

asurements. The tellurium content in $MnTe_2$ appears to be less than required by the formula $MnTe_{2.00}$ at the temperature used in these experiments as this alloy (12) is found to be a two-phase preparation.

It has been pointed out by Biltz and Klemm⁷, that the Mn^{++} ion is extraordinary stable, and it is therefore only to be expected that $MnTe$ and $MnTe_2$, in contradiction to analogous compounds of related metals, have no, or a very small, homogeneity range.

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Strepogenin as a Growth Factor for *Lactobacillus bifidus*

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In 1941 the presence in liver of a new growth factor, effective for certain hemolytic streptococci, was demonstrated by Woolley¹. Later Wright and Skeggs² established that enzymatic digests of casein were potent sources of this factor, and Sprince and Woolley^{3,4} showed that the factor could be found in enzymatic hydro-

lysates of a number of proteins, insulin probably being the most potent source. The last-mentioned authors named the factor "strepogenin", introduced the use of *Lactobacillus casei* for its microbiological assay, and cited evidence for its tripeptide nature. More recently Wright *et al.*⁵ reported that strepogenin, under certain conditions, is essential for *Lactobacillus bulgaricus*. They proposed the use of this organism in the assay of strepogenin, while Kodicek and Mistry⁶, on the other hand, improved the *L. casei*-method for the same purpose.

Investigating the nutritional requirements of a *Lactobacillus bifidus* strain, isolated from the faeces of a breast-fed infant, the present authors⁷ were able to show that strepogenin was essential for its maximal growth. Further evidence of the strepogenin requirement of *L. bifidus* is given in this paper.

In all experiments on the strepogenin requirement of our strain, labelled TM 2, the synthetic basal medium of Hassinen *et al.*⁸ was employed. This medium which, in addition to lactose, sodium acetate, and salts A (KH_2PO_4 , K_2HPO_4) and salts B ($MgSO_4$, $FeSO_4$, $NaCl$, $MnSO_4$), contains only ammonium acetate, cysteine, Ca-pantothenate and biotin, is reported to meet the nutritional requirements of *L. bifidus*. Inocula of the test-organism were prepared in the usual way as cell suspensions in sterile saline. Incubation of the tubes was carried out at 37° for about 70 hours. The growth was measured titrimetrically. The different protein digests investigated were prepared by hydrolysing the proteins with trypsin at 37° for 24 hours. To test the effect of acid-hydrolysis these digests were boiled with equal parts of conc. HCl for 3 hours.

The growth-promoting effect of the tryptic digests of certain proteins is evident from Table 1. Untreated proteins are much less active, while the acid-hydrolysates are completely inactive. Trypsin alone has practically no activity. A mixture of amino acids composed so as to simulate the amino acid composition of casein has only a very slight activity.

Table 1. Effect of different protein preparations on the growth of *L. bifidus* (TM 2).

		Addition to the basal medium	Consumption of 0.1 N NaOH ml/10 ml medium
Exp. A.	1.	None	1.9
	2.	Casein, 0.6 mg/ml	3.8
	3.	Egg albumin, 0.6 mg/ml	7.9
	4.	Blood albumin, 0.6 mg/ml	9.9
	5.	Pepsin, 0.6 mg/ml	6.9
	6.	Gelatin, 0.6 mg/ml	3.1
	7.	Tryptic digest of casein, 0.6 mg/ml	10.4
	8.	» » » egg albumin, 0.2 mg/ml *	14.4
	9.	» » » blood albumin, 0.6 mg/ml	13.2
	10.	» » » pepsin, 0.6 mg/ml	11.7
	11.	» » » gelatin, 0.6 mg/ml	8.9
Exp. B.	1.	None	1.4
	2.	Acid treated tryptic digest of casein	1.1
	3.	» » » » » egg albumin	1.6
	4.	» » » » » blood albumin	1.6
	5.	» » » » » pepsin	1.7
	6.	» » » » » gelatin	1.4
	7.	Trypsin, at the level corresponding to that used in the tryptic digests	2.7
	8.	Amino acid mixture, composed so as to simulate the amino acid composition of casein	3.3

* Because of the high activity of the egg albumin hydrolysate this preparation was tested at a lower level than the others.

Table 2. Effect of the tryptic digest of egg albumin on the growth of different *L. bifidus* strains.

Strain	Consumption of 0.1 N NaOH ml/10 ml medium	
	Basal medium	Basal medium + egg albumin digest (200 µg/ml)
TM 2	3.2	17.9
T 3	0.6	10.6
T 10	0.8	9.7
K 15	0.7	11.1

In addition to strain TM 2 we have investigated several other *L. bifidus* strains isolated from the faeces of different breast-fed infants. As can be seen from Table 2 the results obtained are in good agreement with those of strain TM 2. Thus it seems

evident that at least under the cultural conditions employed by us streptogenin is an essential growth factor for *Lactobacillus bifidus*.

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