RESOLUTION OENO 3/95

REVERSE OSMOSIS MEMBRANE

THE GENERAL ASSEMBLY,

IN VIEW of article 5, paragraph 4 of the International Convention for the Unification of Methods of Analysis and Appreciation of Wines of 13 October 1954,

ON THE PROPOSAL of the Sub-Commission of Unification of Methods of Analysis and Appreciation of Wines,

DECIDES:

TO supplement the International Oenological Codex with the monograph "Reverse Osmosis Membranes for the Enrichment of Musts"

Object

Reverse osmosis is a treatment used exclusively for musts, by means of a process using membranes, to eliminate pure water and thus increase the sugar level and other constituents in grape must .

The technique has found a variety of applications over a period of more than twenty years (drinking water from sea water, concentration of fruit juices, coffee, etc.)

Implementation

This is a physical method of partial removal of water from must by the use of a semi-permeable membrane under the action of a pressure gradient at an ambient temperature and with no change of state.

The principle of implementation indicates the simplicity of the technique. The equipment essentially consists of a force- feeding pump at high pressure pump (typically 100 bars) to overcome osmotic pressure, a membrane block and control apparatus, gauge, pressure indicator and regulator, etc...

Composition

All the materials used in the process, including the reverse osmosis membrane, conform with the regulations concerning materials in contact with food (pipes, pumps, control apparatus, etc.). The membrane is part of the TFC (Thin Film Composite) family of membranes.

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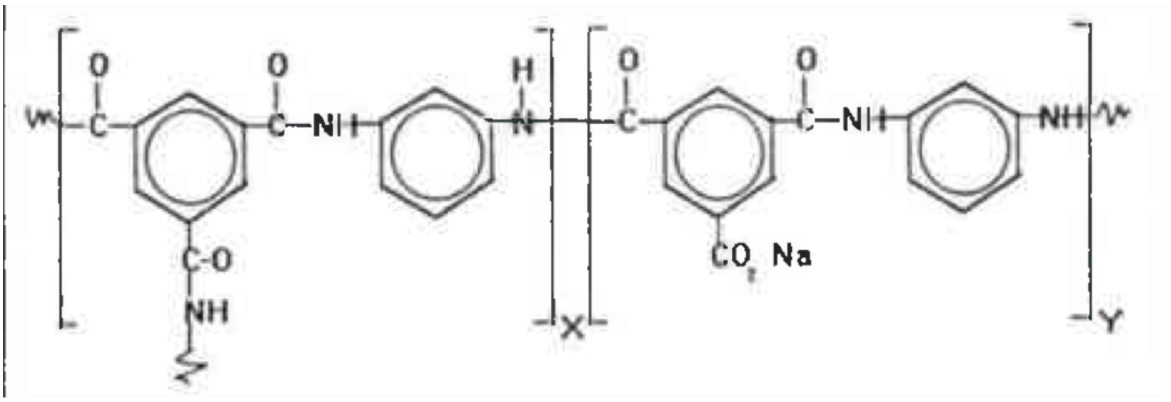
The substances involved in the composition of the membrane conform to current regulations.

These membranes are prepared by an in situ polymerisation reaction on the surface of a porous substrate. The substrate is usually an ultrafilter of the polysulphone type. The thin film acts as a discriminant membrane, while the porous substrate acts as physical support.

The advantage of this manufacturing technique is to allow use of the combination of materials which would be difficult to use individually. For example, a membrane can be constituted from a reticulate aromatic polyamide, formed by interfacial polymerisation on a porous substrate of polysulphone. It would be impossible to prepare the reticulate polyamide separately, the product being completely insoluble in organic solvents.

The structural formula of polyamide base is as follows:



Stages of the manufacture :

The implementation is as follows:

A polysulphone solution is deposited, using a level application with a knife, on a non-weaved polypropylene matrix. The polysulphone is condensed and forms a porous ultrafiltration membrane.

The polysulphone membrane thus prepared by a polymerisation process. The two components necessary for the formation of polyamide (1,3,5 trichlorotricarboxybenzoic acid and 1,3 diphenylamine) are added separately and react depositing a film of reticulate polyamide on the polysulphone.

The membrane goes through several extraction baths containing hot water to

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eliminate all traces of solvent and residual monomers. Thus, as regards foodstuffs, it is totally inert.

In particular, the membrane cannot produce, under normal or abnormal conditions, constituents likely to present a danger to human health (notably the element most easily measured, sodium chloride, which must have a retention level of more than 99%) and also bring about an unacceptable modification in the composition of grape must, all of which leads to an alteration in the organoleptic characteristics.

The user can employ, as a regenerating agent, inorganic products, provided that the operation is completed by rinsing in water to allow this regenerating agent to be completely eliminated before the introduction of the must.

Limits

- All contact materials comply with the rules currently in force.
- There must be no perceptible alteration in the organoleptic characteristics of treated must.
- Any possible leaching of the product or by-product constituting the membrane must remain lower than 50 µg/l in total.
- Possibility of provision of the membrane exclusively by approved stockist or distributor.
- Control and delimitation of use of the membrane by: presence of time meter and lead volumetric meter on the permeate.
    - Presence of time meter and lead volumetric meter on the permeate,
    - Physical prevention of increasing the concentration of the must beyond a fixed limit.

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