

## STUDIES ON MERCAPTALS OF SUGARS. I. NORMAL BUTYL MERCAPTALS OF SUGARS.<sup>(2)</sup>

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Fisher<sup>(3)</sup> found that a glucoside was produced by the condensation of the sugar and the alcohol in presence of hydrochloric acid. When the aldehyde being treated with the mercaptan, a substance "mercaptal," named by Baumann,<sup>(4)</sup> was prepared. Fisher<sup>(5)</sup> obtained various mercaptals in crystalline

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(2) Read before the Chemical Society of Japan, April 6, 1924. The original paper will be published in the *Journal of the Chemical Society of Japan*, and this is an abstract from the original one.

(3) Fisher, *Ber.*, 26 (1893), 2400.

(4) Baumann, *Ber.*, 18 (1885), 884.

(5) Fisher, *Ber.*, 27 (1894), 673.

form by the condensation of sugars and mercaptans in presence of concentrated hydrochloric acid. He used ethyl and amyl mercaptan.

The present authors have studied on the normal butyl mercaptals of various sugars and obtained various crystalline mercaptals. Five monoses, arabinose, glucose, galactose, mannose and rhamnose; three dioses, lactose, maltose and sucrose were tried and the mercaptals thus prepared were crystallized from dilute alcohol. Xylose and fructose were tried, but ended in negative results.

The new mercaptals of sugars prepared by us have the following formula, which were ascertained by the analysis.

Glucose-N-butyl mercaptal		$C_6H_{12}O_5(C_4H_9S)_2$
Galactose	„	$C_6H_{12}O_5(C_4H_9S)_2$
Mannose	„	$C_6H_{12}O_5(C_4H_9S)_2$
Rhamnose	„	$CH_3 C_5H_9O_4(C_4H_9S)_2$
Arabinose	„	$C_5H_{10}O_4(C_4H_9S)_2$
Maltose	„	$C_{12}H_{22}O_9(C_4H_9S)_4$
Lactose	„	$C_{12}H_{22}O_9(C_4H_9S)_4$
Sucrose	„	$C_{12}H_{22}O_9(C_4H_9S)_4$

The physical constants of these mercaptals have been measured and are tabulated as follows.

	M.p.	Sp. rotation.
Glucose-N-butyl mercaptal	124°	$[\alpha]_D^{120} = +27.00$
Galactose	123	„ = +12.67
Mannose	117	$[\alpha]_D^{30} = +16.45$
Rhamnose	119	„ = +16.49
Arabinose	111.5	„ = +14.00
Maltose	126	„ = +12.00
Lactose	106	„ = +23.55
Sucrose	123	„ = + 3.71

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