mine, and thonzylamine, the crystals do not always seek a common orientation. If they assume the front view orientations shown in Fig. 1, one can observe alpha for dexbrompheniramine and thonzylamine and beta for chlorothen.

It has been mentioned that one or both refractive indices for crystals with inclined orientations cannot be determined within narrow limits. The following are approximate values of some of the intermediate indices taken from crystals in their most frequently occurring orientations: sodium 4,4'-dibromodiphenyldisulfimide, 1.635; 4,4'-dibromodiphenyldisulfimide derivatives of antazoline, 1.671; bromdiphenhydramine, 1.590 and 1.700; chlorothen, 1.661; meclizine, 1.570; methapyrilene, 1.569 and 1.751; thenyldiamine, 1.593 and 1.710; and tripelennamine, 1.570 and 1.720.

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Antimicrobial Properties of Thiosemicarbazones of Aliphatic Ketones

By M. MANOWITZ and G. WALTER

The antimicrobial activity of methyl *n*-alkyl ketone thiosemicarbazones was found to be dependent upon the length of the alkyl chain. Maximum activity was obtained with the thiosemicarbazone of 2-dodecanone.

PREVIOUS INVESTIGATIONS demonstrated significant antimicrobial properties present within a group of thiosemicarbazones of aliphatic aldehydes (1, 2). These studies have been extended to include the thiosemicarbazones of aliphatic ketones.

EXPERIMENTAL AND RESULTS

A homologous series of methyl *n*-alkyl ketone thiosemicarbazones were prepared by usual methods (3). The series extended from acetone to 2-tridecanone, except for 2-hexanone. Twofold serial dilutions of the compounds were prepared in dimethylformamide and tested for antimicrobial activity by previously described procedures (2).

Results of these tests, listed in Table I, demonstrated that activity increased with increasing chain length of the molecule, reaching maximum activity at the 2-dodecanone ($R = C_{10}$) derivative. This structure-activity relationship, as a function of chain length, is analogous to the pattern obtained with aldehyde thiosemicarbazones (2). None of the compounds was active at 250 mcg./ml. against *Escherichia coli*, *Pseudomonas aeruginosa*, *Proteus vulgaris*, *Candida albicans*, *Aspergillus niger*, and *Penicillium piscarium*.

TABLE I.—ANTIMICROBIAL ACTIVITY OF THIOSEMICARBAZONES

$$\underset{\substack{|\\R}}{\overset{\substack{CH_3\\|}}{C}}=N-NH-\underset{}{\overset{\substack{S\\\|}}{C}}-NH_2$$

	Min. Concn. mcg./ml. Completely Inhibiting Growth of Organisms			
R	*S. aureus*	*S. epidermidis*	*St. faecalis*	*A. flavus*
CH_3	x[a]	x	x	x
CH_3CH_2	x	x	x	x
$CH_3(CH_2)_2$	x	x	x	x
$CH_3(CH_2)_4$	x	x	x	x
$CH_3(CH_2)_5$	250	250	x	x
$CH_3(CH_2)_6$	62	31	125	x
$CH_3(CH_2)_7$	31	16	31	x
$CH_3(CH_2)_8$	16	8	16	31
$CH_3(CH_2)_9$	8	4	8	62
$CH_3(CH_2)_{10}$	x	x	x	x

[a] x, denotes growth at 250 mcg./ml.

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