

DELLA TOFFOLA

Fruit juice production lines



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Ceramic cross-flow filtration system

A technique allowing a microbiological stabilization of raw apple juice that prevents abnormal fermentation by adopting continuous cycles that do not require filter aids.

The search for new techniques in the food industry that improve final product quality by optimizing the production cycle while reducing costs drives company interest towards processes with greater and greater automation that also ensure that all the uniqueness of the product's territory of origin will be maintained intact.

This is why Della Toffola offers its cross-flow filtration system with the exclusive use of ceramic, rather than organic membranes.

Although these ceramic membranes have been used for years elsewhere such as in pharmaceutical sector, for example, they have become popular in the fruit juice industry only recently, primarily because they provide finished products that are ready for sterilization and bottling without requiring further processing phases, such as the addition of kieselgur, which is also notoriously difficult to eliminate.

The latest Della Toffola research on cross-flow filtration focused on its application to fruit juice, specifically on the production of raw apple juice. Here, cross-flow filtration is performed immediately after pressing, in this way ensuring the product's organoleptic quality without compromise.

In a nutshell, the production cycle with Della Toffola machinery begins with the loading and washing of the apples and is followed by crushing with a special Mohno pump and the addition of pectolitic and cellulase enzyme for the squeezing of the apple pulp, pressing to obtain the juice, cross-flow filtration, and final pasteurization.

The primary purpose of cross-flow filtration is to obtain the microbiological stabilization of the product that prevents abnormal fermentation by adopting continuous cycles that do not require filtration adjuvants like kieselgur.

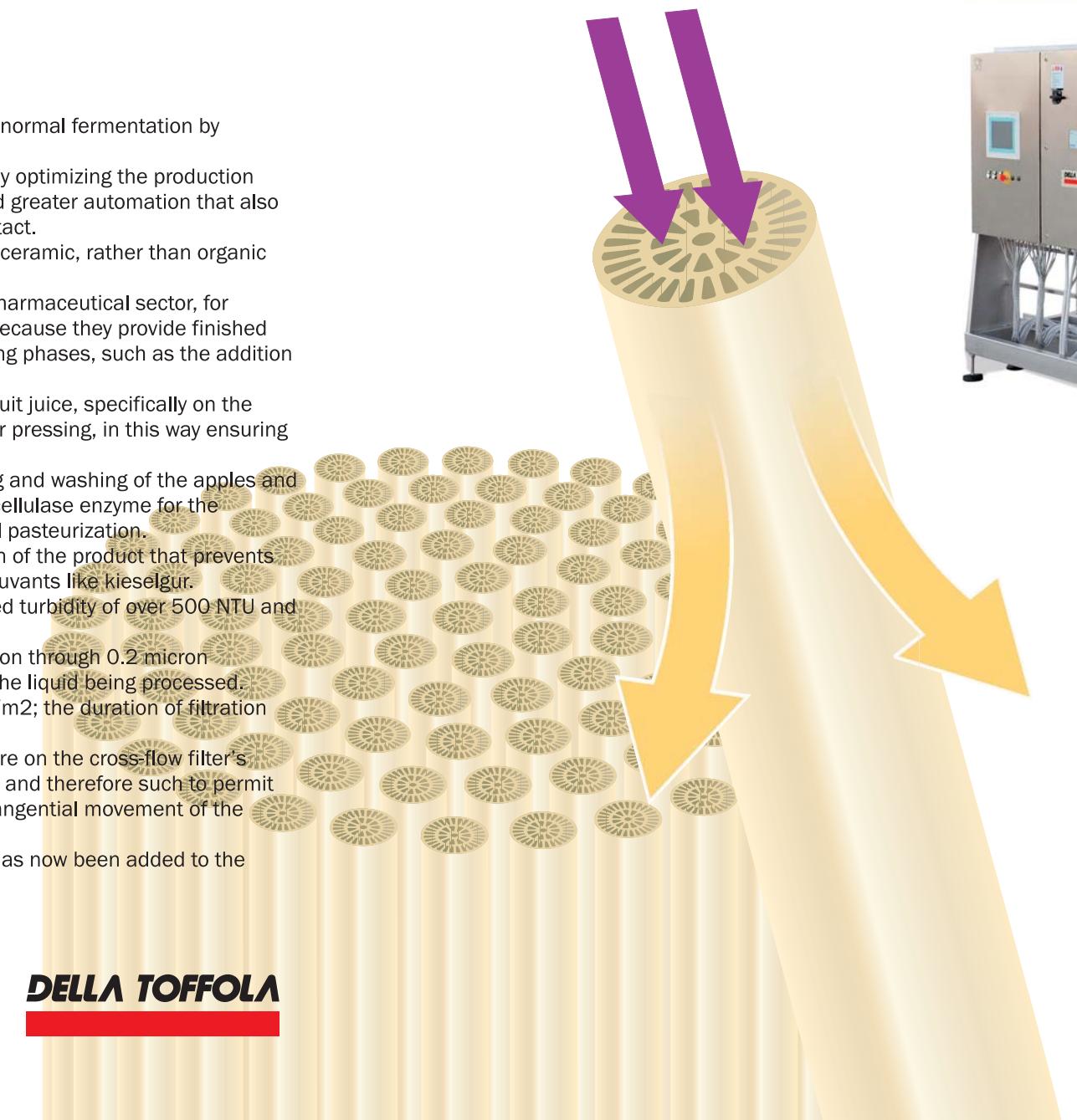
In our study, the juice obtained from the pressing of the apple pulp had a fairly elevated turbidity of over 500 NTU and a rather marked stratification of the suspended solids due to the enzyme used.

Further testing led to the establishment of the definitive method with cross-flow filtration through 0.2 micron membranes with 6 mm diameter feeding channels and a temperature of 40-45 °C in the liquid being processed.

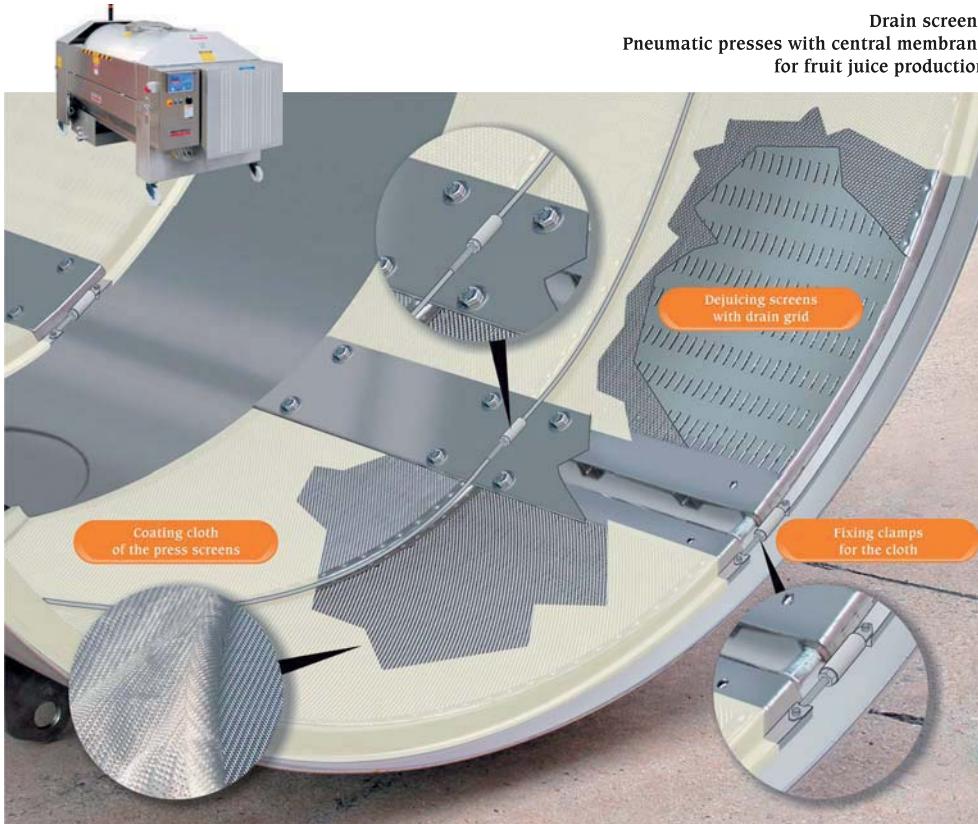
This solution fully satisfied every need instantly: average flows stabilized at 70-90 l/h/m²; the duration of filtration permitted the complete depletion of the product while avoiding work flow problems.

This was possible also thanks to the programmed increase in trans-membrane pressure on the cross-flow filter's computer. The product's suspended solids were much larger than 0.2 micron porosity, and therefore such to permit the automatic and continuous cleaning of the membrane thanks to the effect of the tangential movement of the concentrate contained in the filter.

A qualified new application of the technique that complements others already in use has now been added to the range of Della Toffola filtration.



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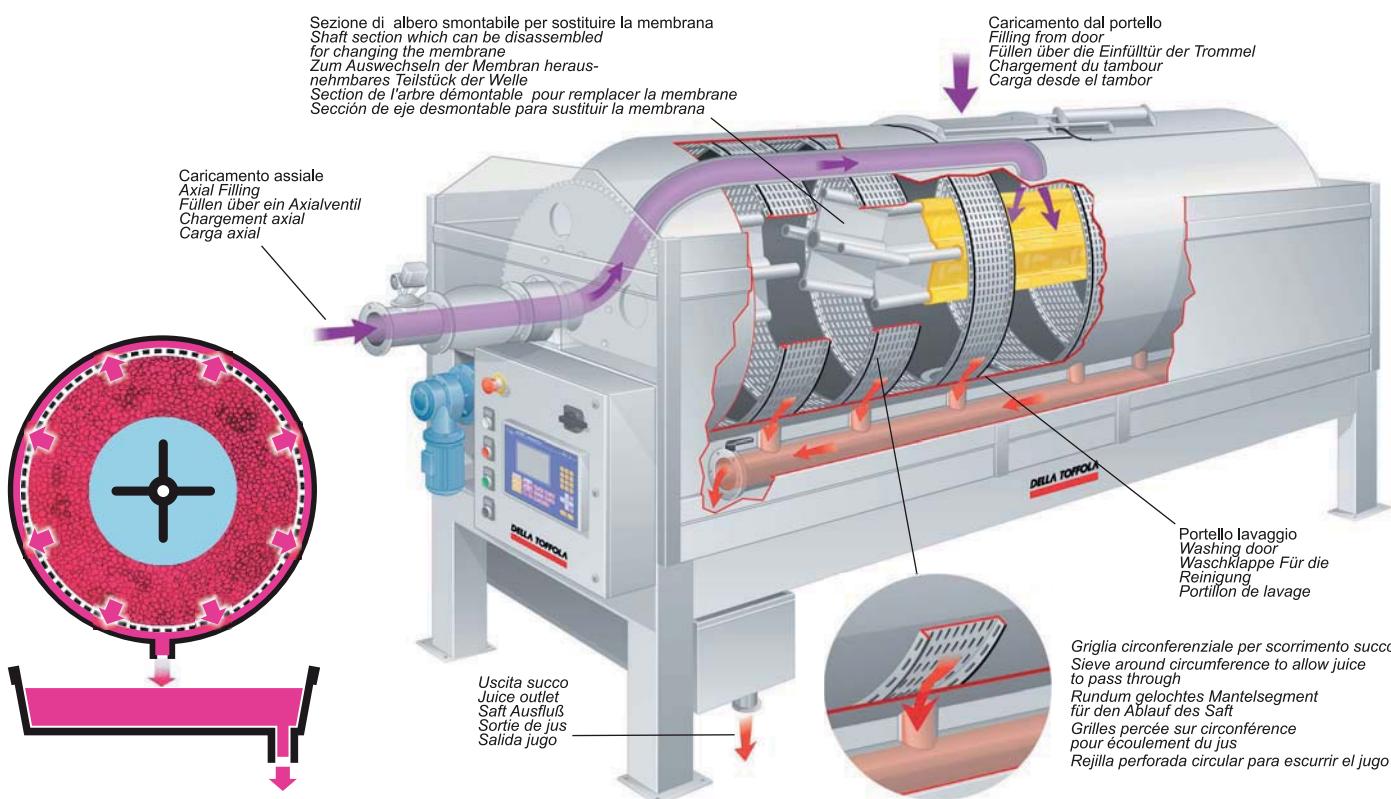
Drain screens
Pneumatic presses with central membrane
for fruit juice production

PEC/PFC

Pneumatic Presses version with circumferential sieves

Unlike other types of presses, the membrane in Della Toffola's models is mounted on the drum axis and presses on its entire inside surface when inflated, not just half of it, thus doubling the dejuicing surface.

- 1) The dejuicing surface is doubled in relation to other presses with the same dimensions;
- 2) The total pressing time is dramatically cut by half. The pressing is carried out at a lower work pressure with fewer pressing and cake breaking phases, thus reducing handling to a minimum;
- 3) The product is distributed in a uniform layer inside the press over a surface of a full 360° (See figure).
- 4) Drain screens and clothes easy to clean.



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