon their size. Three extruders, each of which produces one of the three laminate layers,



charge the eight-mould machine. The bottles are H₂O₂-sterilised in a ten-track GEA Asbofill linear unit (the first to be installed anywhere) and are then dried by sterile air before filling in

two steps. The bottle is then sealed by an aluminium foil blank which is covered by a screw cap closure. Bottles are then transferred to a Krones conveyer where they receive an UV code (Linx) for internal use. Small packs then pass through a Geyssel drinking straw applicator, a Krones Sleeveomatic sleeve label applicator, a label steam-shrink tunnel, and a Kettner Variopak shrink-wrapper which also forms a carry-handle on six-packs (24-packs of small bottles).

As with the yoghurts, the palletising process is manual, the full pallets being made ready for transport by a Franpack shrink wrapper.

Immediately after the UV-coding the bottles are checked for any faults by a Krones Checkmate, so that only perfect

products find their way to the warehouse. Beyti's entire production process is controlled fully automatically. Profibus and Ethernet link peripherals to the OTAS system, and intelligent functions required at each station are provided by Siemens S7 programmable logic controls. Beyti has

A view on the Beyti site from top of the production building

installed three separate cleaning circuits, one each for raw milk reception, milk processing and the finished product zone. All waste water pipes are in stainless steel and the floor-coverings are in industrial-grade long-life Rundmund tiles. The entire factory has been designed and built to high environmental standards: f. i. energy-saving steam traps have been installed at all the appropriate process stations. In addition, a biological waste water treatment system is now being installed. The employees have an excellent working environment. Production tracts are all well lit and have low noise levels.

Workers also have a canteen, modern accommodation and recreational facilities. In the hot climate of Egypt, it is a luxury indeed to have a manual job within a fully air-conditioned environment.

High hopes

Hesham Sheta and Beyti's General Manager Shamel Abaza have undoubtedly set their sights very high. Following the initial production phase, the aim is for the Beyti Dairy turnover to reach 40 to 50 \$ million by the year 2003.

The plan is then to introduce flavoured and enriched milk drinks, cream cheese, desserts, fruit juices and cheese, especially white cheeses such as Feta or Mozzarella.

Previously, there was no such thing as the Beyti brand, but the aim is to become the market leader for all dairy products in the non-fresh product sector, with the emphasis on long-life products backed by appropriate advertising and promotion. Another objective is to export to surrounding countries, where IGI has well-established trading links. One thing is clear, the Beyti project knows no half-measures and has been carefully thought out and calculated.

The combination of investment capital with the marketing skills of Yoplait and IGI will ensure continued growth in North African and Middle East markets for industrially-processed dairy projects. Undoubtedly this will enable Beyti to give robust competition to the current dairy food market leaders Juhayna, Enjoy and Nestlé. □

