The Synthesis and Circular Dichroism of (*R*)-Tartrimide and (*S*)-Malimide

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TARTRANIL[1], malanil,[2] and other *N*-substituted derivatives of tartrimide and malimide have been known for many years but the parent imides have not hitherto been prepared. The claim by Badoche[3] to have obtained tartrimide by the action of alcoholic ammonia on diethyl tartrate is not substantiated by our repetition of his work with all likely variations of his conditions. It is noteworthy in this connection that in solution in alcoholic ammonia tartrimide undergoes ring opening to give tartaric acid diamide. The melting point given by Badoche (216°) does not agree with that of our compound.

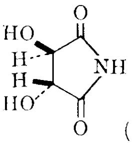
Tartrimide (I) and malimide (II) were obtained by cyclisation of the corresponding amido-esters by sodium or potassium alkoxide in nonaqueous media, the more usual methods failing in these cases.

(*R*)-Tartrimide (m.p. 205—206°, $[\alpha]_D$ +200·9, *c* 2 in H_2O) was made by heating ethyl (*R*) tartramate under reflux with sodium ethoxide in dry benzene or toluene. (*S*)-Malimide (m.p. 96—97°, $[\alpha]_D$ −90·6, *c* 1 in methanol) was obtained by the reaction of either

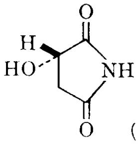
α-ethyl β-(*S*)-malamate
($H_2N{\cdot}CO{\cdot}CH_2{\cdot}CHOH{\cdot}CO_2Et$) or

β-ethyl α-(*S*)-malamate
($EtO_2C{\cdot}CH_2{\cdot}CHOH{\cdot}CONH_2$)

with sodium methoxide in dry benzyl alcohol under vacuum (0·2 mm.) at room temperature.



(I)



(II)

(*R*)-Tartrimide showed a negative circular dichroic maximum at 230 mμ in water (Δε−1·29) whilst in ethanol it had a positive peak at 257 mμ (+0·04) and a negative one at 234 mμ (−0·08). On the other hand the circular dichroic maxima of (*S*)-malimide are positive in both water (246 mμ; +0·55) and ethanol (255 mμ; +0·31). The *N*-alkyl- and *N*-aryl (*R*)-tartrimides show negative dichroic maxima in water and ethanol.

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[1] P. C. Frankland and A. Slator, *Trans. Chem. Soc.*, **1903**, **83**, 1354.
[2] A. E. Arppe, *Annalen*, **1855**, **96**, 110.
[3] M. Badoche, *Compt. rend.*, **1943**, **216**, 62.