



## Clear and stable apple juice!

The production of clarified and stable apple juice poses a challenge to the beverage industry. Today, this type of apple juice is produced by what are called microfiltration and ultrafiltration membrane technologies. These automated technologies offer a definite advantage in terms of productivity. However, certain juices can be very acidic and particularly rich in proteins and tannins; in such cases, membrane fouling can make the technology less attractive for apple juice clarification. It would be impossible to go back to the old clarification technique, which could take up to 20 hours and involved several steps, including the use of large quantities of enzymes to break down the pectin, followed by the addition of a clarifying agent (such as gelatine) to the freshly pressed juice to precipitate the proteins

and tannins. It was necessary to wait until everything settled to the bottom before filtering it all through a filter press.

### A solution to the problem of membrane fouling?

Fouling of microfiltration/ultrafiltration membranes is largely attributable to the high level of tannins and proteins in the apple juice. The solution to the problem of fouled microfiltration/ultrafiltration membranes could well be pre-treatment by **electroflotation** (Figure 1). An electric current applied to electrodes placed at the bottom of the tank splits the water molecules in two, and tiny bubbles of hydrogen and oxygen form at the surface of the electrodes. The bubbles rise to the surface, bringing the particles with them,

and it is then a simple matter of removing the layer that forms at the surface of the tank and filtering.

When the pectin is first removed from the apple juice, electroflotation treatment can reduce the tannin content by one third. When gelatine is added, up to 50% of the tannins and 75% of the proteins are removed, making filtration that much easier.

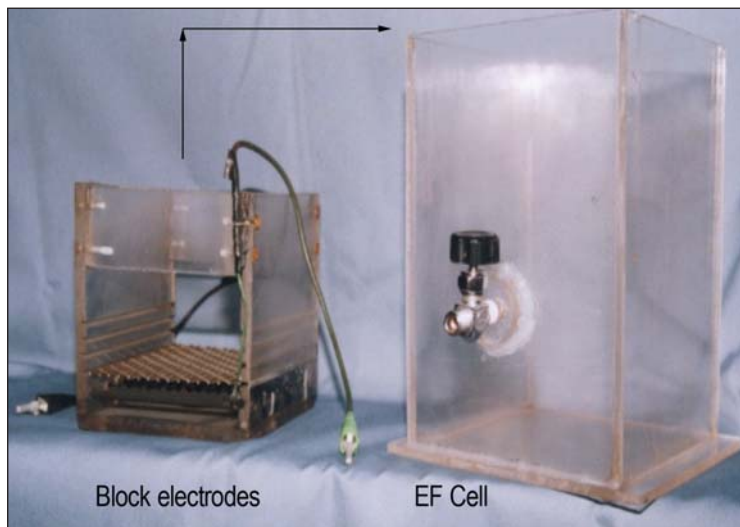


Figure 1: Electroflotation cell

An advantage of this technique is that neither the Brix level (content of soluble solids, including sugars) nor the pH of the apple juice is affected. In many cases, the result is even clearer than juice that has been clarified by the traditional methods, and always equally flavourful (Figure 2).

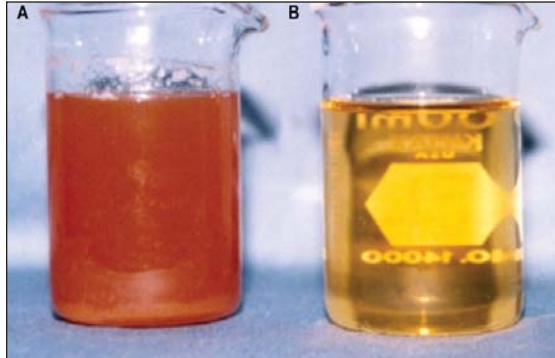


Figure 2: Juice before (A) and after (B) clarification

For more information, please contact:

François Lamarche, Ph.D.  
Research Scientist  
Francois.Lamarche@agr.gc.ca

Martin Mondor, EIT, Ph.D.  
Research Scientist  
Martin.Mondor@agr.gc.ca

Food Research and Development Centre  
Agriculture and Agri-Food Canada  
3600, Casavant Blvd West  
Saint-Hyacinthe, Quebec J2S 8E3  
(450) 773-1105

[www.agr.gc.ca/researchcentre/sthyacinthe](http://www.agr.gc.ca/researchcentre/sthyacinthe)

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SPCS (G. Lessard)