affer addition of a few drops of water, then observe in the same manner.

Method 2 Gas chromatography

This is a method to determine the alcohol number by determining ethanol (C_2H_5OH) content (vol%) from a sample measured at 15°C by the following procedures.

(1) Reagent

Ethanol for alcohol number: Ethanol (99.5) with determined ethanol (C_2H_5OH) content. The relation between specific gravity d_{15}^{15} of ethanol and content of ethanol (C_2H_5OH) is 0.797:99.46 vol%, 0.796:99.66 vol%, and 0.795:99.86 vol%.

(2) Preparation of sample solution and standard solution

Sample solution: Measure accurately a volume of sample at 15 ± 2°C equivalent to about 5 mL of ethanol (C_2H_5OH), and add water to make exactly 50 mL. Measure accurately 25 mL of this solution, add exactly 10 mL of the internal standard solution, and add water to make 100 mL.

Standard solution: Measure accurately 5 mL of ethanol for alcohol number at the same temperature as the sample, and add water to make exactly 50 mL. Measure accurately 25 mL of this solution, add exactly 10 mL of the internal standard solution, and add water to make 100 mL.

(3) Procedure

Place 25 mL each of the sample solution and the standard solution in a 100-mL, narrow-mouthed, cylindrical glass bottle sealed tightly with a rubber closure and aluminum band, immerse the bottle up to the neck in water, allowed to stand at room temperature for more than 1 hour in a room with little change in temperature, shake gently so as not to splash the solution on the closure, and allow to stand for 30 minutes. Perform the test with 1 mL each of the gas in the bottle with a syringe according to the Gas Chromatography under the following conditions, and calculate the ratios, Q_T and Q_S, of the peak height of ethanol to that of the internal standard.

$$\text{Alcohol number} = \frac{Q_T}{Q_S} \times \frac{5\ (\text{mL})}{\text{a volume (mL) of sample}} \times \frac{\text{ethanol } (C_2H_5OH) \text{ content (vol\%) of ethanol for alcohol number}}{9.406}$$

Internal standard solution—A solution of acetonitrile (6 in 100).

Operating conditions—

Detector: A hydrogen flame-ionization detector.

Column: A glass tube about 3 mm in inside diameter and about 1.5 m in length, packed with 150- to 180-μm porous ethylvinylbenzene-divinylbenzene copolymer (mean pore size: 0.0075 μm, 500 - 600 m^2/g) for gas chromatography.

Column temperature: A constant temperature between 105°C and 115°C.

Carrier gas: Nitrogen

Flow rate: Adjust the flow rate so that the retention time of ethanol is 5 to 10 minutes.

Selection of column: Proceed with 1 mL of the gas obtained from the standard solution in the bottle under the above operating conditions, and calculate the resolution. Use a column giving elution of ethanol and the internal standard in this order with the resolution between these peaks being not less than 2.0.

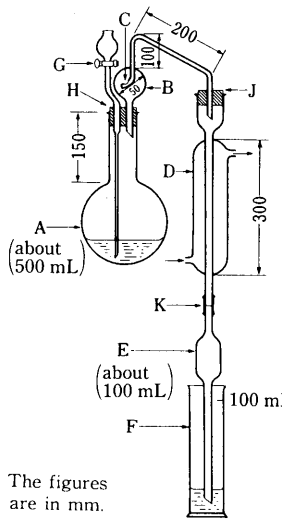
3. Ammonium Limit Test

The Ammonium Limit Test is a limit test for ammonium contained in drugs.

In each monograph, the permissible limit for ammonium (as NH_4^+) is described in terms of percentage (%) in parentheses.

Apparatus

Use a hard glass apparatus as illustrated in the figure; ground-glass joints may be used. All rubber parts used in the apparatus should be boiled for 10 to 30 minutes in sodium hydroxide TS and for 30 to 60 minutes in water, and finally washed thoroughly with water before use.



A: Distilling flask
B: Spray trap
C: Small hole
D: Condenser
E: Trap
F: Measuring cylinder
G: Stop cock
H and J: Rubber stoppers
K: Rubber tubing

Procedure

(1) Preparation of test solution and control solution—Unless otherwise specified, test solutions and control solution are prepared as directed in the following.

Place an amount of the sample, directed in the monograph, in the distilling flask A. Add 140 mL of water and 2 g of magnesium oxide, and connect the distillation apparatus. To the receiver F add 20 mL of boric acid solution (1 in 200) as an absorbing solution, and immerse the lower end of the condenser. Adjust the heating to give a rate of 5 to 7 mL per minute of distillate, and distill until the distillate measures 60 mL. Remove the receiver from the lower end of the condenser, rinsing the end part with a small quantity of water, add sufficient water to make 100 mL and designate it as the test solution.

Place a volume of Standard Ammonium Solution, directed in the monograph, in the distilling flask A, proceed as for the preparation of the test solution, and designate it as the control solution.

(2) Test of the test solution and the control solution—Unless otherwise specified, proceed as directed in the following.

Place 30 mL each of the test solution and the control solution in Nessler tubes, add 6.0 mL of phenol-sodium pentacyanonitrosylferrate (III) TS to each solution, and mix. Then add 4 mL of sodium hypochlorite-sodium hydroxide TS and water to make 50 mL, mix, and allow to stand for 60

minutes. Compare the color of both solutions against a white background by viewing downward or transversely: the color developed in the test solution is not more intense than that of the control solution.

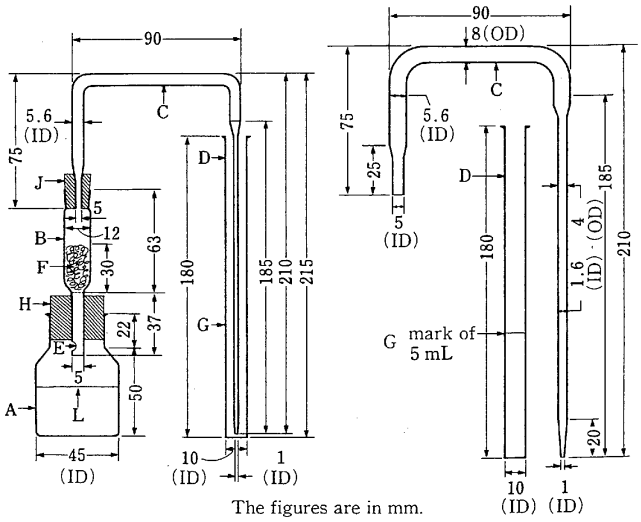
4. Arsenic Limit Test

The Arsenic Limit Test is a limit test for arsenic contained in drugs. The limit is expressed in terms of arsenic (III) trioxide (As_2O_3).

In each monograph, the permissible limit for arsenic (as As_2O_3) is described in terms of ppm in parentheses.

Apparatus B

Use the apparatus illustrated below.



The figures are in mm.

Fig. 2

A: Generator bottle (capacity up to the shoulder: approximately 70 mL).
B: Exit tube.
C: Glass tube (inside diameter: 5.6 mm, the tip of the part to be inserted in the absorber tube D is drawn out to 1 mm in diameter).
D: Absorber tube (inside diameter: 10 mm).
E: Small perforation.
F: Glass wool (about 0.2 g).
G: Mark of 5 mL
H and J: Rubber stoppers.
L: Mark of 40 mL

Place glass wool F in the exit tube B up to about 30 mm in height, moisten the glass wool uniformly with a mixture of an equal volume of lead (II) acetate TS and water, and apply gentle suction to the lower end to remove the excess of the mixture. Insert the tube vertically into the center of the rubber stopper H, and attach the tube to the generator bottle A so that the small perforation E in the lower end of B extends slightly below. At the upper end of B, attach the rubber stopper J to hold the tube C vertically. Make the lower end to the exit tube of C level with that of the rubber stopper J.

Preparation of the test solution

Unless otherwise specified, proceed as directed in the following.

(1) Method 1

Weigh the amount of the sample directed in the monograph, add 5 mL of water, dissolve by heating if necessary, and designate the solution as the test solution.

(2) Method 2

Weigh the amount of the sample directed in the monograph, add 5 mL of water, and add 1 mL of sulfuric acid except in the cases that the samples are inorganic acids. Add 10 mL of sulfurous acid solution, transfer to a small beaker, and evaporate the mixture on a water bath until it is free from sulfurous acid and is reduced to about 2 mL in volume. Dilute with water to make 5 mL, and designate it as the test solution.

(3) Method 3

Weigh the amount of the sample directed in the monograph, and place it in a crucible of platinum, quartz or porcelain. Add 10 mL of a solution of magnesium nitrate hexahydrate in ethanol (95) (1 in 50), ignite the ethanol, and heat gradually to incinerate. If carbonized material still remains by this procedure, moisten with a small quantity of nitric acid, and ignite again to incinerate. After cooling, add 3 mL of hydrochloric acid, heat on a water bath to dissolve the residue, and designate it as the test solution.

(4) Method 4

Weigh the amount of the sample directed in the monograph, and place it in a crucible of platinum, quartz or porcelain. Add 10 mL of a solution of magnesium nitrate hexahydrate in ethanol (95) (1 in 10), burn the ethanol, heat gradually, and ignite to incinerate. If carbonized material still remains by this procedure, moisten with a small quantity of nitric acid, and ignite again to incinerate in the same manner. After cooling, add 3 mL of hydrochloric acid, heat on a water bath to dissolve the residue, and designate it as the test solution.

(5) Method 5

Weigh the amount of the sample directed in the monograph, add 10 mL of *N,N*-dimethylformamide, dissolve by heating if necessary, and designate the solution as the test solution.

Test solutions

Absorbing solution for hydrogen arsenide: Dissolve 0.50 g of silver *N,N*-diethyldithiocarbamate in pyridine to make 100 mL. Preserve this solution in a glass-stoppered bottle protected from light, in a cold place.

Standard Arsenic Stock Solution: Weigh accurately 0.100 g of finely powdered arsenic (III) trioxide standard reagent dried at 105°C for 4 hours, and add 5 mL of sodium hydroxide solution (1 in 5) to dissolve. Add dilute sulfuric acid to neutralize, add further 10 mL of dilute sulfuric acid, and add freshly boiled and cooled water to make exactly 1000 mL.

Standard Arsenic Solution: Pipet 10 mL of Standard Arsenic Stock Solution, add 10 mL of dilute sulfuric acid, and add freshly boiled and cooled water to make exactly 1000 mL. Each mL of the solution contains 1 μg of arsenic (III) trioxide (As_2O_3). Prepare Standard Arsenic Solution just before use and preserve in a glass-stoppered bottle.

Procedure

Unless otherwise specified, proceed using Apparatus B. Carry out the preparation of the standard color at the same time.

Place the test solution in the generator bottle A and, if