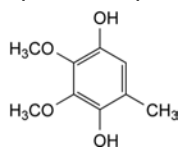
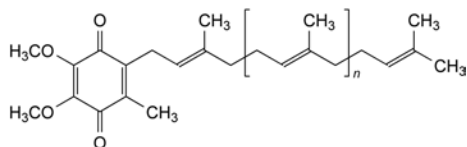


## IMPURITIES

Specified impurities: A, B, C, D, E, F.



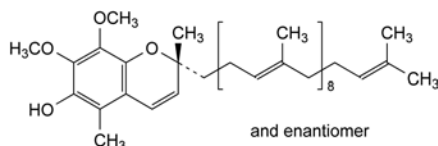
A. 2,3-dimethoxy-5-methylbenzene-1,4-diol,



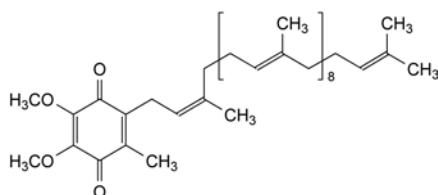
B.  $n = 5$ : 2-[(all-*E*)-3,7,11,15,19,23,27-heptamethyloctadocosa-2,6,10,14,18,22,26-heptaenyl]-5,6-dimethoxy-3-methylbenzene-1,4-dione (ubiquinone-7),

C.  $n = 6$ : 5,6-dimethoxy-3-methyl-2-[(all-*E*)-3,7,11,15,19,23,27,31-octamethyldotriaconta-2,6,10,14,18,22,26,30-octaenyl]benzene-1,4-dione (ubiquinone-8),

D.  $n = 7$ : 5,6-dimethoxy-3-methyl-2-[(all-*E*)-3,7,11,15,19,23,27,31,35-nonamethylhexatriaconta-2,6,10,14,18,22,26,30,34-nonaenyl]benzene-1,4-dione (ubiquinone-9),



E. (2*RS*)-7,8-dimethoxy-2,5-dimethyl-2-[(all-*E*)-4,8,12,16,20,24,28,32,36-nonamethylheptatriaconta-3,7,11,15,19,23,27,31,35-nonaenyl]-2*H*-1-benzopyran-6-ol (ubiquinol),



F. 2-[(2*Z*,6*E*,10*E*,14*E*,18*E*,22*E*,26*E*,30*E*,34*E*,38*E*)-3,7,11,15,19,23,27,31,35,39-decamethyl-2,6,10,14,18,22,26,30,34,38-tetracontadecaenyl]-5,6-dimethoxy-3-methylbenzene-1,4-dione (ubidecarenone (*Z*)-isomer).

B. Freezing point (2.2.18): 21 °C to 24 °C.

C. To 2.0 g add 2 mL of freshly distilled *aniline R* and boil under a reflux condenser for 10 min. Allow to cool and add 30 mL of *ether R*. Shake with 3 quantities, each of 20 mL, of *dilute hydrochloric acid R* and then with 20 mL of *water R*. Evaporate the organic layer to dryness on a water-bath. After recrystallising twice from *ethanol (70 per cent V/V) R* and drying *in vacuo* for 3 h, the residue melts (2.2.14) at 66 °C to 68 °C.

D. Dissolve 0.1 g in a mixture of 2 mL of *dilute sulfuric acid R* and 5 mL of *glacial acetic acid R*. Add dropwise 0.25 mL of *potassium permanganate solution R*. The colour of the potassium permanganate is discharged.

## TESTS

**Peroxide value** (2.5.5, *Method A*): maximum 10.

**Fixed and mineral oils.** To 1.0 g add 5 mL of *sodium carbonate solution R* and 25 mL of *water R* and boil for 3 min. The hot solution is not more opalescent than reference suspension II (2.2.1).

**Water-soluble acids.** To 1.0 g add 20 mL of *water R* heated to 35-45 °C and shake for 2 min. Cool and filter the aqueous layer through a moistened filter. To 10 mL of the filtrate add 0.1 mL of *phenolphthalein solution R*. Not more than 0.1 mL of 0.1 *M* *sodium hydroxide* is required to change the colour of the indicator.

**Degree of unsaturation.** Dissolve 85.0 mg in a mixture of 5 mL of *dilute hydrochloric acid R* and 30 mL of *glacial acetic acid R*. Using 0.05 mL of *indigo carmine solution R1* as indicator, added towards the end of the titration, titrate with 0.0167 *M* *bromide-bromate* until the colour changes from blue to yellow. 8.9 mL to 9.4 mL of 0.0167 *M* *bromide-bromate* is required. Carry out a blank titration.

**Sulfated ash** (2.4.14): maximum 0.1 per cent, determined on 0.50 g.

## ASSAY

Dissolve 0.750 g in 10 mL of *ethanol (96 per cent) R*. Titrate with 0.5 *M* *sodium hydroxide* using 0.1 mL of *phenolphthalein solution R* as indicator, until a pink colour is obtained.

1 mL of 0.5 *M* *sodium hydroxide* is equivalent to 92.14 mg of  $C_{11}H_{20}O_2$ .

## STORAGE

In a non-metallic container, protected from light.

01/2008:0461

01/2008:0743  
corrected 6.0

## UNDECYLENIC ACID

Acidum undecylenicum



$C_{11}H_{20}O_2$   
[112-38-9]

$M_r$  184.3

## DEFINITION

Undec-10-enoic acid.

**Content:** 97.0 per cent to 102.0 per cent.

## CHARACTERS

**Appearance:** white or very pale yellow, crystalline mass or colourless or pale yellow liquid.

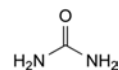
**Solubility:** practically insoluble in water, freely soluble in ethanol (96 per cent) and in fatty and essential oils.

## IDENTIFICATION

A. Refractive index (2.2.6): 1.447 to 1.450, determined at 25 ± 0.5 °C.

## UREA

Ureum



$CH_4N_2O$   
[57-13-6]

$M_r$  60.1

## DEFINITION

Carbamide.

**Content:** 98.5 per cent to 101.5 per cent (dried substance).

## CHARACTERS

**Appearance:** white or almost white, crystalline powder or transparent crystals, slightly hygroscopic.

**Solubility:** very soluble in water, soluble in alcohol, practically insoluble in methylene chloride.

## IDENTIFICATION

**First identification:** A, B.