

Maselli Misure in the tomato processing industry

An increasingly competitive market is forcing the tomato processing industry to seek out innovative technological solutions aimed at optimizing plant performance and enhancing product quality. The main aim consists in obtaining a high level of quantity and maximum product quality with minimum expenditure in raw materials and energy costs. The entire sector is fully aware that reaching this goal depends greatly on process automation and on improving Quality Control. For years, Maselli Misure, in collaboration with those operating in this specific sector, has been developing and testing equipment to meet these requirements. Today Maselli Misure is a reliable business partner offering global solutions for process automation and Quality Control. When tomatoes are delivered, throughout processing procedures and in the laboratory, Maselli is there offering specific, accurate and reliable analysis and control systems, which ensure the user can continuously supervise and check the incoming raw materials and plant performance. All the devices allow for PC interfacing for the collection, processing and printing of data. And customer satisfaction does not end

with the consignment of equipment; Maselli offers post-sales services available all over the world thanks to a consolidated network of branches, agents and exclusive dealers. Despite the wide range of products and services already available, Maselli is continuing to invest in research and human resources in its aim to become the most qualified business partner in terms of experience, professionalism and technological know-how. The information registered by our instruments is indispensable for food chain traceability, in accordance with the UNI 10939 standard for tomato "Controlled Quality". In fact our systems provide essential data for creating data banks connected to traceability systems. For example, the "SV01 tomato consignment evaluation system" can be described as the starting point of computerization for the traceability cycle. In fact for each and every consignment, as well as the usual values for quantity of discarded product and quality parameters such as °Brix, pH and colour, other significant data relative to the raw material is also recorded; for example, the name of the supplier, the seed source, the cultivation techniques applied and so on.



Maselli: an international group contributing to the evolution of liquid analysis.

Maselli Misure has been making a decisive contribution to know-how and technological evolution in quality control and liquid analysis systems since it was established in 1948. Today it is one of the few Italian companies in a position to design and directly produce: evaluation of raw material consignment systems; both on-line and laboratory multiparametric liquid analyzers. Collaboration with industries operating in diverse sectors and con-

present with all its structures and products in all the industrialized areas of the world. The Italian and European markets are continuously assisted by a widespread and efficient network of branches and agencies which refer directly back to the Italian head office.

In order to meet the needs of our overseas markets we have operative subsidiaries: Maselli Measurements in Stockton, USA, operating in North America;



stant commitment to research and experimentation, means that Maselli Misure can boast unique experience and consequently the necessary skills to globally resolve the most varied problems concerning analyses. A versatile and flexible organization allows Maselli Misure to be

Maselli Measurements de Mexico operating in the central American market; Maselli Misure Asia Pacific, with its main office in Australia, for south-east Asia.

Maselli Misure is a tight-knit group which guarantees professionalism, know-how, quality and service everywhere.

EVALUATION CENTRE

The SV01 station

Evaluation of the quality of the tomato entering the plant, once considered a facultative operation, has today become indispensable. The new technologies applied to the cultivation and harvesting of the raw materials create incoming lots with incredibly variable characteristics as



opposed to the more homogeneous lots of the past. This is why it has become necessary to introduce evaluation parameters to identify, when a load enters the plant, the Quality of the consignment and the quantity of unacceptable product. The system to evaluate consignments in use today is based on the 'discarded product' and waste value and on the value of certain physical-chemical parameters such as Brix, pH and colour. It is customary to collect this data manually and pass subjective evaluations. But the effectiveness of any method is far greater when it can be carried out in a manner which is strictly objective and repeatable.

Only a specifically designed sys-

tem, which integrates and automates the various operations can guarantee the observance of these guidelines, safeguarding the transactions between cultivator and plant administration. Maselli Misure is specialized in this technology and has been creating integrated systems for incoming tomato consignment evaluation for many years. The SV01 module represents the fusion of all our experience.

The SV01 station for:

- Evaluating quantity of discarded product: non-tomato waste and tomatoes which are damaged, diseased, green etc.
- Defining product °Brix, pH and colour
- Processing the collected data,



calculating the detraction % .

- Printing of a provisional document for the consigner which includes: producer's personal details, products main characteristics and the evaluation results.
- Disk storing of all data for later processing.



This is where you will find us: from raw m

In the tomato processing industry our instruments find applications:

In quality evaluation areas

Our SV01 is designed to be located in the evaluation area where it evaluates the quality of incoming consignments and the amount of waste product (the quantity of unacceptable product) they contain.

In concentrate production processes

In continuous concentrate processes it is essential to carry out continual Brix value measurement in order to be able to use it as an input signal for the automatic process control loop.

In the production of consumer products

The production processes for

sauces, pulp, purée, peeled and chopped tomatoes need continuous analyzing units for piloting the automatic °Brix, pH and salinity control loop.

In the preparation processes of preserving liquids

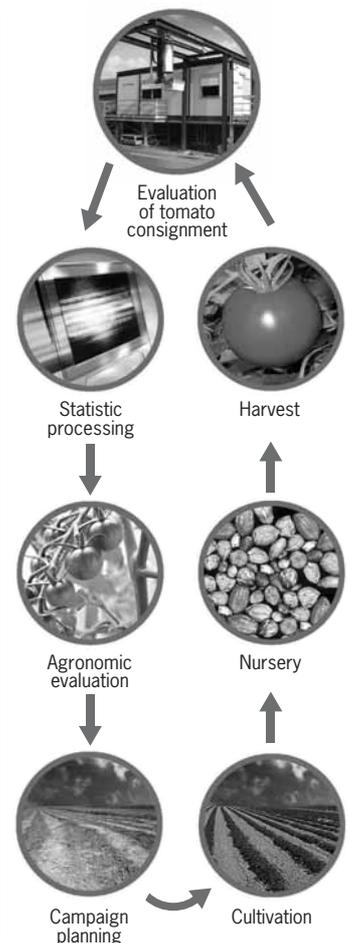
The processes for preparing preserving liquids with batch or continuous systems are also piloted by analyzers which determine concentration, pH and salinity.

In the laboratory

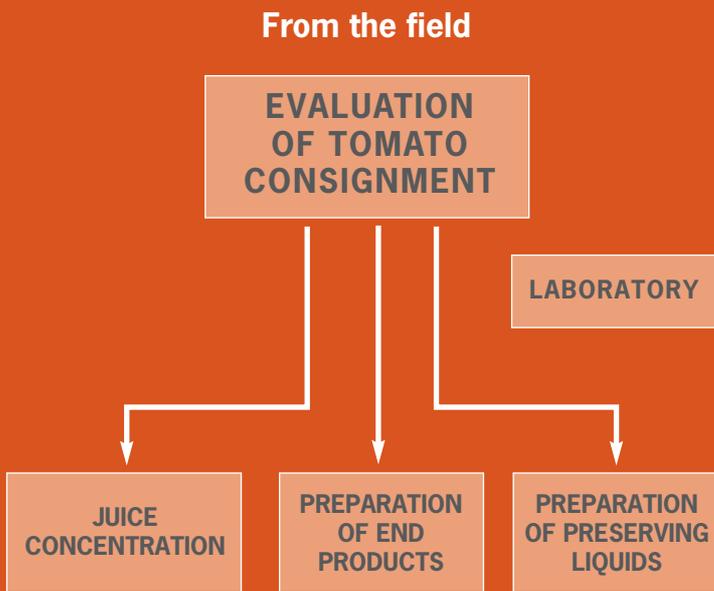
Maselli Misure is present in the laboratory with its refractometers for Brix measurements and spectrophotometric analyzers for measuring degrees of colour and pigment percentages.

SV01: "The road to Quality begins here!"

Improving end product quality is the aim of every Tomato Processing Plant. To reach this goal, improving the Quality of the incoming Raw Materials is of the utmost importance. For this reason, research activities undertaken by the agronomy department are fundamental. The agronomist works mainly on the data and statistics archived from previous campaigns. Until now, the collection of data during a campaign was partial and often arbitrary, hence bearing little significance. The introduction of the SV01 system has made detailed data collection and archiving on all incoming consignments possible. The mass of collected data ensures complete statistical research can be carried out once the campaign is over. The processing of this data means that the next campaign can be planned in safety, defining all the interventions necessary to improve the product: from the type of seed to soil treatment and so on, this characteristic is certainly the most important feature of the SV01 Station.



material reception to the production line.



CONCENTRATE

The most important process for any tomato processing plant has always been the making of concentrate. The process begins with juice extraction. The juice is extracted by centrifugal force in the refining plant, to separate it from the skin, seeds and a part of the cellulose content. The juice thus obtained, which has an initial water content of approximately 95%, is then sent to the concentration process in multistage evaporators, which under vacuum at relatively low temperatures (60-70° C), eliminate a part of the water contained in the juice. Depending on the dry residue level reached, expressed in °Brix, different end products are obtained: concentrated tomato juice (7-8 °Brix), thick tomato purée (7-10 °Brix), tomato concentrate (18-27 °Brix), double concentrate (28-35 °Brix) and triple concentrate (over 35 °Brix). In multiple effect (or multistage) continuous concentration systems, extraction of the concentrated product can already be carried out, at least in



part, in the very first stage for products such as concentrated juice and purée. While the most concentrated products are obtained at the final outfeed. It is therefore necessary to be able to control concentration levels from the very first stages, as well as at final product outfeed, in order to guarantee, via automatic regulation, the desired °Brix. The UR24 on-line refractometer is the latest process Brix measuring device developed by Maselli Misure. This equipment is the result of over 50 years of experience. It can be used in all the measuring points required thanks to its wide scale range, precision, temperature resistance and sturdy construction which can withstand high levels of vibration. This apparatus, through the analogue 4-20mA output can be connected to a PLC or the continuous system regulator. By using the RS485 serial output, it is possible to have remote control over the apparatus and to connect it to sophisticated data acquisition systems.

PREPARATION OF FINAL CONSUMER PRODUCTS

Puree, pulp, sauces, peeled and chopped tomatoes

The tomato processing industry, apart from making tomato concentrates, also prepares other products such as purée, pulp, sauces and peeled and chopped tomatoes etc..... For these specific production processes, Maselli Misure offers a series of analyzers and regulating systems for measuring and if necessary modifying the °Brix, pH, salt % values in both continuous flow preparation and batch preparation in cisterns or tanks.



The regulation of °Brix can be carried out by adding concentrate or water as the case requires, or by mixing products of different °Brix in order to obtain an intermediate concentration. The regulation of pH, by citric acid dosing is carried out both in plants with continuous dosage and plants with vats for batch preparation. In the first case the ratio of citric acid and product is determined by the flow (with correction pH measuring), whereas in the second case an appropriate dosing system will add the citric acid pro rata, depending on the pH delta. The Maselli pH regulating systems are equipped, on request, with automatic calibration systems which significantly simplify control and calibration operations. Salt % regulation is normally executed in continuous systems based on the relation between product and brine flow.

PRESERVING LIQUIDS

Citric acid, brine, souse

Many kinds of packaged products, such as peeled and chopped tomatoes, as well as sauces, apart from having a solid content also contain a preserving liquid. Preserving liquids are prepared by special processes. For the preparation of these liquids, Maselli Misure offers °Brix, salt % and citric acid measuring and regulating systems. Preserving liquids are usually produced in batches in discontinuous systems, such as:

- citric acid dissolvers,
- salt dissolvers
- souse preparers with pH and °Brix control

The refractometer and pH and salt measuring devices find applications in all these preparation systems to solve the problems of dosage control. For the quality control team, automatic preparation guarantees the certainty that all the ingredients are added in exactly the right quantities thus avoiding unpleasant hiccups. By simply inserting an analyzer, the operator can be alerted immediately to any anomalies; if an automatic dosing system is then added, preparation is all but infallible. The level of automation in process systems depends very much on the type of plant in question and the way in which the production cycle is managed.



LABORATORY

LR01 and LR02 Laboratory Refractometers

The LR-01 and the LR-02 "Easy Start" laboratory refractometers with microprocessors are instruments supplied by Maselli Misure for laboratory



use. This equipment has been designed to be precise, sturdy, compact and easy to use. The LR-01 version is renowned in the tomato sector for its precision and capacity to directly register the °Brix for products such as double and triple concentrates. The simplicity of calibration (simple auto-zeroing with distilled water), the possibility to introduce user scales for direct measurements of citric acid, brine, caustic soda and peroxide solutions, as well as many other products, have made this the best apparatus for many quality control supervisors who need a simple, reliable, precise and flexible tool. The LR-02 version, thanks to its battery power sup-

ply and its carrying handle, make this an easy to transport and simple to use piece of equipment which does not need connecting to a power supply. Both models have a waterproof keyboard and a stainless steel body so that they can be safely operated directly in the production area. By simply lowering the cover, without the need to press a single button on the LR-02 "Easy Start" or by pressing the "Start" button on the LR-01 model, the apparatus measures the sample's refractive index, calculates the level of concentration (Brix or User), displays the relative value on the back-lit LCD panel and sends the recorded value to an optional external printer or to a PC. These models are manufactured using state-of-the-art technology, which guarantees a high level of precision and reliability, such as **the sapphire prism, the LED long-life light source and high-resolution digital optical CCD sensor.**



LC01 Colour and lycopene measurements

The LC01 Spectrophotometric Colorimeter is the latest laboratory apparatus developed by Maselli Misure to measure lycopene and a/b - L indices in tomato derivatives. Designed to



be precise, sturdy and easy to use, thanks to its continuous reference system it does not require repetitive calibration. The innovative and original method of detecting lycopene directly on the product has become an indispensable aid for controlling this parameter throughout tomato processing operations. The interface with Windows using a touchscreen, makes using the software easy and direct, so that all its functions and potential, such as spectra, graphs, data storage, transmission and printing can be used to the full. The waterproof screen and stainless steel body mean that the apparatus can be used safely in the production area. This equipment has been developed using state-of-the-art technology, which guarantees a high level of precision and reliability, such as the vertical optical unit, the LED long-life stable light source and high-resolution digital optical sensor. The equipment does not need calibrating and any necessary tests can be carried out using the classic BCR tomato standard red tile, whereas for measuring operations it uses special glass and PVC sample cups.

MASELLI MISURE s.p.a.
43100 Parma - Italy - Via Baganza, 4/3
Tel. +39.0521.257411
Fax +39.0521.250484
info@masellimisure.com
www.masellimisure.com

MASELLI MEASUREMENTS, INC
7746 Lorraine Avenue, Suite 201
Stockton, California, USA

Maselli Measurements de México S.A. de C.V.
Plan de San Luis No. 101 Int. 301
Col. Coecillo
C.P. 37260 León, Gto. México

Maselli Misure Iberica
c/Industria, 309 - 1º 2ª (E-08041)
Barcelona (ESPAÑA)

Maselli Misure France
Parc d'Activités de Gémenos
Les Espaces de la Sainte Baume, 28
30 Avenue du Château de Jouques
13420 GEMENOS

Maselli Instruments Systems
PO Box 6459 - Northampton - NN4 9WP

Maselli-GSA GmbH
Hölzlestraße. 26 - D-72336 Balingen

Maselli Misure Asia Pacific
P.O. Box 219 - Roseville NSW 2069
Australia

REPRESENTATIVES
Canada - Guatemala - Brazil
Perù - Chile - Argentina
Denmark - Belgium - Netherlands
Switzerland - Rumania - Slovenia
Greece - Turkey - Iran
Israel - Tunisia - South Africa
Bangladesh - Pakistan - Burma - India
Cambodia - China / Hong Kong - Fiji
Indonesia - Japan - Korea - Laos
Malaysia - Singapore - Philippines -
Papua New Guinea - Taiwan - Thailand
Vietnam - New Zealand



LYCOPENE IN TOMATOES

For good measure

Tomatoes contains both lycopene and beta-carotene; they are both carotenoids but they produce different effects. Beta-carotene is a precursor of vitamin A, while lycopene recently became well-known as an antagonist to free radicals after its antioxidant properties were discovered. It is also beneficial in the prevention of cardiovascular problems. Lycopene is found in the whole of the tomato fruit, substituting chlorophyll during the ripening process which is favoured by exposure to sunshine and mild temperatures. The lycopene found in tomatoes

remains active even after cooking. A European study has substantiated the influence agronomic factors and genetics have on the lycopene content in tomatoes as well as its stability to processing and preservation and its antioxidant properties. As a result hybrid tomatoes with a high lycopene content have been developed. In the laboratory the need for an analyzing unit capable of directly and rapidly detecting this parameter has become more and more apparent. Maselli Misure has been quick to find the perfect solution.