

Citrus processing

Citrus juices, concentrate, essential oils and citrus by-products





Your partner for citrus processing

Popular worldwide for their taste and nutritional values, citruses are one of the most complete and versatile fruits. This fruit family stands, amongst other, of orange, tangerine, lemon, lime, grapefruit, etc. First cultivated in the Eastern world, orange is nowadays one of the most cultivated fruit in the whole world and orange juice could be considered as one of the most consumed breakfast complement.

The citrus fruits are an interesting alternative in production, and not just for their juice, since from those fruits it is possible to get pulp, fiber, essential oil, and from the peel, when processed adequately, animal food.

Nowadays citrus processors are looking for alternatives to grow while increasing the portfolio of products they can process as well as their productivity and yield. This improvement is possible by automation and industrialization of the process by new systems and control devices.

Our engineering center is located in the biggest European area for citrus growing and processing (South of Spain). We have built some of the major plants in this area, and our expertise in citrus processing is unique in the European market.

We work to fulfill both: our clients' requirements and all other different factors such as the local industrial legislation, citrus type, production capacity, budget and other requirements. Our lines are manufactured following the latest market trends.

During harvest season time is a critical factor to avoid citrus deterioration, and our clients plants need to run continuously during this period. For this reason efficient and reliable machinery is mandatory to handle production and product quality.

MachinePoint Food Technologies develops integrated solutions for the production of

- Concentrate
- Juice
- Pulp
- Essential oils
- Pulp dehydration
- Other complementary lines to process citrus by-products

Our equipment and lines include:

- Receiving, storage, washing and grading area
- Juice extracting lines
- Juice finisher
- Juice pasteurization, concentrators and evaporators
- Essential oil extraction and centrifugation
- Industrial Aseptic Filling
- Aseptic Storing areas
- Frozen product line

International standards for design and quality

Our equipment designs and construction follow the best manufacturing practices and hygienic design principles, achieving strict standards, following EU and international regulations for equipment design and fabrication, including CE-approval and 3-A SSI Certification.

Also our equipment and process design comply with production and energy efficient requirements.

Great quality / price relationship

We have a unique business model where our clients can get a complete production solution with a great price / quality relationship, thanks to our capacity to integrate used machinery into our projects. Supported by our sister company MachinePoint Used Machinery, we can include in our projects reliable and affordable top brand and high quality second hand machinery.

Leadership in innovation

We are aware that keeping ahead with technological innovations is key to being competitive; in order to satisfy our customers' requirements MachinePoint Food Technologies R&D department is always looking for new technologies, developing processes and equipment alternatives.

Our range of brand new equipment includes extractors, evaporators, reduce product loses during production, aseptic product storage systems, and more.



Defining the right manufacturing process

"A correct definition of the manufacturing process will lead to a competitive advantage. Choose well not only the equipment but the process too."

Citrus processing

MachinePoint Food Technologies supplies equipment and process engineering for the processing of fresh citrus into juice, concentrate and several other products obtained from the by-products left over from juice pro-



duction: essence oils, press liquor, citrus molasses, d'limonene, dried peel.

Citrus processing is challenging as the goal is to maintain the fresh fruit qualities as untouched as possible, and yet obtain the maximum yield out of the citrus. Orange and other citrus processing plants should be located near to the citrus growing areas, so that the fresh fruit can be processed as soon as possible after harvesting, as temperatures in citrus growing areas tend to be high and fruit deteriorates quickly. Consumer citrus juice plants can be located anywhere and next to consumer markets, as juice can be made out of concentrate.

Citrus juice, NFC juice, concentrate juice

Juice is the most important product to be obtained from citrus. Orange by-products - pulp and peel - represent about 50% of the oranges, and they can be further processed into other marketable products.

There are two types of juices: NFC juice, meaning Not from concentrate, to define those juices that come from

fresh citrus and frozen concentrate orange juice, to define those juices that come from citrus concentrate. MachinePoint Food Technologies supplies processing lines for the transformation of citrus into both types of juices.

The general process could be described as the following. After the washing and grading, citrus are cut in half and pressed in different machines according to their size. Peels are evacuated on one side and juice on the other side. Cells are removed by passing the juice through a refiner in order to discard solid particles.

After it has been clarified by centrifugation, the citrus juice for concentrate is concentrated by falling film evaporators and then packed into aseptic bags for industrial distribution and storage. On the other hand, not from concentrate juice is directly pasteurized and stored in aseptic storage.

Citrus essential oils

Since citrus peels contain a large amount of oil, they are used to obtain essential oils, much in demand in food and perfume industry as flavoring and perfuming agent. Various techniques exist to process essential oils. Once citrus juice has been extracted, the remaining peels are evacuated and then cut to squeeze the oil out. It is also possible to prick the peel before washing it and recollecting the oil coming out of it. It is then separated from water by using centrifugation.

MachinePoint Food Technologies manufactures distillation lines for capacities of 6,000, 12,000 and 30,000 liters per hour. Lines for other capacities can be built upon request. Distillation systems are integrated into the sterilizer or can be provided as a fully independent control unit.

The oil obtained from our distillation lines appear colorless as they are drawn out in the right conditions. In other distillation processes, with poor conditions, the oil gets polluted with juice components and takes on a murky color.



Evaporator



Cooling tank

Selecting the right equipment for each process

Citrus reception & washing area

Depending on our clients' requirements and product availability, there are two main ways to deliver and unload citrus at a factory. Fruits can be unloaded using dry systems and stored in a ventilated warehouse in order to allow their conservation up to 15 days. Their processing takes place as soon as possible.



When the factory is running 24 hours a day, citrus can also be unloaded in reception pools filled with water by injecting water into the trucks through mobile hoses to discharge the fruits. This process gives it a first wash, and helps removing all the field dirt and leaves. They can also be unloaded using other methods.

Our citrus reception area with water unloading system includes a recirculation pump, staff platform, sludge and dirt discharge, and air water bubbling system.

Sorting and grading areas

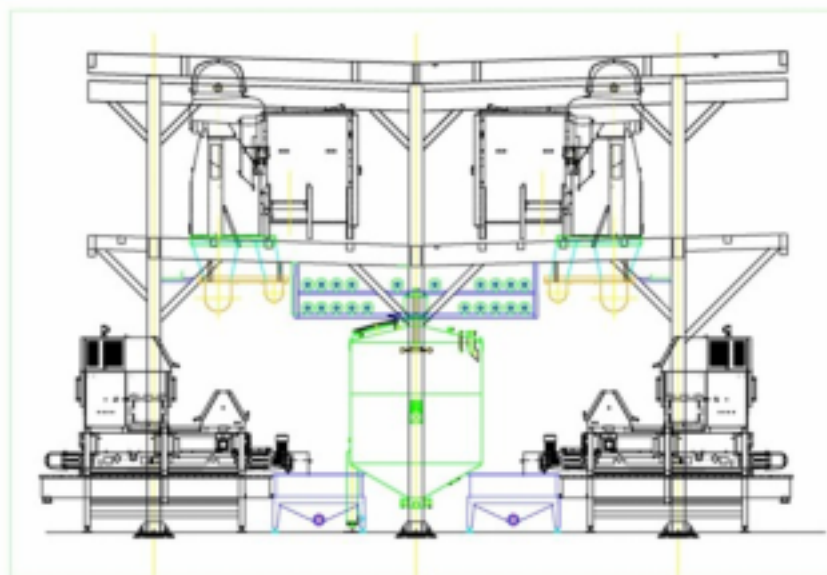
After reception, citrus are carried by conveyors and elevators to be further cleaned and graded. On the sorting tables, a human inspection is performed to remove any damaged or spoiled product, as well as any residual materials. A grinder is then used to sort out citrus according to size to send the fruits to defined extractors to take maximum profit of the fruits and reduce losses.

Our equipment in sorting area consists of an elevator conveyor, watching units and citrus sorting or selection units.

Citrus extracting area

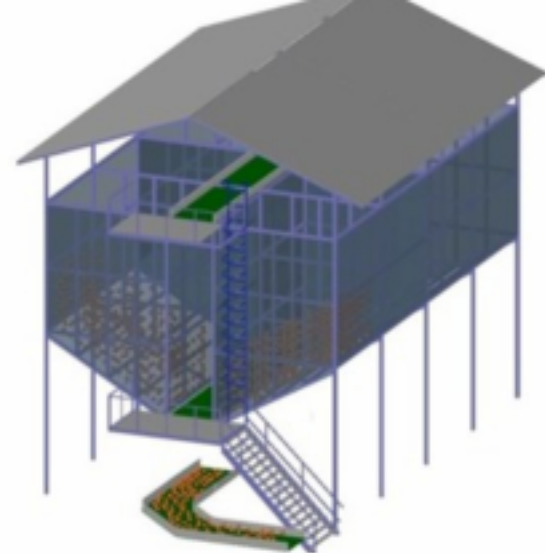
After the citrus have been washed and sorted, each one goes to the suited extractors. There are many different types of extracting systems to choose from, of which it depends on the final product, production method and budget. A good extractor line is key to obtain a quality juice and a good yield.

Our extraction takes place on an elevated platform; fruits are cut by blades to allow extractors to press them to get the juice. Peels and seeds are discarded on one side and the juice containing pulp goes on the other side.

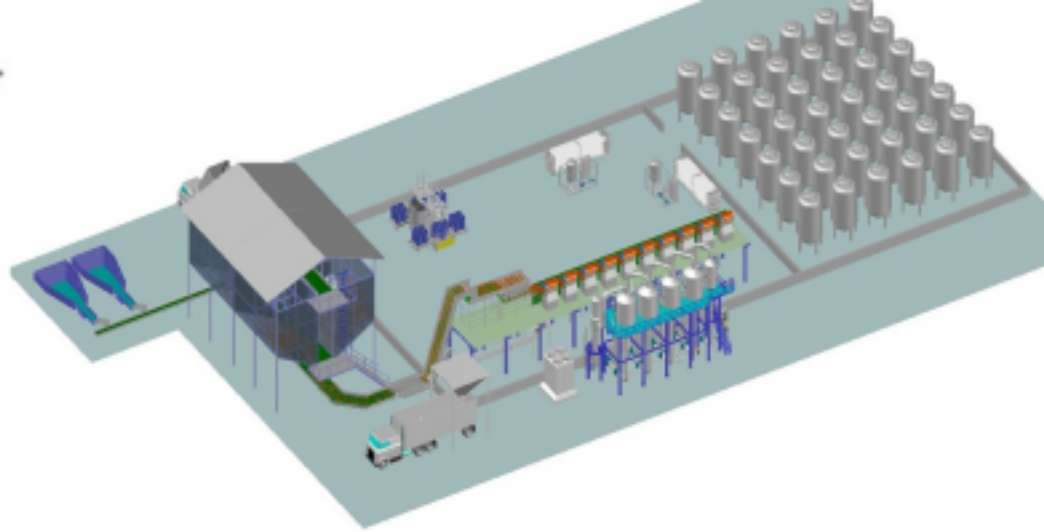


The extractors included in our projects stand of five cups with variable diameters according to our client requirements, a pre filtering system to ensure production quality and efficiency and a regulation system.

Juices coming from different extracting lines are mixed and blended to obtain a homogeneous flavor and acidity.



Citrus ventilated warehouse



Citrus processing plant

Juice finisher

Pulpy juice passes onto finisher machines that separate the juice from the pulp. Pulp resulting from this process will go to pulp recovering units. In order to separate the pulp from the juice, a centrifugation operation takes place. The juice enters the finisher, there a fast rotating blade throws the product against a perforated fabric, that retains the pulp and allows the juice to pass through.

Our finisher stands of a regulation system to allow various sizes of perforation. In order to improve the product quality and avoid the product oxidation during the process, our system has an optional accessory to work under inert atmosphere, (nitrogen), getting a very high quality product compared to traditional ones.

Juice pasteurization

At MachinePoint Food Technologies, we believe in aseptic technologies to ensure the safety and quality of the final concentrate. Pasteurized concentrate or juice can now be processed and packaged whilst retaining their initial properties: organoleptic qualities and nutritional properties.

Flash pasteurization is a process than consists in heating the product in 0,15 seconds to preserve its organoleptic characteristics. We use our own tubular heat exchangers branded Gemina made out of stainless steel and using the latest orbital welding technology. Our system includes a monitoring unit to control production flow, sterilization temperature, residence time and sterilization degree.

Juice will follow now into the filling and packaging lines to obtain NFC juice. An aseptic storing area will be required for the production of NFC juice.

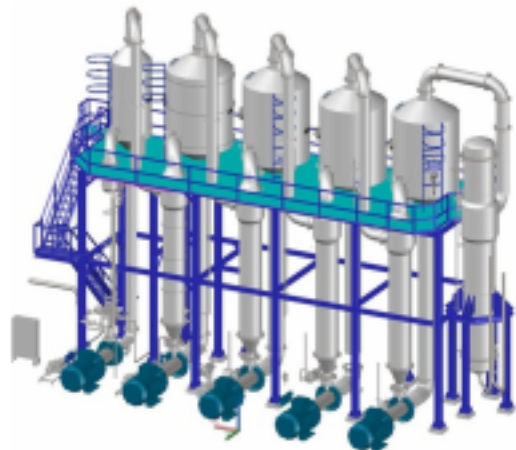
To produce citrus concentrate juice, juice follows onto the evaporation process.

Evaporation

We offer different types of evaporators, depending on the size of the plant and on its yield.

For smaller plants, we recommend falling film evaporators. They are suited to heat sensitive products.

After entering the evaporator at the head, a thin film of the product to be evaporated flows down the side of the heat exchanging tubes. Steam condenses on the outside of the tubes supplying the required energy to the inside of the tubes.



For bigger plants, we can offer a thermo accelerator evaporator, known as Thermally Accelerated Short Time Evaporator (T.A.S.T.E.). It is suited to any type of citrus juices.

This evaporator has been designed to reach a 65° Brix juice concentration with a product output temperature under 15°C. The complete process is ran at the speed of sound, so that the product stays as little time as possible in the evaporator, since the product short exposure to high temperatures preserves its organoleptic qualities.

The evaporation takes place when the juice is heated to a certain temperature under very low pressure; this condition allows it to boil under 100°C. The product finally passes through a cooling chamber before it exits the evaporator.

The evaporator consists of a product distribution unit, a tubenest heat exchanger, a liquid-vapor separation chamber, a transfer pump and a PID and PLC automatic control system. The machine is operated through an easy-to-use interface.

All evaporators are designed to be mounted on a self-supporting steel frame, simplifying the packaging, transportation, delivery and in-place assembly.



Finisher



Pasteurizer

Industrial Aseptic Filling

We have an extensive experience in aseptic filling in different food industry sectors. Our Gemina aseptic filler consists of two cylindrical heads with vertical motion, mounted on a stainless steel structure.



The vertical motion control allows highly accurate filling without the use of elevators and also the possibility of using different aseptic bags sizes.

The sterilization of the filling nozzle is achieved by 110 °C steam in a sealed chamber.

The clean product circuit, completely protected through sterile steam barriers and automatically controlled, includes dosage control by weight, vertical movement with gradual heads to provide weight control and keep the filling chamber clear, continuous operation heads and high filling efficiency.

Aseptic Storage

In order to be able to attend the consumer market demand throughout the whole year with a high quality product, MachinePoint offers aseptic storages.

Aseptic storage allows the preservation of these products for long periods of time under optimal conditions at room temperature. There are 4 types of aseptic storing:

Tanks: to store from 1000 liters to 4 million liters. They are gallons that can contain several million liters.

Drums: made out of metal or cardboard, they store up to 200 liters. They contain a sterilized plastic bag

inside. This is the option most suitable for small producers where the bulk product is sold in small consignments. The product inside has been previously sterilized. They can be shipped worldwide without needing refrigeration. For packaging these drums, we use aseptic fillers for drums. They allow for air-less sterile packaging.

Bins: 1000 kg capacity. This system is identical to the storage drums described above, except that the container in this case has a 1000 kg capacity. They may also be made out of cardboard or wood. They are best suited for medium production levels and long distance shipping.

Canteens or aseptic farms: For huge quantities or self storage. They are constituted by tanks from 25,000 liters to 4 million liters.

MachinePoint Food Technologies manufactures aseptic storage cellars with stainless steel. Automated loading and unloading is done under sterile conditions. Robotic welding assures the canteen sterility. To sterilize the tanks, steam is injected, and subsequently replaced by sterile nitrogen. For the larger containers chemical sterilization is used to ensure the tank integrity. Thanks to the nitrogen atmosphere within the tanks, there is no product oxidation and product life is extended to over 1 year.

CIP systems

CIP (Clean in Place) units come in a wide range of capacities and automation level according with the system design and process requirements. Our units could include from 3 to 7 tanks depending on if a recovery cleaning solution is necessary or not, or if an additional disinfection solution is needed.

They will be designed and customized according to the production line, since the CIP capacity must fit perfectly the line configuration, production capacity, product characteristics and requirements.





Heat Exchangers

Our CIP system could include a full automated system, that provides continuous monitoring and control of cleaning parameters, including flow rates, chemical concentration, temperatures, cleaning time, and all the variables required for full process validation.

Technology

Machine Point Food Technologies is constantly looking for new alternatives and developing proposals to bring to our clients the best manufacturing practices and equipment with high efficiency and performance standards.

Our process equipment built in conjunction with our partner comply with European standards and the highest quality requirements on the industry. We invest in our people and in our managing and construction resource in order to provide our clients with the most affordable and reliable technology to promote knowledge in the area of technical development, research and production. Our clients can be sure that MachinePoint Food Technologies will respond in a quick and reliable way to their specific needs.

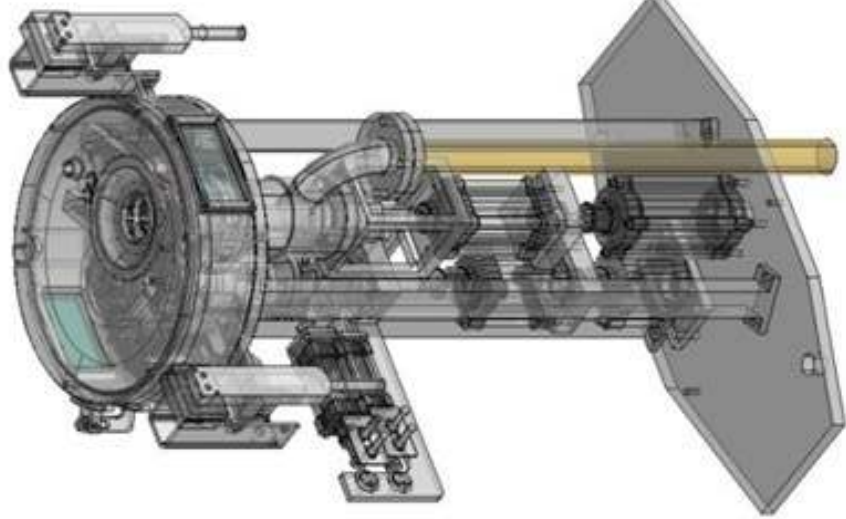
MachinePoint Food Technologies guarantees that all matters related to your project will be taken into consideration to ensure a tailor-made solution exactly suited to your needs.

As part of the engineering and automation system configuration we supply: project design and layout, equipment selection, drawings and list of material, maintenance and operation manuals.

Installation, configuration and PLC logic programming of the global automated system, touch screens Siemens, electrical panels and cabinets, control wiring, main computer (PC) and control software license.

After-sales services

As MachinePoint Food Technologies aims at achieving complete customers satisfactions, we are involved during every single steps of your project, from the product design to production start, including after-sales services. Because we want to be your technical partner and support time after time, our services involve project concept, production start and the required technical support to continue with the production, improve the products characteristics and capacities during the following years.



Industrial bag-in-drum filling head

Our after-sales program includes a permanent support service with service and maintenance that takes effect directly after your plant has been set. Customer support also includes defined maintenance and individual inspection agreements to ensure fault-free, reliable operation, and to keep your plant running efficiently for years. A comprehensive range of services are available throughout the entire service life of your plants, all designed to achieve maximum productivity and economic efficiency. We act as procurement office for spare parts and undertake everything needed for successful operation of dairy plants.

In order to contribute with our client's production continuity, we organize staff training.

Easy to use operation and control system

One of the driving forces of our designers is to make the operation and control of our equipment simple and reliable. For this purpose, we follow in our designs ergonomic and functional standards and our equipment are being continuously updated with the last manufacturing developments.

We use high-quality components and equipment from the market top brands, contributing to reach high reliability, high performance and low maintenance in our systems.

In order to bring additional confidence or guaranty, our units are designed, manufactured and pre-tested in our facilities in Spain before being shipped to our clients. We offer on-the-job training for our clients' personnel during the installation, set-up and commissioning.

24/7 Technical assistance to our clients

Our 24/7 technical assistance team is focused on helping our clients when it is most important, when it is needed! Our systems include an automated control system with the possibility to be connected to internet at your request, allowing our technical team to have access to the system via internet, directly from our technical service office and helping to solve the situation. This way most problems can be solved immediately, reducing shutdown time and trouble-solving costs.

Head Office - Europe
Parque Tecnológico de Boecillo
Edificio C.E.E.I. - 2.01
E - 47151 Valladolid
Spain
Tel: +34 983 549 900
Fax: +34 983 549 901
Email: foodtechnologies@machinepoint.com

Engineering Center – Europe
Poligono Industrial Los Romerales
Parc. 3 y 4
30520 Jumilla - Murcia - España
Apartado Correos 231
Email: foodtechnologies@machinepoint.com

India
39, Rajdhani Bungalows,
Near Ramwadi, Isanpur Road
Ahmedabad – 382 443
India
GSM: 0091 997 997 5617
Tele/Fax: 0091 79 65492585
Email: india@machinepoint.com

North Africa
71, Rue Jilani Marchand 2034 Ezzahra
Ben Arous
Tunisia
Tel: +216 98 31 14 90
Tel/Fax: +216 79 48 45 21
Email: africa@machinepoint.com

Turkey
Rasımpaşa Mah. Meltem Sok. NO:13/A Kadıköy/İstanbul
Türkiye
Tel: +90 554 577 2166
Tel: +90 212 414 27 49
Email: turkey@machinepoint.com

France
Tel: +33 975 181 356
Email: france@machinepoint.com

Mexico
Tel: +52 442 348 6609
Email: mexico@machinepoint.com