

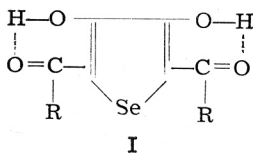
CCA-46

541.486:547.76

Chelating Properties of 2,5-Dibenzoyl-3,4-dihydroxy Selenophene**L. Filipović and A. Balenović-Solter**Chemical Institute, Faculty of Science, University of Zagreb,
Strossmayerov trg 14, Zagreb, Croatia, Yugoslavia*

Received October 10, 1956

In this Laboratory several 2,5-diacyl-3,4-dihydroxy selenophenes (I) have earlier been prepared by reacting, α , γ , δ , ϵ -tetraketones with selenium dioxide¹.



It is evident that the enolic and carbonyl groups of the compounds of the formula I are in such positions as to be able to form chelates.

This study concerns the chelating properties and preliminary evaluation of 2,5-dibenzoyl-3,4-dihydroxy selenophene (I; R = C₆H₅) as an analytical reagent.

An interesting property of this compound is its ability to form stable chelates with a large number of metal ions. Many of these metal chelates are easily prepared, stable, intensely coloured, insoluble in water, and soluble in several organic solvents.

APPARATUS AND REAGENTS

2,5-Dibenzoyl-3,4-dihydroxy selenophene was prepared as described earlier¹, and used as 0,2 weight % solution in 95% ethanol or acetone. Test solutions of metal ions were prepared from reagent grade chemicals as 1 weight % solutions of the metal. Nitrate salts were used when available.

PROCEDURE

Successive sample dilutions in Emich test tubes containing 0.05 ml of metal solution and the same quantity of reagent solution were used to determine the sensitivity of the test.

RESULTS AND DISCUSSION

The results of tests for metal ions and the smallest quantity of each ion detected are given in Table I. In every case the chelate was formed rapidly

* Communication No. 59 from this Laboratory

as shown by the immediate formation of precipitate. An exception is the formation of a red-coloured chelate of aluminium (III) chloride in greater dilutions.

The most useful solvent for extracting coloured chelates from aqueous solutions is n-butanol.

Mercury(II), chromium(III), zinc(II) and manganese(II) gave no precipitate with the reagent under test conditions.

2,5-Dibenzoyl-3,4-dihydroxy selenophene is a non-specific reagent for some metals. It may be used to concentrate and isolate heavy metals by precipitation, extraction or chromatography.

TABLE I
Ions Detected with 2,5-Dibenzoyl-3,4-dihydroxy-selenophene

Ion	Colour of the Complex	Dilution limit* for	
		Precipitate	Colour of the Complex
Ag ⁺	yellow	10 ^{-2,97} ; (1:9.3×10 ²)	
Hg ₂ ⁺⁺	red-brown	10 ^{-2,7} ; (1:5.0×10 ²)	
Pb ⁺⁺	red	10 ^{-2,99} ; (1:9.7×10 ²)	10 ^{-3,99} ; (1:9.7×10 ³)
Cu ⁺⁺	dark red	10 ^{-3,49} ; (1:3.1×10 ³)	
Cd ⁺⁺	yellow	10 ^{-2,26} ; (1:1.8×10 ²)	
Bi ⁺⁺	orange	10 ^{-2,15} ; (1:1.4×10 ²)	
Sn ⁺⁺	yellow	10 ^{-3,23} ; (1:1.7×10 ³)	
Fe ⁺⁺⁺	black-brown	10 ^{-3,73} ; (1:5.4×10 ³)	
Al ⁺⁺⁺	red-orange	10 ^{-3,04} ; (1:1.1×10 ³)	10 ^{-4,04} ; (1:1.1×10 ⁴)
Ni ⁺⁺	orange	10 ^{-3,53} ; (1:3.4×10 ³)	
Co ⁺⁺	orange	10 ^{-3,53} ; (1:3.4×10 ³)	
U (UO ₂ ⁺⁺)	dark red	10 ^{-2,92} ; (1:8.4×10 ²)	10 ^{-3,92} ; (1:8.4×10 ³)
Th ⁺⁺⁺⁺	red	10 ^{-3,23} ; (1:1.7×10 ³)	

REFERENCES

1. K. Balenović, D. Cerar and L. Filipović, *J. Org. Chem.* **19** (1954) 1556.
2. *Réactifs pour l'analyse qualitative minérale*, Deuxième Rapport, Wepf et Cie, Basle, 1945, P. Wenger and R. Duckert, Editors.

IZVOD

Helatna svojstva 2,5-dibenzoil-3,4-dioksi selenofena

L. Filipović and A. Balenović-Solter

Izvedeno je preliminarno ispitivanje helatnih svojstava 2,5-dibenzoil-3,4-dioksi-selenofena (I; R = C₆H₅). Važniji rezultati skupljeni su u tablici I. 2,5-dibenzoil-3,4-dioksiselenofen je nespecifični reagens na neke metale. Može se upotrijebiti za koncentriranje i izoliranje teških metala taloženjem, ekstrakcijom ili kromatografijom.

KEMIJSKI INSTITUT
PRIRODOSLOVNO-MATEMATIČKI FAKULTET
I
I. BIOKEMIJSKA GRUPA
INSTITUT »RUĐER BOŠKOVIĆ«
ZAGREB

Primljeno 10. listopada 1956.

* Expressed in terms as recommended²