COLLOIDAL SILICON DIOXIDE SOLUTION
Silica colloidalis solutio
SILICON GEL IN AQUEOUS DISPERSION
(Oeno 44/2000)

1. OBJECTIVE, ORIGIN AND SCOPE OF APPLICATION

Colloidal silicon dioxide solutions are aqueous dispersions of silicon dioxide particles which are hydroxylated on the surface and are, therefore,negatively charged.

These preparations are used to clarify wines and are associated with protein-based clarifying agents.

2. LABELING

The label should indicate silicon dioxide concentration and its safety and storage conditions.

3. PROPERTIES

Depending on the manner in which they are prepared, acidic or alkaline solutions are obtained containing sodium ions expressed as NaO_2. Alkaline solutions are most often used.

Colloidal silicon dioxide solutions are free from of organic compounds.

Their concentration as determined by drying at 110 °C is always equal to or greater than 15 pp 100 (m/m) and is most often between 15 and 30.7.

The density of colloidal silicon dioxide solutions at 20 °C (r20°C) is given as a function of the concentration C (m/m) by the equation:

?20°C = ?20°C (water) x 1/1-0.0056C

?20°C(water) = density of water at 20 °C = 0.998203.

These preparations are sold in the form of opalescent or milky liquids with slightly bluish tints, or in gel form.

4. TESTS

4.1. The solution should have no disagreeable odor or taste.

4.2. pH

Depending on the preparation method and on whether acidic or alkaline solutions are employed, pH should be between 3 and 4 or between 8 and 10.5.

4.3. Silicon Dioxide Concentration (Dry Extract at 110 °C)

The weight, P, of the dry residue expressed in g per 100 g of product should correspond to within ± 0.5 g of the product's concentration.

4.4. Alkalinity

For alkaline colloidal solutions, determine the alkalinity of a 5 g sample using 0.1M hydrochloric acid (R) in the presence of 2 drops of methyl orange solution (R). Alkalinity expressed in terms of Na_2O for 100 g of product should be less than P/100.

4.5. Preparing the Solution for Tests

Place a volume of colloidal silicon dixoide solution corresponding to 10 g of dry extract in a platinum dish 7 cm in diameter and 2.5 cm high. Evaporate until dry. Take up after cooling with 5 ml fluorhydric acid. Dry evaporate. Repeat this procedure until the silicon dioxide residue is eliminated. Dry evaporate. Take up using 2 ml concentrated hydrochloric acid (R) and dry evaporate. Add 2 ml of concentrated hydrochloric acid (R). Decant in a 50 ml volumetric flask and fill to the line with distilled water.

4.6. Heavy Metals

To 5 ml of the test solution prepared under paragraph 4.5, add 5 ml of water, 2 ml of pH 3.5 buffer solution (R) and 1.2 ml of thioacetamide reagent (R).

No precipitate should form. If a color appears it should be less intense than that of a control prepared as indicated in the Annex and filled to a volume of to 25 ml. (Heavy metal content, expressed in terms of lead in dry extract form, should be less than 10 mg/kg).

4.7. Lead

Using the technique described in the Compendium, determine lead content in the test solution (4.5). (Lead content to be less than 5 mg/kg.)

4.8. Mercury

Using the technique described in the annex, determine mercury content in the test solution (4.5). (Content to be less than 5 mg/kg.)

4.9. Arsenic

Using the technique described in the annex, determine arsenic content in the test solution (4.5). (Content to be less than 3 mg/kg.)

4.10. Methanol

Place 50 ml of colloidal silicon dioxide solution in a 200 ml in a balloon. Distill and collect 50 ml of distillate.

Place 1 ml of distillate in a test tube with 4 drops of 50 pp 100 (m/m) orthophosphoric acid (R) and 4 drops of 5 pp 100 (m/v) potassium permanganate solution (R). Stir and let sit 10 minutes. Decolor the permanganate with several drops (typically 8) of 2 pp 100 (m/v) of potassium anhydrous sulfite (R), while avoiding any excess. Add 5 ml of chromotropic sulfuric acid (R). Place in a 70 °C water bath for 20 minutes. No violet coloration should appear.

4.11. Formaldehyde

Place 10 ml of the distillate obtained under paragraph 4.10 in a test tube. Add 1 ml of rosaniline chlorhydrate bleach out using sulfuric acid (R). No pink coloration should appear.

5. STORAGE

Colloidal solutions of silicon dioxide should be stored in hermetically sealed containers away from contaminants and at temperatures of above 0 °C (the product freezes at 0 °C with irreversible precipitation of the silicon dioxide).