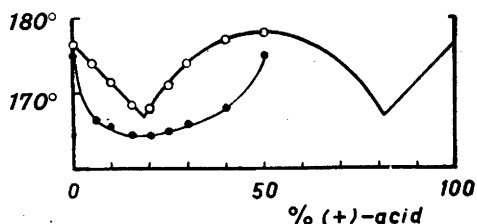# Short Communications

Correlation between Steric Configuration and Growth-regulating Activity of α-(3-Chloro-2-naphthoxy)propionic Acid

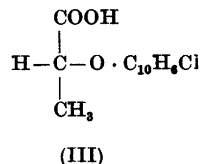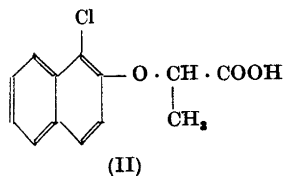MAGNUS MATELL
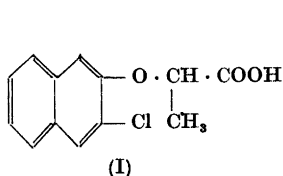
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Fig. 1. *Melting point diagram of (+) - and (—)-α- (3-chloro-2-naphthoxy)propionic acid.*

The resolution of α-(3-chloro-2-naphthoxy)propionic acid (I) into optical antipodes has recently been reported by Pope and Woodcock[1]. According to these authors the (+)-form of the acid (I) is a highly active plant-growth substance while the (—)-form is inactive. Several other optically active plant-growth substances have been investigated by Matell[2-4] and by Åberg[5]. The establishment of the configuration of these compounds led to the conclusion that D-configuration is a necessary condition for auxin activity while L-configuration is associated with anti-auxin activity or inactivity. According to this rule the (+)-form of the acid (I) should belong to the D-series. This conclusion has now been verified by connecting the 3-chloro acid (I) sterically to α-(1-chloro-2-naphthoxy)propionic acid (II). This could

be done by means of the quasi-racemate method[6-8].

The racemic form of the acid (I) is a true racemate as can be seen from Fig. 1. The acid (II) has a still greater tendency to

racemate formation as the middle branch of its melting point curve extends over 80 % of the concentration interval and the racemate melts 10° higher than the antipodes[9]. Thus the conditions for the formation of a quasi-racemate between the acids (I) and (II) are favourable not only because of their structural similarity. The melting point diagram of the acids (I) and (II) with opposite directions of rotation (Fig. 2) shows the existence of a molecular compound in the ratio 1:1, which is evidently a quasi-racemate as no molecular compound is formed between the acids with the same direction of rotation (Fig. 3). The configuration of the 1-chloro isomer (II) is known; the (+)-form belongs to the

D-series[9,10]. By definition the components of a quasi-racemate have opposite configurations and thus the (+)-form of the 3-chloro isomer (I) has D-configuration. It is represented by the stereoformula (III).
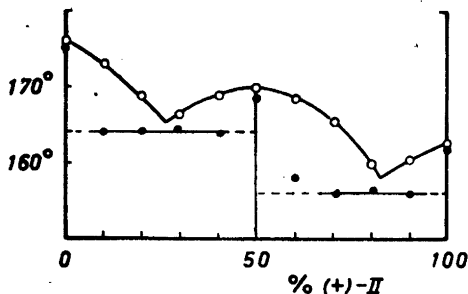
(I) $\quad$ O·CH·COOH, Cl, CH$_3$

(II) $\quad$ O·CH·COOH, CH$_3$

(III) $\quad$ COOH, H—C—O·C$_{10}$H$_6$Cl, CH$_3$

Fig. 2. Melting point diagram of (—)-α-(3-chloro-2-naphthoxy)propionic acid (I) and (+)-α-(1-chloro-2-naphthoxy)propionic acid (II).

Experimental. — Melting point diagrams.
Weighed quantities of the components were dissolved in acetone. After evaporation to dryness the residue was powdered and the melting point determined with a hot stage microscope according to Kofler [11].

The author thanks Dr. D. Woodcock for samples of optically active α-(3-chloro-2-naphthoxy) propionic acid.

1. Pope, P. and Woodcock, D. *J. Chem. Soc.* 1955 577.
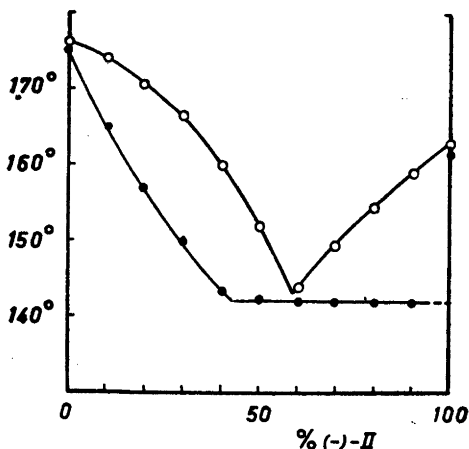2. Matell, M. *Ann. Roy. Agr. Coll. Sweden* 20 (1953) 205.

Fig. 3. Melting point diagram of (—)-α-(3-chloro-2-naphthoxy)propionic acid (I) and (—)-α-(1-chloro-2-naphthoxy)propionic acid (II).

3. Matell, M. *Arkiv Kemi* 7 (1954) 437.
4. Matell, M. *Ibid.* 8 (1955) 79.
5. Åberg, B. *Ann. Roy. Agr. Coll. Sweden* 20 (1953) 241.
6. Fredga, A. *The Svedberg 1884 30/8 1944*, Uppsala 1944, p. 261.
7. Matell, M. *Mikrochemie ver. Microchim. Acta* 38 (1951) 532.
8. Timmermans, J. *J. Chim. Phys.* 49 (1952) 162.
9. Matell, M. and Larsson, S. *Arkiv Kemi* 5 (1953) 379.
10. Matell, M. *Ibid.* 6 (1953) 355.
11. Kofler, L., Kofler, A. and Brandstätter, M. *Thermo-Mikro-Methoden*, 3rd Ed. Innsbruck 1954, pp. 4, 17.

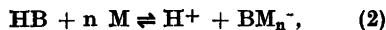# On the Formation of Boric Acid -Mannitol Complexes

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The formation of boric acid-mannitol complexes has been the object of many studies, but only a few quantitative investigations of the reaction in question have been published. The author of this paper has previously studied [1] the influence of mannitol on the ionization of boric acid in aqueous solutions of some alkali salts and shown that the apparent ionization constant K^* of boric acid in dilute boric acid solutions can be expressed in the form:

$$K^* = K \cdot C^n, \qquad (1)$$

where C is the stoichiometric concentration of mannitol, n the average number of mannitol molecules which combine with one molecule of boric acid and K the equilibrium constant for the reaction:

$$HB + n\ M \rightleftharpoons H^+ + BM_n^-, \qquad (2)$$

where HB and M designate boric acid and mannitol, respectively, and BM_n^- the anion of the acid formed.

The values of the complex formation constant K obtained by previous workers [2-8] show a considerable variation with varying concentration of mannitol. Most probably one reason for this variation lies in the