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# Short Communications

## On the System Manganese-Tellurium

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The compounds MnTe and $MnTe_2$ have earlier been prepared and investigated by X-ray methods. They are found to have structures characteristic of compounds of the transition elements Ti-Ni with the elements in the sixth group (O-Te), as MnTe has the NiAs structure [1] and $MnTe_2$ the pyrite structure [2,3]. In some of the related systems other phases of lower symmetry are also found [4], and we have prepared a number of alloys of manganese and tellurium in order to find out whether any such phases exist in this system.

Weighed quantities of manganese and tellurium (pure to about 99.9 and 99.7 % respectively) were kept at about 800° C for 30 hrs in evacuated silica tubes. The alloys were carefully crushed, then annealed at 500° C for two months and finally quenched in ice water. The following alloys were prepared and investigated: Mn (1), $MnTe_{0.5}$ (2), $MnTe_{0.8}$ (3), $MnTe_{0.9}$ (4), $MnTe_{1.0}$ (5), $MnTe_{1.1}$ (6), $MnTe_{1.2}$ (7), $MnTe_{1.3}$ (8), $MnTe_{1.4}$ (9), $MnTe_{1.6}$ (10), $MnTe_{1.8}$ (11), $MnTe_{2.0}$ (12), $MnTe_{2.1}$ (13), $MnTe_{3.0}$ (14), $MnTe_{3.5}$ (15), and Te (16). X-ray diagrams were taken of all the alloys, using Fe$K$ radiation (wave length Fe$K\alpha_1$ = 1.9360 Å) and a powder camera 114.6 mm in diameter. Lines from the following phases were observed on the diagrams:

| Alloy | Phases observed |
|---|---|
| (1) | $\alpha$-Mn |
| (2), (3) | $\alpha$-Mn + MnTe |
| (4), (5) | MnTe |
| (6)–(10) | MnTe + $MnTe_2$ |
| (11) | $MnTe_2$ |
| (12)–(15) | $MnTe_2$ + Te |
| (16) | Te |

No other phases were detected. The lattice constants were determined to be:

| | |
|---|---|
| $\alpha$-Mn: | cubic, $a$ = 8.911 Å (± 0.002 Å) |
| MnTe: | hexagonal, $a$ = 4.146 Å, $c$ = 6.709 Å (± 0.005 Å) |
| $MnTe_2$: | cubic, $a$ = 6.951 Å (± 0.002 Å) |
| Te: | hexagonal, $a$ = 4.457 Å, $c$ = 5.916 Å (± 0.006 Å) |

These measurements are in good agreement with those reported in the literature ($\alpha$-Mn: $a$ = 8.912 Å[5]; MnTe: $a$ = 4.132 Å, $c$ = 6.711 Å[1]; $MnTe_2$: $a$ = 6.954 Å[2]; Te: $a$ = 4.454 Å, $c$ = 5.922 Å[6]. The values refer to the same value of the X-ray wave length as in the present investigation).

The lattice constants of $\alpha$-Mn, MnTe, $MnTe_2$ and Te are found not to vary with the composition of the alloys within the experimental error (± 0.002 Å). However, a slight variation cannot be excluded, thus the lattice constant of $MnTe_2$ in the alloys (6)–(11) appear to be slightly (about 0.001 Å) greater than in the alloys (12)–(15). At any rate, the homogeneity range of the phases, if any, must be very small. The phase boundaries, or the exact composition, of the phases MnTe and $MnTe_2$ cannot be deduced from the present me-

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 Klemm [7], 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 Woolley [1]. Later Wright and Skeggs [2] 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 hydrolysates 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 Mistry [6], 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 authors [7] 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.