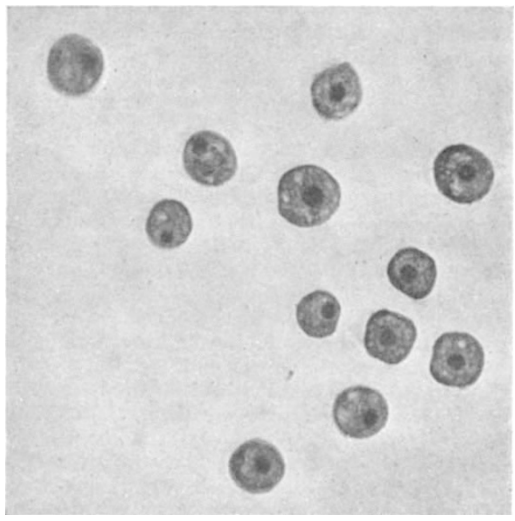

Erythrocytes of *Priapulus*. Cells fixed with Bouin's fluid and stained by Giemsa-solution. (Photo by G. Gustafson)

A more detailed account of this investigation will be published later.

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[1] Marrian, G. F., *Brit. J. Exp. Biol.*, **4**, 357 (1927).
[2] Florkin, M., *Arch. Intern. Physiol.*, **36**, 247 (1933).

Composition of Linseed Mucilage

THE study of the complex mixture obtained on hydrolysis of the polysaccharides has been facilitated by the application of the methods of partition chromatography[1] to the study of carbohydrates[2]. Using these methods, the mucilage obtained from the sperms of linseed (*Linum usitatissimum* var. Redwing) by extraction with water is under investigation. This mucilage is of special interest because it has been proved that the rarely occurring hexose, L-galactose, is a constituent sugar[3]. Hilger[4] reported the presence of xylose, glucose, arabinose, galactose, and an acidic fraction, which was later identified as an aldobionic acid consisting of D-galacturonic acid and L-rhamnose[5]. However, later workers have not confirmed the presence of arabinose or glucose.

A preliminary examination of the mucilaginous solution showed that the purified, ash-free mucilage (equiv. 850) may be fractionated by using copper acetate into a water-insoluble copper salt (equiv. 420; yield 45 per cent) and a water-soluble fraction (equiv. 1,050; yield 55 per cent). Investigation of the acid-hydrolysis products of the soluble fraction by means of paper partition chromatography on strips of filter paper, both qualitatively and quantitatively[6], suggested the presence of galactose (12 per cent), arabinose (12 per cent), xylose (27 per cent), ribose or fucose (trace) and rhamnose (29 per cent). Using similar methods, study of the insoluble fraction indicated the presence of galactose (8 per cent), arabinose (9 per cent), xylose (25 per cent) and rhamnose (13 per cent).

The identity of the sugars in the soluble fraction was confirmed by an examination of the products of hydrolysis of the purified fraction (1·5 gm.). The sugar mixture, after separation from the acidic fraction, was separated into its component sugars, using a column of powdered cellulose, with *n*-butanol saturated with water as the mobile phase[7]. Six fractions were thus obtained (see table). The small yield of rhamnose showed that most of the relatively stable aldobiuronic acid had escaped hydrolysis.

Fraction II was oxidized using sodium meta-periodate, a modification[8] of the Nicolet and Shinn[9] method being employed. The formation of a small amount of acetaldehyde proved the presence of a trace of methyl pentose. Further evidence for a methyl pentose was afforded by the colour reaction with aniline trichloracetate and anisidine acetate. A comparison of the rate of movement with that of fucose on the paper chromatogram using various solvents suggested that linseed mucilage contains this methyl pentose.

Fraction	Yield (mgm.)	R_G value of sugar present	$[\alpha]_D$ in water	Sugar	Derivative
I	68	0·30	+8	L-Rhamnose	Benzoyl hydrazone
II	21	0·21; 0·17	—	Methyl pentose; D-Xylose	(Acetaldehyde)
III	368	0·17	+25	D-Xylose	Dibenzilidene dimethyl-acetal
IV	119	0·135	+98	L-Arabinose	Benzoyl hydrazone
V	50	0·135; 0·075	—	L-Arabinose; L-Galactose	—
VI	101	0·075	−70	L-Galactose	1-Methyl-1-phenylhydrazone

Fraction IV gave the colour reaction for a pentose with aniline trichloracetate, and the rate of movement was identical with that of arabinose. This was confirmed by the formation of the benzoyl hydrazone in quantitative yield[10], the positive rotation of the sugar solution providing the final evidence for the presence of L-arabinose. This work confirms the earlier work of Hilger; but no glucose was discovered in the acid hydrolysate.

The occurrence of L-galactose with D-galacturonic acid and L-arabinose is of great interest. It has been suggested that the pentoses originate by a process of decarboxylation of the uronic acids[11], which are formed by oxidation of the corresponding hexoses. Evidence for this theory is afforded by the co-existence of D-galactose, D-galacturonic acid, and L-arabinose in a number of mucilages. The sugars in linseed mucilage thus exhibit a very interesting anomaly since it is impossible for the galacturonic acid or arabinose to arise from the L-galactose by any simple mechanism.

Further work is in progress.

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[1] Consden, Gordon and Martin, *Biochem. J.*, **38**, 224 (1944).
[2] Partridge, *Nature*, **158**, 270 (1946).
[3] Anderson and Lane, *J. Biol. Chem.*, **168**, 289 (1947).
[4] Hilger, *Berichte*, **36**, 3197 (1903).
[5] Anderson and Crowder, *J. Amer. Chem. Soc.*, **52**, 3711 (1930).
[6] Hough, Hirst and Jones, *J. Chem. Soc.*, 928 (1949).
[7] Hough, Jones and Wadman, *J. Chem. Soc.*, 2511 (1949).
[8] Unpublished results.
[9] Nicolet and Shinn, *J. Amer. Chem. Soc.*, **63**, 1456 (1941).
[10] Hirst, Jones and Woods, *J. Chem. Soc.*, 1048 (1947).
[11] Hirst, *J. Chem. Soc.*, 71 (1942).

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