

Letter to the Editor

## Reaction of ephedrines with carbon disulphide

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Sir,

When reacted with carbon disulphide ( $\text{CS}_2$ ) in alkaline solution, most primary amines ( $\text{RNH}_2$ ) form dithiocarbamic acid derivatives. Some primary amines, including amphetamine [1], for example, form isothiocyanates. The role of the substituent, R, in determining the reaction pathway is not well understood, and the product (i.e., dithiocarbamate or isothiocyanate) cannot easily be predicted. Van der Merwe and Hendrikz [2] have described the reaction of norephedrine and norepseudoephedrine with  $\text{CS}_2$ . The latter formed the corresponding isothiocyanate, but norephedrine produced almost equal amounts of the isothiocyanate and the dithiocarbamate.

Secondary amines normally react with  $\text{CS}_2$  to form dithiocarbamates, but isothiocyanates are not produced. Van der Merwe and Hendrikz [2] reported that the major product formed on reacting ephedrine with  $\text{CS}_2$  was the dithiocarbamic acid derivative. These authors also claimed that an isothiocyanate was formed from pseudoephedrine and, as a minor

product, from ephedrine. The structure postulated for this isothiocyanate contained a pentavalent nitrogen atom, and must therefore be considered unlikely.

The reactions of aminoalcohols with  $\text{CS}_2$  have been extensively studied. Moreno-Mañas and Padros [3] showed that ephedrine and pseudoephedrine both produced an intermediate, thought to be the dithiocarbamate, which was efficiently cyclized to 3,4-dimethyl-5-phenyl-2-oxazolidinethione (Fig. 1). Depending on the conditions used, the corresponding oxazolidinone was also formed. Delaunay et al. [4] subsequently studied some of the factors influencing these cyclization reactions. Low et al. [1] showed that ephedrine and pseudoephedrine also undergo a similar cyclization reaction in the presence of mercury (II) or silver (I) ions.

It can be concluded that the product described by Van der Merwe and Hendrikz [2] with molecular ion at  $m/z$  207 is almost certainly the oxazolidinethione shown in Fig. 1.

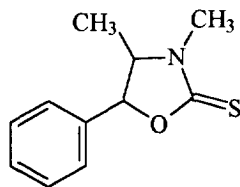


Fig. 1. The structure of 3,4-dimethyl-5-phenyl-2-oxazolidinethione.

### References

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