CLXXI. EFFECT OF SOIL TREATMENT ON THE VITAMIN B₁ CONTENT OF WHEAT AND BARLEY

By P. C. LEONG¹

*From the Nutritional Laboratory, Medical Research Council and University
of Cambridge*

(Received 15 July 1939)

VARIOUS investigators have claimed that the nature of the manure applied to the soil influences the "vitamin B" content of wheat [McCarrison & Viswanath, 1926; Hunt, 1927] and grass seeds [Rowlands & Wilkinson, 1930]. Employing the bradycardia method of assay, Harris [1934] found that specimens of wheat from plots at the Rothamsted Experimental Station which had been treated with different types of manure did not show any striking variation in their vitamin B₁ content. Since then it has also been reported by other workers that differences in soil treatment did not affect the vitamin B₁ content of wheat [Scheunert & Schieblich, 1936] or of rye and barley [Scheunert & Wagner, 1937].

This note describes the results of further studies on the vitamin B₁ content of samples of wheat and barley harvested at Rothamsted in 1935 and 1936. The details of the soil treatment of the various plots are given in Table I.

Table I. *Details of soil treatment to the continuous wheat and barley plots at the Rothamsted Experimental Station*

Wheat Broadbalk Plot no.	Barley Hoosfield Plot no.	Type of manure
2	7-2	14 tons of dung per acre
3	6-1	No manure
5	4-0	Complete mineral manure: 3½ cwt. superphosphate 200 lb. sulphate of potash 100 lb. sulphate of soda 100 lb. sulphate of magnesia } per acre
7	4-A	Complete mineral manure plus 412 lb. of ammonium sulphate per acre
10	1-A	412 lb. of ammonium sulphate per acre

Method of assay. The bradycardia method [Drury & Harris, 1930; Birch & Harris, 1934] was employed. Comparative tests with graded doses of the International Standard (activated acid clay) were carried out simultaneously with these assays. A dose-response curve with the International Standard was constructed, from which the vitamin B₁ potency of the substance under test could be obtained by inspection [see Leong & Harris, 1937]. In assaying the flours a uniform dose of 2 g. of the finely ground meal was given to each test rat. The material was made into a thick paste with water before being administered.

Results. The results are detailed in Table II and depicted in Fig. 1. The tests on the whole wheat flours confirmed the previous observation of Harris [1934]

¹ At present in the Biochemical Department, King Edward VII College of Medicine, Singapore.

in that there were no appreciable differences in the vitamin B₁ contents of the samples from the various plots. The values obtained for the 5 specimens of wheat flours ranged from 1.0 to 1.3 i.u. per g.

Table II. *Results of bradycardia tests on wheat and barley*

Material and plot no.	Period of cure of bradycardia, days (individual tests)	Mean	i.u. vitamin B ₁ per g.
Wheat, 1935:			
2	3.5, 3.5, 4, 4, 4, 4.5, 5, 6, 7, 8	5.0	1.2
3	3, 3, 4, 4, 4, 4.5, 5, 5, 5, 6	4.4	1.0
5	3.5, 3.5, 4, 4, 5, 5, 5.5, 7, 8, 8	5.4	1.3
7	3, 3.5, 4, 4, 4, 5, 5, 6, 6.5, 8	5.1	1.2
10	3.5, 3.5, 4, 4.5, 5, 5, 5.5, 6, 7, 8	5.2	1.2
Barley, 1935:			
7-2	5, 7, 8.5, 9, 9, 10	8.1	2.0
6-1	2.5, 3.5, 5, 5.5, 5.5, 6.5	4.8	1.1
4-0	4, 5, 5, 5, 5.5, 7	5.3	1.3
4-A	3.5, 4, 4.5, 5, 5, 6	4.7	1.1
1-A	2.5, 4.5, 5, 5, 5, 7	4.8	1.1
Barley, 1936:			
7-2	4, 4, 4, 5, 5, 5, 6	4.8	1.1
6-1	3, 3, 3, 4.5, 5, 5	3.9	0.8
4-0	2, 3, 3, 3.5, 5, 6	3.8	0.8
4-A	3, 3, 3, 4, 4, 5	3.7	0.8
1-A	4, 4, 4, 4.5, 5, 7	4.8	1.1
International standard, acid clay (mg.):			
10	2, 2, 2.5, 3, 3	2.5	—
20	3.5, 4.5, 4.5, 5, 5.5	4.6	—
30	4.5, 5.5, 6, 6, 8	6.0	—
40	6, 7, 7.5, 9, 10	7.9	—

Fig. 1. Vitamin B₁ content of wheat and barley.

As regards the barley flours in the 1935 crop a higher vitamin B₁ content was found in the specimen from the plot treated with dung (2.0 i.u. per g.) than in the others, which gave an average value of about 1.2 i.u. per g. This test was again repeated with the barley crop obtained in 1936. On this occasion, however, no significant variation in the vitamin B₁ contents of the various plots was observed.

SUMMARY

The observation of Harris that the vitamin B₁ potency of wheat was not significantly influenced by soil treatment has been confirmed. Similar results were also obtained for barley.

My thanks are due to Sir John Russell and Dr Leslie Harris for their collaboration in this work.

REFERENCES

- Birch & Harris (1934). *Biochem. J.* **28**, 602.
Drury & Harris (1930). *J. Soc. chem. Ind. Lond.* **49**, 851.
Harris (1934). *J. agric. Sci.* **24**, 410.
Hunt (1927). *Bull. Ohio agric. Exp. Sta.* no. 415, 3.
Leong & Harris (1937). *Biochem. J.* **31**, 672.
McCarrison & Viswanath (1926). *Ind. J. med. Res.* **14**, 351.
Rowlands & Wilkinson (1930). *Biochem. J.* **24**, 199.
Scheunert & Schieblich (1936). *Biederm. Zbl. B, Tierernahrung*, **8**, 120.
—— & Wagner (1937). *Biochem. Z.* **295**, 107.