Solubility of Tin Ricinoleate in Solvents

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LITTLE or no information has been published (1) on the properties of metallic ricinoleates. Contrary to the well known metallic soaps (aluminum, zinc and calcium stearate, lead, cobalt, manganese, and copper naphthenate), the salts of ricinoleic contain an hydroxyl group on the 12th carbon atom of the ricinoleic acid, which may have a considerable influence on the solubility.

In a recent issue of this Journal (2) has been published a paper on the solubility and swelling of metallic ricinoleates in various solvents. It was found that among five soaps examined [aluminum (tri), barium, calcium, magnesium, and zinc] the salt of magnesium shows the best solubility, followed by the salt of calcium. Aluminum (tri) and magnesium ricinoleate give clear mixtures of soap/solvent whereas the other four soaps generally give transparent mixtures only.

In connection with this study we have investigated the solubility of tin ricinoleate in the same manner. Characteristics may be described thus:

Tin ricinoleate, the salt of bivalent tin, is a viscous liquid of slightly brownish color and with very little odor. Starting from pure ricinoleic fatty acid, theoretically the contents of tin would amount to 16.6%. For a technical product, like that used, the contents of tin was found to be 12-14%. The technical data are as follows:

Specific gravity at 20°C.—about 1.112
Refractive index at 20°C.—about 1.504
Viscosity at 20°C.—4,000-7,000 cp.
Flash point (Marcusson)—165°C.

The suggested field of application for tin ricinoleate is for use as a heat and light stabilizing agent in halogenized polymers (3, 4).

The stabilizing effect is limited to certain special resins. Small additions to plastisols increase noticeably the thixotropic properties. For processing, tin ricinoleate is very useful as a sliding and lubricating agent for calandery.

TABLE I

Solubility of Tin Ricinoleate in Solvents

Solvents			Tin-Ricinoleate Weight %			
Class		Product	20	40	60	80
Hydrocarbons	Aliphatic	Mineral Spirits	+	+	+	+
		White Spirit	+	+	+	+
	Aromatic	Xylene	+	+	+	+
Terpenes		Turpentine	+	+	+	+
Alcohols		Butanol	+	+	+	+
		Diacetone Alcohol	−t	+	+	+
Glycol		Propylene Glycol	−	−	−	−
Ketones		Acetone	+	+	+	+
		Cyclohexanone	+	+	+	+
Esters		Butyl Acetate	+	+	+	+
		Dioctyl Phthalate	+	+	+	+
		Methyl Acetyl Ricinoleate	+	+	+	+
Ether Alcohol		Methyl Cellosolve	+	+	+	+
Chlorinated Solvents		Carbon Tetrachloride	+c	+c	+c	+c
		Trichloroethylene	+c	+c	+c	+c
Solvent Mixture		80 Toluene/20 Ethanol	+	+	+	+
Vegetable Oils		Castor Oil	+	+	+	+
		Linseed Oil	+	+	+	+
		Dehydrated Castor Oil	+	+	+	+
Varnish		DCO-Pentalyn G	+	+	+	+

Coding: + transparent clear yellow solution.
t translucent yellow.
c cloudy.
— no significant solubility of metallic soap in hot solvent.

Summary

Among the salts of ricinoleic acid available [aluminium (tri), barium, calcium, magnesium, zinc, and tin] the salt of tin shows the best solubility, in polar as well as in non-polar solvents (with the exception of glycols).

In the case of diacetone alcohol the diacetone alcohol is soluble in tin ricinoleate, but not *vice versa*.

All the viscosities of the soap/solvent mixtures are according to the viscosities of the solvents. Normally there are no separations in phases, no swelling or thixotropic phenomena.

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ABSTRACTS . . . . . R. A. Reiners, Editor

• Oils and Fats

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Extraction of oil by solvents at elevated temperatures. II. A. G. Antonioli and R. Turriziani(Univ. Rome). *Ann chim.* (Rome) 43, 839-44(1953). The extraction of oil from olive pulp with ligroine (b. 80-120°) was more efficient at temperatures above 60° than at lower ones.

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