

SINCLAIR REFINING COMPANY

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Oxo-Process

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To Dr. Hansen.

Re: Preparation of Drying Oils

A. Previous experiments

In our prior experiments aimed at the preparation of drying oils, we were essentially starting from the observation that aldols resp. their acroleine derivatives can be converted into drying oils by acid condensation. For several reasons, however, the results were unsatisfactory.

1. The products are of a dark color.
2. Only straight-chained aldehydes are a suitable starting material, that means, only a minor part of the Oxo-aldehydes is suitable.
3. By alkaline condensation, to be sure, light products were formed, but they would dry only half way.

Up to this date nothing indicates that further progress, is to be expected by following the methods in question; therefore, I am suggesting to discontinue these lines of work and to strike out into new directions.

B. Preparation of poly-aldehydes

We know already how to prepare resins of great hardness from aldehydes; such resins can be used as shellac substitutes. Up till now, essentially, only acetaldehyde was available as a commercial parent material for them. We ought to try to find, whether valuable lacs can be prepared in this manner from Oxo-aldehydes, particularly, from propylene. This material would be available in sufficient quantities; it could be prepared from propane by means of dehydrogenation.

The resins prepared, up to this time, from acetaldehyde, resp. from crotonaldehyde, are very hard and brittle. For this reason, we must improve their elasticity, e.g., by adding substances containing carbonyl-groups or other softeners. Possibly, resins prepared from higher aldehydes would have more satisfactory physical properties; maybe, such products failed to be taken into consideration up till now, because no starting materials were available for them.

To be sure, we should not obtain drying oils but resins which may be used in the lac-industry. Schafer for instance, has described, in "Fette and Seifen" 49, page 861 (1942) some procedures, which could be applied to our aldehydes.

C. Preparation of drying oils by a method analogous to that for working up castor oil.

Actually, technically very successful procedures are in *practical* operation for preparing drying oils from castor oil or ricinoleic acid. In the simplest process known, water is split off catalytically (Scheiber-process, Synourin). In a more developed procedure, conjugated double bonds are obtained by having the double bonds occupied by an auxiliary substance, immediately after they have been formed, and by having this auxiliary substance split off thereafter (illegible word). Finally, the Swiss firm Künzel has developed a procedure for preparing a highly unsaturated oil from castor oil in several steps; this oil contains nine double bonds, thus being very similar to the most precious of drying oils, the wood oil.

That is to say, by means of this procedure they succeeded in building in numerous double bonds into the molecule of a fatty acid. This process is certainly not just a simple splitting off of water, for the ricinoleic acid contains only one hydroxyl-group. Therefore, it is feasible that these procedures can be transferred upon our synthetical fatty acids, and thus we may obtain drying oils in this manner.

A great incentive for this type of work may be seen in the excellent properties of the drying ricinoleic-acid derivatives and in the wide demand which cannot be supplied by castor oil products.

Literature references concerning the procedures in question have been compiled by Pegorari in "Fette and Seifen" 42, page 733 (1942).

Roelen

H. Beth