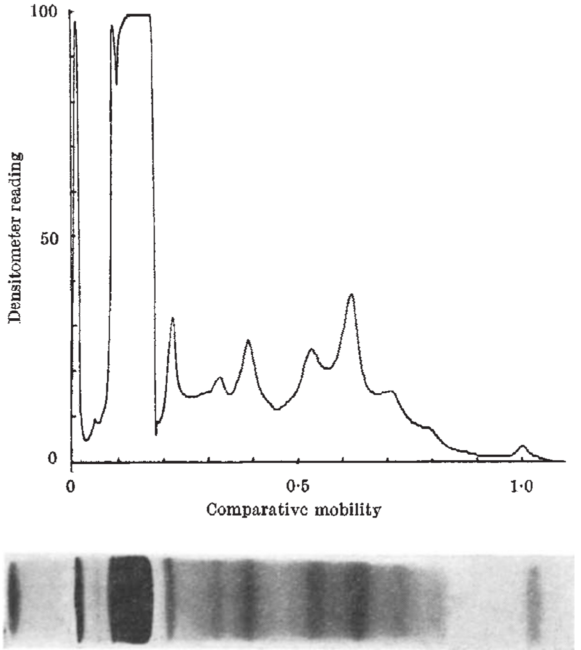

Fig. 1. Electrophoretic separation and corresponding densitometer tracing of the soluble leaf proteins of *Triticum dicoccum*. Direction of migration is left to right. The large pore spacer gel protrudes to the left of the origin

ported[7] to have a higher mobility than the other leaf proteins, its relatively large size (molecular weight of 375,000 (ref. 8)) was probably responsible for its low mobility in 7·5 per cent polyacrylamide (pore size 50 Å (ref. 6)).

At present fifteen to eighteen bands can be distinguished and this may be improved by current investigations designed to refine the technique. The method is being used to investigate the role of leaf proteins in rust infection of wheat plants.

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[1] Heitefuss, R., Buchanan-Davidson, D. J., and Stahmann, M. A., *Arch. Biochem. Biophys.*, **85**, 200 (1959).
[2] Mendiola, L., and Akazawa, T., *Biochemistry*, **3**, 174 (1964).
[3] Staples, R. C., and Stahmann, M. A., *Phytopathology*, **54**, 760 (1964).
[4] Racusen, D., and Calvanico, N., *Anal. Biochem.*, **7**, 62 (1964).
[5] Steward, F. C., and Barber, J. T., *Ann. N.Y. Acad. Sci.*, **121**, 525 (1964).
[6] Ornstein, L., and Davis, B. J., *Disc Electrophoresis*, preprinted by Distillation Products Industries.
[7] Wildman, S. G., and Bonner, J., *Arch. Biochem.*, **14**, 381 (1947).
[8] Eggman, L., Singer, S. J., and Wildman, S. G., *J. Biol. Chem.*, **205**, 969 (1953).

Available Lysine Content of Dried Milk

The heat treatment to which milk is subjected during drying causes some combination between the ε-amino groups of lysine and lactose, which renders such lysine unavailable for nutritional purposes. Since drying conditions on rollers are more severe than in a spray chamber it is possible that there is less available lysine in roller-dried than in spray-dried powder. A series of available lysine determinations was made on both types of powder from a number of factories to discover the extent of the loss of this essential amino-acid and to learn whether such losses are sufficient to cause any deficiency under normal conditions of feeding.

Four different batches of powder from separate factories were tested in duplicate, using Carpenter's[1] dinitrofluorobenzene method as modified by Rao *et al.*[2], and correcting for the loss due to the acid hydrolysis in the presence of lactose. The results are shown in Table 1, together with figures for raw bulk milk. By comparing the results for liquid and dried milk an estimate can be made of the average percentage of lysine destroyed during production in each case.

Table 1. Available Lysine Content of Liquid and Dried Milk

Factory	Available lysine (g/16 g N) Maximum	Minimum	Mean	Average percentage destruction of lysine
		Liquid milk		
—	7·5	7·4	7·4	—
		Spray-dried milk		
A	7·3	6·9	7·1	4·1
B	7·6	7·4	7·4	Nil
C	7·3	6·9	7·1	4·1
		Roller-dried milk		
A	6·5	5·8	6·2	16·2
D	7·3	7·1	7·2	2·7
E	7·4	6·9	7·2	2·7
F	6·5	6·0	6·2	16·2
G	7·3	6·2	6·7	9·5

Table 2. Comparison of the Available Lysine of Human Milk and of Reconstituted Full-cream Roller-dried Powders

	Available lysine (g/16 g N)	Protein (per cent)	Available lysine (mg/100 ml.)
Human milk (ref. 3)	6·2	1·5	93
Reconstituted full-cream roller powder, best individual sample	7·4	3·3	244
Reconstituted full-cream roller powder, worst individual sample	5·8	3·3	191

Table 3. Daily Requirement of the Infant for Lysine

Minimum weight of lysine required per kg body-weight per day (ref. 4)	103 mg
Weight of lysine supplied per kg body-weight per day by full-cream roller powder (70 g):	
(*a*) Best individual sample	347 mg
(*b*) Worst individual sample	274 mg

The loss of lysine in the spray powders, and in the roller powders from factories *D* and *E*, is very small. The loss is greater in roller powders from factories *A*, *F* and *G*, but is in no case sufficiently high to make these products deficient in this amino-acid when used for infant feeding. This aspect is demonstrated in Tables 2 and 3, where comparisons are made with human milk and with the daily requirements of the infant.

All the individual samples of powder examined are richer sources of lysine than is average human milk, and when fed in the proportions normally recommended for infants they will provide two and a half to three times the minimum daily requirements.

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[1] Carpenter, K. J., Ellinger, G. M., Munro, J. I., and Rolf, E. J., *Brit. J. Nutrition*, **11**, 162 (1957).
[2] Rao, S. R., Carter, F. L., and Frampton, V. L., *Anal. Chem.*, **35**, 1927 (1963).
[3] *United States National Research Council Bulletin 254, The Composition of Milks* (1953).
[4] Holt, jun., L. E., and Snyderman, S. E., in *Protein and Amino-Acid Requirements in Early Life*, by Holt, jun., L. E., *et al.* (New York University Press, 1960).

Production of Peptide Alkaloids in Submerged Culture by a Strain of *Claviceps purpurea* (Fr.) Tul.

The production of lysergic acid α-ethoxy amide in submerged culture by a strain of *Claviceps paspali* Stev. et Hall was reported earlier[1-3]. The present communication describes the production of ergotamine in submerged culture by a strain of *Claviceps purpurea* (Fr.) Tul. isolated from a sclerotium found in Spain on a variety of Triticale (an artificial hybrid between wheat and rye). This strain (*IC*/39/20 of the collection of the Department of Biochemistry, Imperial College of Science and Technology, London), unlike other strains of *Claviceps purpurea*, does not produce conidia in any of the media tested. The