SPECIAL ARTICLES

ON THE CONFIGURATIONAL RELATIONSHIP BETWEEN β-OXYBUTYRIC AND LACTIC ACID

IT was shown in a previous communication[1] that levorotatory β-oxybutyric acid is configurationally related to levorotatory propylene glycol. That is, the asymmetric carbon atoms in these two substances have the same configuration when they rotate polarized light in the same direction. Independently of us and simultaneously this fact was ascertained by P. Karrer and W. Klarer.[2] We now find that lactic acid also can be converted into propylene glycol by the reduction of ethyl lactate with metallic sodium and alcohol. The glycol obtained in this manner rotates in the same direction as the original free lactic acid. Here again, in the glycol and in the lactic acid the asymmetric carbon atoms have the identical configuration when the acid and the glycol rotate in the same direction.

Therefore, a lactic acid and a β-oxybutyric acid are configurationally related when both are convertible into the identical glycol. In the present experiment, the starting material was lactic acid of low optical activity $[\alpha]_D^{20} = +0.7°$. The ester had a specific rotation of $[\alpha]_D^{20} = -2.5°$. The glycol had a rotation of $[\alpha]_D^{20} = +0.6°$. Its composition was C = 47.72%; H = 10.66%, the theory requires C = 47.37%; H = 10.52%.

P. A. LEVENE
H. L. HALLER

THE ROCKEFELLER INSTITUTE

VARIATION IN GROWTH OF NURSERY GRAFTS

THE variable growth of apple grafts in the nursery is commonly ascribed to such causes as variation in the seedling stocks, incompatibility of stock and scion and poorly made grafts. While working upon the latter problem, it is believed that the principal cause of the extreme variation in growth has been found. The explanation to be offered developed from three observations: (1) The growth of the scion is usually made from the top bud; (2) the callus union is best along the tongues of the graft; and (3) the rapid rise of water during transpiration is in a straight line with very slow lateral diffusion. It is suggested then that, in order to secure the best condition for good growth, *the top bud of the scion should be directly above the point of union.*

More than 1,500 grafts of the 1925 planting were examined in early June to determine the relation of growth to bud position. The growth condition was recorded as bud dead, poor (only a few leaves forced out), medium (a few inches long but growth stopped), and good (actively growing at the time of observation). The bud positions were described by number as follows:

(1) Above matched side of tongues;
(2) Above lower lip of scion;
(3) Above mismatched side of tongues (opposite 1); and
(4) Above upper lip of stock (opposite 2).

Grafts made with the scion and root of equal size permitting a more extensive callus union had 6 per cent. more good, 19 per cent. more medium, and 25 per cent. less dead and poor growths than grafts with the scion and root of unequal size. The following data were secured from 907 of the latter grafts:

	Percentage	
Position 1 (343)	91.9	good
	.3	dead
	2.3	poor
Position 2 (141)	9.9	good
	9.9	dead
	61.8	poor
Position 3 (182)	0.0	good
	7.8	dead
	88.9	poor
Position 4 (241)	4.6	good
	21.2	dead
	63.8	poor

In the case of equal-sized parts of the graft, approximately one third of the buds in positions 2 and 4 were making a good growth. There was a corresponding reduction in dead and poor growths. Of all dead buds observed, 78.8 per cent. were on position 4 where the direct ascent of moisture is often cut off.

Clearly, the position of the bud in relation to the point of union would seem to be the principal cause of the great variation in the early season growth of the grafts. Fortunately, only a slight reduction in the speed with which grafts are made will permit of all grafts being put together with the top bud of the scion directly above the matched tongues (position 1).

In addition to the practical significance of this finding, there is also the following item of technical importance: By eliminating the great variation in growth of the grafts due to the position of the bud on the scion, it will be possible to measure more accurately than has been done heretofore the interrelations of stock and scion.

R. H. ROBERTS

UNIVERSITY OF WISCONSIN

[1] *Journ. Biol. Chem.* (1925), lxv, 49.
[2] *Helv. Chim. Acta* (1925), viii, 393.