of Benzalkonium Chloride in 10 mL of water: the solution is clear and colorless to light yellow.

(2) Petroleum ether-soluble substances—To 3.0 g of Benzalkonium Chloride add water to make 50 mL, then add 50 mL of ethanol (99.5) and 5 mL of 0.5 mol/L sodium hydroxide TS, and extract with three 50-mL portions of petroleum ether. Combine the petroleum ether extracts, and wash with three 50-mL portions of dilute ethanol. After shaking well with 10 g of anhydrous sodium sulfate, filter through a dry filter paper, and wash the filter paper with two 10-mL portions of petroleum ether. Evaporate the petroleum ether on a water bath by heating, and dry the residue at 105°C for 1 hour: the residue is not more than 1.0%.

Water Not more than 15.0%.

Residue on ignition Not more than 0.20% (1 g).

Assay Weigh accurately about 0.15 g of Benzalkonium Chloride, and dissolve in 75 mL of water. Adjust the pH between 2.6 and 3.4 by adding dropwise diluted dilute hydrochloric acid (1 in 2), add 1 drop of methyl orange TS, and titrate with 0.02 mol/L sodium tetraphenylboron VS until the color of the solution becomes red.

Each mL of 0.02 mol/L sodium tetraphenylboron VS
= 7.080 mg of $C_{22}H_{40}ClN$

Containers and storage Containers—Tight containers.

Benzalkonium Chloride Solution

塩化ベンザルコニウム液

Benzalkonium Chloride Solution is an aqueous solution containing not more than 50.0 w/v% of benzalkonium chloride.

It contains not less than 93% and not more than 107% of the labeled amount of benzalkonium chloride ($C_{22}H_{40}ClN$: 354.01).

Method of preparation Dissolve Benzalkonium Chloride in Water or Purified Water. It is also prepared by diluting Concentrated Benzalkonium Chloride Solution 50 with Water or Purified Water.

Description Benzalkonium Chloride Solution is a clear, colorless to light yellow liquid, having a characteristic odor.

It foams strongly on shaking.

Identification (1) Evaporate a volume of Benzalkonium Chloride Solution, equivalent to 0.2 g of Benzalkonium Chloride according to the labeled amount, on a water bath to dryness, and proceed with the residue as directed in the Identification (1) under Benzalkonium Chloride.

(2) To a volume of Benzalkonium Chloride Solution, equivalent to 0.01 g of Benzalkonium Chloride according to the labeled amount, add water to make 10 mL. Proceed with 2 mL of this solution as directed in the Identification (2) under Benzalkonium Chloride.

(3) To a volume of Benzalkonium Chloride Solution, equivalent to 1 g of Benzalkonium Chloride according to the labeled amount, add water or concentrate on a water bath, if necessary, to make 10 mL. To 1 mL of this solution add 0.1 mol/L hydrochloric acid VS to make 200 mL, and proceed as directed in the Identification (3) under Benzalkonium Chloride.

(4) To a volume of Benzalkonium Chloride Solution, equivalent to 0.1 g of Benzalkonium Chloride according to the labeled amount, add water or concentrate on a water bath, if necessary, to make 10 mL. Proceed with 1 mL of this solution as directed in the Identification (4) under Benzalkonium Chloride.

Assay Pipet a volume of Benzalkonium Chloride Solution, equivalent to about 0.15 g of benzalkonium chloride ($C_{22}H_{40}ClN$), dilute with water to make 75 mL, if necessary, and proceed as directed in the Assay under Benzalkonium Chloride.

Each mL of 0.02 mol/L sodium tetraphenylboron VS
= 7.080 mg of $C_{22}H_{40}ClN$

Containers and storage Containers—Tight containers.

Benzalkonium Chloride Concentrated Solution 50

濃塩化ベンザルコニウム液 50

Benzalkonium Chloride Concentrated Solution 50 is an aqueous solution, presented as $[C_6H_5CH_2N(CH_3)_2R]Cl$, where R ranges from C_8H_{17} to $C_{18}H_{37}$, and mainly consisting of $C_{12}H_{25}$ and $C_{14}H_{29}$.

It contains not less than 50.0 w/v% and not more than 55.0 w/v% of benzalkonium chloride ($C_{22}H_{40}ClN$: 354.01).

Description Benzalkonium Chloride Concentrated Solution 50 is a colorless to light yellow liquid or jelly-like fluid, and has a characteristic odor.

It is very soluble in water and in ethanol (95), and practically insoluble in diethyl ether.

A solution prepared by adding water to it vigorously foams when shaken.

Identification (1) Dissolve 0.4 g of Benzalkonium Chloride Concentrated Solution 50 in 1 mL of sulfuric acid, add 0.1 g of sodium nitrate, and heat for 5 minutes on a water bath. After cooling, add 10 mL of water and 0.5 g of zinc powder, heat for 5 minutes, cool, and filter: the filtrate responds to the Qualitative Tests for primary aromatic amines. The color of the solution is red.

(2) To 2 mL of a solution of Benzalkonium Chloride Concentrated Solution 50 (1 in 500) add a mixture of 0.2 mL of a solution of bromophenol blue (1 in 2000) and 0.5 mL of sodium hydroxide TS: a blue color develops. Add 4 mL of chloroform to this solution, and shake vigorously: the blue color shifts to the chloroform layer. Collect the chloroform layer, and add dropwise, with stirring, a solution of sodium lauryl sulfate (1 in 1000): the chloroform layer turns colorless.

(3) Determine the absorption spectrum of a solution of Benzalkonium Chloride Concentrated Solution 50 in 0.1 mol/L hydrochloric acid TS (1 in 1000) as directed under the Ultraviolet-visible Spectrophotometry, and compare the spectrum with the Reference Spectrum: both spectra exhibit

similar intensities of absorption at the same wavelengths.

(4) To 1 mL of a solution of Benzalkonium Chloride Concentrated Solution 50 (1 in 50) add 2 mL of ethanol (95), 0.5 mL of dilute nitric acid and 1 mL of silver nitrate TS: a white precipitate is produced. This precipitate does not dissolve on the addition of dilute nitric acid, but dissolves on the addition of ammonia TS.

Purity **(1)** Clarity and color of solution—Dissolve 2.0 g of Benzalkonium Chloride Concentrated Solution 50 in 10 mL of water: the solution is clear and colorless to light yellow.

(2) Petroleum ether-soluble substances—To 6.0 g of Benzalkonium Chloride Concentrated Solution 50 add water to make 50 mL, then add 50 mL of ethanol (99.5) and 5 mL of 0.5 mol/L sodium hydroxide TS, and extract with three 50-mL portions of petroleum ether. Combine the petroleum ether extracts, and wash with three 50-mL portions of dilute ethanol. After shaking well with 10 g of anhydrous sodium sulfate, filter through a dry filter paper, and wash the filter paper with two 10-mL portions of petroleum ether. Evaporate the petroleum ether on a water bath by heating, and dry the residue at 105°C for 1 hour: the residue is not more than 1.0%.

Residue on ignition Not more than 0.20% (1 g).

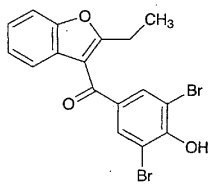
Assay Weigh accurately about 0.30 g of Benzalkonium Chloride Concentrated Solution 50, and dissolve in 75 mL of water. Adjust the pH to between 2.6 and 3.4 by adding dropwise diluted dilute hydrochloric acid (1 in 2), add 1 drop of methyl orange TS, and titrate with 0.02 mol/L sodium tetraphenylboron VS until the color of the solution becomes red.

Each mL of 0.02 mol/L sodium tetraphenylborate VS
= 7.080 mg of $C_{22}H_{40}ClN$

Containers and storage Containers—Tight containers.

Benzbromarone

ベンズブロマロン



$C_{17}H_{12}Br_2O_3$: 424.08
3,5-Dibromo-4-hydroxyphenyl 2-ethylbenzofuran-3-yl ketone [*3562-84-3*]

Benzbromarone, when dried, contains not less than 98.5% of $C_{17}H_{12}Br_2O_3$.

Description Benzbromarone occurs as a white to light yellow, crystalline powder. It is odorless and tasteless.

It is very soluble in *N,N*-dimethylformamide, freely soluble in acetone and in chloroform, soluble in diethyl ether, sparingly soluble in ethanol (95), and practically insoluble in water.

Identification **(1)** Dissolve 0.02 g of Benzbromarone in 1 mL of chloroform, and add 4 drops of dehydrated iron (III) chloride-pyridine TS: a blue-purple color develops.

(2) Dissolve 0.1 g of Benzbromarone in 10 mL of ethanol (95), add 3 mL of 2,4-dinitrophenylhydrazine TS, and heat in a water bath for 20 minutes: a red precipitate is formed.

(3) Determine the infrared absorption spectrum of Benzbromarone, previously dried, as directed in the potassium bromide disk method under the Infrared Spectrophotometry, and compare the spectrum with the Reference Spectrum: both spectra exhibit similar intensities of absorption at the same wave numbers.

(4) To 0.1 g of Benzbromarone in a porcelain crucible add 1 g of anhydrous sodium carbonate, and fuse and incinerate at 700°C. After cooling, dissolve the residue in 50 mL of water by warming, and neutralize with dilute nitric acid: the solution responds to the Qualitative Tests for bromide.

Melting point 149 - 153°C

Purity **(1)** Clarity and color of solution—Dissolve 1.0 g of Benzbromarone in 10 mL of chloroform: the solution is clear and colorless to light yellow.

(2) Sulfate—Dissolve 1.0 g of Benzbromarone in 40 mL of acetone, and add 1 mL of dilute hydrochloric acid and water to make 50 mL. Perform the test using this solution as the test solution. Prepare the control solution as follows: to 0.40 mL of 0.005 mol/L sulfuric acid VS add 40 mL of acetone, 1 mL of dilute hydrochloric acid and water to make 50 mL (not more than 0.019%).

(3) Soluble halides—Dissolve 0.5 g of Benzbromarone in 40 mL of acetone, and add 6 mL of dilute nitric acid and water to make 50 mL. Proceed with this solution as directed under the Chloride Limit Test. Prepare the control solution as follows: to 0.25 mL of 0.01 mol/L hydrochloric acid VS add 40 mL of acetone, 6 mL of dilute nitric acid and water to make 50 mL.

(4) Heavy metals—Proceed with 2.0 g of Benzbromarone according to Method 2, and perform the test. Prepare the control solution with 2.0 mL of Standard Lead Solution (not more than 10 ppm).

(5) Iron—Prepare the test solution with 1.0 g of Benzbromarone according to Method 3, and perform the test according to Method A. Prepare the control solution with 2.0 mL of Standard Iron Solution (not more than 20 ppm).

(6) Arsenic—Prepare the test solution with 2.0 g of Benzbromarone according to Method 3, and perform the test using Apparatus B (not more than 1 ppm).

(7) Related substances—Dissolve 0.10 g of Benzbromarone in 10 mL of chloroform, and use this solution as the sample solution. Pipet 1 mL of the sample solution, add chloroform to make exactly 100 mL, and use this solution as the standard solution. Perform the test with these solutions as directed under the Thin-layer Chromatography. Spot 10 μL each of the sample solution and the standard solution on a plate of silica gel with fluorescent indicator for thin-layer chromatography. Develop the plate with a mixture of chloroform, acetone and acetic acid (100) (100:2:1) to a distance of about 10 cm, and air-dry the plate. Examine under ultraviolet light (main wavelength: 254 nm): the spots other than the principal spot from the sample solution are not more intense than the spot from the standard solution.