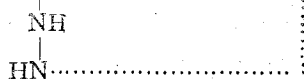


(2) The saponified product (Yield; quantitative).

Anal. Calcd. for $(\text{CH}_3-(\text{CH}_2)_7-\text{CH}-\text{CH}=\text{CH}(\text{CH}_2)_7-\text{CO})$:



N, 9.56; Found: N, 10.12.

15. Syntheses of Antioxidants. (III)

Polynuclear Alkylphenol Antioxidants Containing *p*-hydroxyanisole Nuclei and Relations between Molecular Weight and Potencies

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In the preceding report, we have described polynuclear alkylphenol antioxidants containing *p*-cresol nuclei and found some excellent, high molecular, active compounds with good solubility to fatty oils. In view of the recent publication that mono-*t*-butyl-*p*-hydroxyanisole is an effective and nontoxic antioxidant, we have now prepared some similar polynuclear alkylphenol antioxidants containing *p*-hydroxyanisole and found some effective ones, one of them was superior to commercial 2,5-di-*t*-butyl-*p*-cresol.

p-Hydroxyanisole was dimethylolated as follows. A mixture of 31 g. of *p*-hydroxyanisole, 100. of 10 % aqueous NaOH and 37 g. of 40 % formalin was kept at 15-16°C in the period of three days and neutralized with dilute sulfuric acid. After standing overnight in a refrigerator the precipitated crystals were filtered, yield 22 g. Repeated recrystallizations from ethyl acetate afforded pure dimethylol-*p*-hydroxyanisole, m. p. 127-128°C, which was a new compound.

Condensations with various phenols were carried out according to the description of our preceding report. From the condensation product with phenol a crystalline compound was isolated with the aid of hot water and was recrystallized from a mixture of benzene and acetic acid, m. p. 192-193°C. The acetate, m. p. 99-100°C, molecular weight, 454. This is considered to be the acetate of a trinuclear compound bis-(*p*-hydroxybenzyl)-*p*-hydroxyanisole with calculated molecular weight 452. The condensation with *p*-cresol afforded beside resinous product crystals, m. p. 179-181°C, whose acetate, m. p. 120-121°C, had molecular weight of 493. This was assumed to be the acetate of trinuclear bis-(2-hydroxy-5-methylbenzyl)-*p*-hydroxyanisole. *o*-Cresol, *m*-cresol, thymol, eugenol, *p*-bromophenol, *o*-bromophenol, *p*-*t*-butylphenol, mono-*t*-butyl-*p*-cresol, mono-*t*-butyl-*o*-cresol and mono-*t*-butyl-*m*-cresol gave resinous products.