COEI-1-MEMOSM Reverse osmosis membranes

1. Objective, origin and scope of application

A reverse osmosis membrane is a membrane belonging to the group of semi-permeable thin-layer composites (known as TFC, or Thin Film Composites).

Reverse osmosis is a must-enrichment treatment. It entails the use of a membrane to remove pure water, thus increasing the concentration of sugars and other constituents in solution in grape musts.

2. Principle underlying the procedure

This is a physical process for removing a portion of the water in a must using a semi-permeable membrane acted upon by a pressure gradient at ambient temperature and without changing or degrading its condition.

The equipment used consists essentially of a so-called « booster » pump which feeds a high-pressure pump (under 100 bars, for example) which allows osmotic pressure to be overcome, a membrane block and control apparatuses such as a flow meter, pressure indicator, pressure regulator, etc.

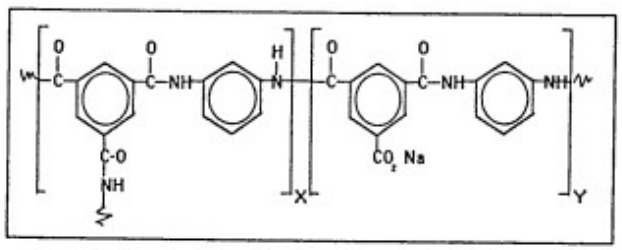
3. Composition

All equipment used in this Prescriptions must be in compliance with the regulations concerning fittings which come into contact with foodstuffs (pipes, pumps, control apparatuses, joints, etc.) and in particular, the reverse osmosis membrane.

The substances which make up the membrane must be in compliance with the regulations in force.

These membranes ares prepared by *in situ* polymerization of a polymer on the surface of a porous substrate. The substrate is typically an polysulfone ultrafilter. The thin layer serves as a discriminating membrane, while the porous substrate provides physical support.

As an example, the structural formula of the polyamide base is as follows:



4. Implementation

During the manufacturing process, the membrane passes through a number of extraction baths containing hot water in order to eliminate traces of solvent and residual monomers.

In particular, under normal or unforeseen circumstances it cannot give off any constituents which could pose a threat to human health (with respect to the component most easily measured, i.e., sodium chloride, in particular, it should exhibit a substance-retention rate greater than 99%). It must not cause an undesirable change of the composition of the grape must (or of a solution containing 170 g/l of sugar and 5 g/l of tartaric acid neutralized to a pH of 3.5 by potassium hydroxide), nor can it alter the organoleptic properties of the must.

5. Membrane Regeneration

As regenerating agent, the operator can use inorganic products permitted under the regulations, provided that the operation ends by washing with water so as to completely remove the regenerating agent before adding the must.

6. Limits

All equipment/materials in contact with food products must be in compliance with the standards in force.

There should be no perceptible change of the organoleptic properties of the processed must.

Any release of product or derivative constituting a constituent of the membrane must be less than 50 µg/l in its entirey, which is the recommended value, and it must comply with the regulatory limits governing the specific migration of the various materials constituents.

7. Special restrictions

Membranes may be supplied only by approved suppliers or distributors.

Use of the membrane must be monitored and restricted by :

- installing a time meter and a volumeter which are sealed at the permeate outlet,
- the physical impossibility inhering in the process of increasing the concentration of the must beyond the established threshold.