

Mr. C. E. Staff
Bakelite Company
30 East 42nd Street
New York 17, New York

December 7, 1953

Mr. G. G. Himmeler

Dear Charlie:

It is of interest that in 1941 our group at Mellon Institute fed several vinyl films for ninety days to dogs and groups of rats. Four samples of films were utilized, made up from "Vinylite" resin VYNW.

Sample F-4043 contained stabilizer D-15, 0.75%; dibutyl "Cellosolve" phthalate, 27.00%; and methyl "Cellosolve" oleate, 3.00%.

Sample F-4159 contained calcium stearate, 1.00%; methyl "Cellosolve" oleate, 3.00%; and tricresyl phosphate, 27.00%.

Sample F-4164 contained stabilizer D-22, 1.00%; dibutyl "Cellosolve" phthalate, 27.00%; and methyl "Cellosolve" oleate, 3.00%.

Sample F-4165 contained lead stearate, 1.50%; dibutyl "Cellosolve" phthalate, 27.00%; and methyl "Cellosolve" oleate, 3.00%.

As you know, there were very minor amounts of other components in the above.

The result of this study, which consisted of 90-day oral doses to dogs in meat at 1 gm./kg./day and to rats as aqueous extract at 19.4 gm./kg./day, showed that films F-4043, 4159, 4164, and 4165 gave no injury except slight biochemical changes. The last gave detectable lead in the blood. This study would indicate that these films were of a very low order of toxicity.

Plasticizers - We have done an enormous amount of work on DOP which has been published. In this application

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we would be principally interested in oral toxicity. The single oral LD₅₀ dose for DOP is 30.6 gm./kg. body weight for rats. In regard to tri(2-ethylhexyl) phosphate the single oral LD₅₀ dose is 39.8 gm./kg. body weight. Plasticizer R2H, when tested on rats, a single oral dose of 63 gm./kg. in lard killed none of nine rats. You will see that all these plasticizers have quite a low order of toxicity.

Stabilizers - The tin stabilizers are much more toxic. For example, dibutyl tin dilaurate or stabilizer D-22 has a single oral LD₅₀ dose of 1.24 gm./kg. body weight. Dioctyl tin dichloride has a single oral LD₅₀ dose of 0.19 gm./kg. body weight. The various lead stabilizers used in vinyl films are not highly toxic by single oral ingestion. Stabilizer C-2, or calcium ethyl acetoacetate, is of a low order of toxicity as evidenced by the single oral LD₅₀ dose of 9.93 gm./kg. body weight.

I would hate to predict what the effect might be on a cow eating a vinyl film of any sort. This opinion is based upon the recent discovery of the adverse effect on cattle of extremely minute amounts of chlorinated naphthalenes. I should think that the greatest hazard from a cow's eating an ensilage cover made of vinyl film would be that it would be likely to produce an obstruction in one of the cow's two stomachs and long intestinal tract.

We have done some extraction studies on the tin stabilizers, and it was found that as far as D-22 is concerned, when it was incorporated in film, none was extracted in two months by water or a buffer at pH of 8.2. However, lard extracted 61 per cent of the stabilizer in seven days. DOP has been shown to be extracted by fats in particular, but not by aqueous solutions. Despite these assertions, I think the best experience can be obtained by experimentation in which we fed dogs and rats films containing tin stabilizers, etc. Based upon this piece of work, it would seem that these films are of an extremely low order of toxicity.

If there are any further questions, do not hesitate to contact this office.

Very truly yours,

MEDICAL DIRECTOR
INDUSTRIAL MEDICAL AND TOXICOLOGY DEPARTMENT

Thos. W. Hale, M. D.
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FOR INTERNAL CORRESPONDENCE

BAKELITE COMPANY

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30 EAST 42nd STREET, NEW YORK 17, NEW YORK

To (Name)
Company
LocationDr. T. W. Nale
300 Madison Ave.
Room 203

Date

November 30, 1953

Originating Dept.

Answering letter date

Copy to

Mr. G. G. Himmler - BB

Subject

In considering the use of vinyl films for some agricultural applications, the toxicity of the compound will be of some importance. Though the base resins, I know, are non-toxic, I would appreciate any information you have on feeding tests on our principal plasticizer, dioctyl phthalate, and lesser plasticizers trioctyl phosphate and 2RH. Also any information available on the toxicity of lead and tin stabilizers dispersed in plasticizer or vinyl compounds will be appreciated.

We are considering a grant to Rutgers University for some work on ensilage covers and one point of interest will be the toxicity to farm animals in case they should eat the plasticized sheeting. I would expect that there would be no effect because of the short residence of the compound, but it is a point which will have to be checked and any information on the ingredients will be helpful.


C. E. Staff

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