

## Plant iT for the utmost flexibility in beverage production

Even the Near East's leading beverage producer is focusing on the ProLeiT process control system

The Egyptian beverage producer Juhayna is intensively preparing for globalization and growth. The company is not only expanding into new markets in the Gulf region, the Middle and Near East, but is also developing partnerships with global fast food chains and trade organizations. In order to satisfy the increasing worldwide demand for its products, Juhayna has invested in a new fruit juice mixing plant in the Cairo area. To meet its ambitious goals, Juhayna has requested its suppliers to install ultra-modern plants and components for highly flexible and extremely safe production, stringent hygienic standards and consistent product traceability. The ProLeiT Plant iT process control system provides the basis for this forward-thinking approach.

Founded in 1983, Juhayna is one of the most dynamic enterprises in the food and beverage industry in the Middle and Near East. The company originally started in Egypt as a dairy, but rapidly developed into a full-line provider of different milk shake products, fruit juices and carbonated beverages. With its present production capacity of more than 1,200 tons per day, Juhayna is now serving the entire market in Egypt, the Near East, the Gulf region and even Africa. In the meantime, the company's clientele also includes multinational fast food chains such as McDonalds and global trade chains, and Juhayna is even serving customers in countries as far away as the United States. Based on its investment in an entirely new, ultra-modern production plant in the Cairo area, Juhayna is preparing for further growth. In order to secure its international competitiveness, the company relies on the highest possible technical standards of the market leaders. Therefore, it comes as no surprise that Juhayna awarded GEA Tuchenhausen the contract for the design and installation of its new plant with INDAG and ProLeiT as subcontractors. The new Juhayna fruit juice plant is fully automated - including incoming goods receipt, the concentrate store, the mixing plant and all mixing tanks in the process area, bottling and even delivery. The plant's process area is equipped with an Heidelberg mixer and an Heidelberg inline mixer from INDAG, a continuous sugar dissolver (CSD) and 5 high-temperature short-time pasteurizers. In the area of the concentrate store, barrels of

deep-frozen fruit juice concentrates are emptied using a barrel tipper and temporarily stored. In a small-component station, solutions are produced from powders and then made available for further processing in the INDAG Heidelberg mixer. At the pectin dissolving station, powdered pectin is dissolved and also made available as a solution for further processing in the INDAG Heidelberg mixer. Following mixing in the Heidelberg mixer strictly according to the recipe, the product is pasteurized in the high-temperature short-time pasteurizers, or conti-mixed in the INDAG Heidelberg inline mixer, and then transferred to the bottling lines. And, of course, the two CIP plants ensure that strict hygiene principles are followed in all plant sections.

### Network based on Ethernet, PROFIBUS and ASi

Two Siemens S7 controllers communicating with a server via Ethernet provide the hardware framework for the automation. At the bay and unit levels, a PROFIBUS establishes reliable connections to the controllers. Since many valves and initiators used in this plant are designed as state-of-the-art ASi devices, these ASi loops are connected to the PROFIBUS via gateways. Following the example of an increasing number of companies in the beverage industry, Juhayna is focusing on this simple and cost-efficient bus system for the actor/sensor level. Thanks to significantly reduced wiring expenditure, this solution simplifies installation, reduces potential sources of error and provides for increased safety during both commissioning and plant operation. The production areas are equipped with hand-held scanners connected to the Ethernet network via WLAN. These scanners serve to verify the products delivered in containers and other receptacles before making them available for the production process.

### The mixing process is at the heart of a consistent concept

To meet the highest standards in terms of product quality and productivity in fruit juice mixing, Juhayna has decided to implement the Plant iT process control system. A major

#### INFO



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<b>Sector:</b>	Beverages
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<b>Country:</b>	Egypt

requirement was highly flexible process control in order to be able to adapt recipes to both natural raw material variations and changing market demands. Plant iT stands out from its



One of the products that are produced in Egypt – the mango fruit juice of Juhayna.

competitors for its modular design and specific parameterization which replaces rigid programming. Since the entire process - including incoming goods receipt, quality control, incoming order processing, process control, reporting and product traceability - must be mapped in the process control system, ProLeiT has integrated the entire materials management as an autonomous module of the process control system. This sophisticated approach ensures that the use of raw materials, ingredients, flavors and even water can be traced throughout the entire production process, and thus ensures a maximum level of transparency with regard to a product's composition and production. The ProLeiT Plant Direct iT module provides for the connection of actors and sensors to the automation system. This sophisticated concept ensures operation, monitoring and process visualization. The Plant Acquis iT module serves for data acquisition and reporting during the entire production process. But the core component for process automation is Batch iT, because all the recipe details are stored in this module. What is so unique about Batch iT is the fact that all data concerning

- the ingredients of a mixture,
- the quantities of raw materials and
- the parameters for the production process

is updated and edited separately. This data is classified according to so-called bills of materials and process descriptions in the database. When starting a mixing recipe, the plant operator automatically selects the bill of materials assigned to the desired product, and the system automatically suggests the related process description. This linkage is the prerequisite for an executable control recipe processed by the controllers (PLCs). Since the process control system requires information concerning the entire materials inventory, Plant iT is structured in such a way that even the incoming goods receipt is interlinked to the automation system. At the Juhayna plant also, the raw materials are recorded in the system only after a quality check and release. And, of course, all information concerning a product, including its date of expiry, is recorded in the database. This functionality is playing a major role at the Juhayna plant because fruit juice concentrates are delivered in barrels as described above. The system ensures the temporary storage of concentrates in the corresponding tanks without any risk of confusion. The plant operator is notified accordingly if a recipe prescribes raw materials or pre-mixtures which are not available

from a tank farm at the plant, but require ingredients which have to be added manually from containers or other packages. The Plant iT materials management module automatically follows the First In, First Out principle. The integrated residual materials management system monitors the current inventory. Based on re-calculated batch sizes, it ensures that no residual quantities are left at the end of a batch. In order to ensure that the container selected by the system is actually connected to a dosing station, the operating personnel must verify it using a hand-held scanner and send a corresponding confirmation to the process controller via WLAN. This sophisticated approach prevents any confusion of raw materials.

### Traceability included

What is essential in this context is that the recipe control recognizes each material with all its important parameters, as well as all dosing organs and dosing paths. The accounting records, which are indispensable for tracking, can only be created afterwards. Full traceability and unique transparency of products are essential features of the ProLeiT system and highly appreciated by Juhayna - because without these functionalities, a company is no longer competitive in international markets. Furthermore, this unique concept of particularly flexible parameterization is ideal for the Juhayna product range. It not only allows the mixing of a large number of already existing recipes in this plant, but new beverage recipes can be conveniently integrated into the process control. The control of CIP procedures is another major advantage of this concept. In Plant iT, each cleaning process is stored as a recipe with the required ingredients, quantities and process descriptions and then processed in the same way as any other product recipe - and, of course, all details are automatically recorded.

### Simple process control and diagnosis

Workstations distributed all over the plant provide options not only for process monitoring, but also for order entry, fault diagnosis and message and alarm acknowledgement - depending on the level of authorization of the individual employee. This highly flexible concept also allows the operator to perform technological adjustments outside the control room directly in the field. In addition, numerous ASi loops are fully integrated in the diagnostic system. Faults and alarms are directly displayed in the process image, independently of where they occurred in the plant, and can be localized with precision down

to the individual module. The service personnel can specifically trace back and fix the module or a broken cable; time-consuming searches are no longer necessary.



Packages while leaving the filling station.