

CASE STUDY



Resin Filters Increase Flavonoid Pigment Extraction From Juice

- **Project:** Natural Colors Recovery
- **Location:** Reggio Emilia, Italy

A bioscience technology plant in Italy wanted to increase its natural pigment extraction from fruit and vegetable juices while reducing the use of alcohol and thermal energy during the distillation process.

- **Solution:** Food & Beverage Processing
- **Technology used:** Adsorbent and strong cationic resins

This case study explains how Fluence developed and installed a juice and color extraction system that reduced the production cycle while lowering the plant's operating expenses.

Background

Demand has been increasing for food and vegetable concentrates, and natural color additives. A global bioscience technology company that develops and produces natural ingredients for the food, nutritional, pharmaceutical, and agricultural

industries has been looking for new ways to optimize its formulations to reduce production costs and complexity, whilst simultaneously improving the quality of its products.

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Challenges

The firm's Italian factory wanted to implement a process that would increase its extraction of anthocyanins and enocyanins from fruit and vegetable juice, while reducing the amount of

alcohol and thermal energy used during the distillation process. The company chose Fluence to design an innovative extraction system to increase its production of these flavonoid pigments.

Solutions

Fluence designed and implemented a new extraction system which consists of two floating-bed adsorbent resin filters. The production takes place from bottom to top, while the color recovery is performed from top to bottom. Each filter is equipped with two inner drainage plates placed at a higher and lower level, and each can hold up to 10,000 Litres of specialty adsorbent resins.

These filters thoroughly reduce the dilution of the juice to be treated and the volume of regenerants during the phases of production and regeneration. Distillation of the hydroalcoholic solution obtained through regeneration produces an aqueous solution containing anthocyanins and enocyanins, and alcohol, which can be reused again in the process.

Results

The fruit or vegetable juice that results from the extraction and the distillation processes features the same chemical composition as the juice before treatment, but it contains much lower levels of anthocyanins and enocyanins. Regeneration with alcohol produces a hydroalcoholic solution which contains the extracted flavonoids at levels up to eight times higher than the processed juice, depending on the type of juice.

Because this new extraction and regeneration process makes use of high bed depth and high-quality resins that both improve adsorption capacity, it requires a lower alcohol consumption. As a result, the company has increased anthocyanin and enocyanin extraction, while reducing the amount of thermal energy needed during the distillation process.

Advantages of our technology

- Low regenerating caustic soda consumption due to the counter current regeneration
- No supply and disposal cost for active carbon
- High absorption capacity due to high bed depth and quality of the resins used
- Reduction of organic load to WWTP (energy savings)
- No Atex plant, authorisation and distillation column required

