CLVII. A NOTE ON THE SOLUBILITIES OF CALCIUM SOAPS.

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In the course of some special work it was necessary to know the solubilities and melting points (if any) of calcium oleate, palmitate, and stearate. The information in standard works of reference was meagre and to some extent contradictory, and a summary of it is given below (Table I). No statement as to the existence or otherwise of a melting point for any of the three soaps was found.

Table I.

Authority	Calcium oleate	Calcium palmitate	Calcium stearate
Beilstein [1920]	Soluble in alcohol and ether	100 parts absolute alcohol dissolve at 20°, 0.0103 part	No data
Lewkowitsch and Warburton [1921]	Insoluble in alcohol and ether. 200 cc. of a 10 % sugar solution, after digestion with oleate for 1 hour, dissolve at 19.5, 35, 50 and 65°, 0.0661, 0.1767, 0.450 and 0.726 g. respectively. Solution in pyridine passes through an india-rubber membrane	100 parts absolute alcohol dissolve at 20°, 0.0103 part	Practically insoluble in alcohol
Ullmann [1920]	Insoluble in alcohol and ether	No data	No data
Seidell [1920]	1000 cc. water dissolve about 0.1 g. at <i>t</i> ° not stated (Fah- rion). 100 g. glycerol (of <i>d</i> =1.114) dissolve 1.18 g. at <i>t</i> ° not stated (Asselin)	No data	No data
<i>The Condensed Chemical Dictionary</i> [1919]	No data	No data	Soluble in alcohol and ether: insoluble in water
Martindale and Westcott [1920]	Slightly soluble in alcohol and ether	No data	No data

The three salts were prepared by "double decomposition," and the details given in Table II were ascertained by direct experiment.

METHOD OF PREPARATION.

A known weight of the organic acid (oleic, palmitic or stearic) was dissolved in absolute alcohol and neutralised with caustic soda (10 % aqueous solution), using phenolphthalein as indicator.

A calculated excess of calcium chloride was dissolved in a large volume of water, and the sodium salt, which had been prepared as above, was added. The precipitate of the calcium soap was washed repeatedly on a Buchner filter with water, and lastly with absolute alcohol. The soap was finally dried in a vacuum desiccator over calcium chloride.

Table II.

Solvent at	Calcium oleate			Calcium palmitate			Calcium stearate		
	0°	Room temp. 15-20°	B.p. of solvent	0°	Room temp. 15-20°	B.p. of solvent	0°	Room temp. 15-20°	B.p. of solvent
Alcohol (ethyl, absolute)	Insol.	Insol.	Insol.	Insol.	Insol.	Insol.	Insol.	Insol.	Sl. sol.
Ether (di-ethyl)									Insol.
Chloroform	V. sl. sol.	Fairly sol.	Sol.	"	V. sl. sol.	Sl. sol.	"	"	V. sl. sol.
Acetone	Insol.	Insol.	Insol.	"	Insol.	Insol.	"	"	Insol.
Benzene	Sl. sol.	Fairly sol.	Sol.	"	V. sl. sol.	Sl. sol.	"	V. sl. sol.	Sl. sol.
Xylene	"	Fairly sol.	"	"	Insol.	V. sl. sol.	V. sl. sol.	Sl. sol.	Fairly sol.
Light Petroleum (b.p. 50-60°)	Insol.	Insol.	Insol.	"	"	Insol.	Insol.	Insol.	Insol.
Water	"	"	"	"	"	"	"	"	"
Effect of heating:	No definite m.p. Conglutinates 115-120° Starts to decompose 140-160°			No definite m.p. Conglutinates 110° Starts to decompose 150-155°			No definite m.p. Conglutinates 115-120° Starts to decompose 155-160°		

Abbreviations: Insol.=insoluble. Sl.=slightly. V. sl.=very slightly. Sol.=soluble. M.p.=melting point. B.p.=boiling point.

Notes: All three salts may be "dissolved" by acid alcohol (we used 1 % HCl in absolute alcohol)—slightly at 0°, with fair ease at room temperature (15-20°), and readily when the acid alcohol is boiling.

Calcium stearate was obtained as anisotropic "osazone-like" sheaves by crystallising from hot alcohol. It was necessary to allow the solution to cool very slowly.

It is felt that the above data (Table II), though only qualitative, may possibly be of some value to other workers.

I am much indebted to my assistant, Mr R. J. Bromfield, for much of the labour in the above observations.

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