substance (factor L) will be found to be active in very small doses. If the total failure of lactation on the otherwise complete synthetic diet can be prevented by a minute amount of the substance in question, it would seem that the latter may reasonably be classed under the category of vitamins.

In conclusion, we take the pleasure of expressing our sincere appreciation to Professor U. Suzuki, M. I. A., for his cordial encouragement and valuable criticisms.

LITERATURE

- (1) L. W. Mapson: Biochem. J., **26**, 970 (1932).
- (2) H. G. Smith and W. H. Seegers: J. Nutrition, **7**, 209 (1934).
- (3) W. Nakahara, F. Inukai and S. Kato: Proc. Imp. Acad., **10**, 268 (1934); Sc. Pap. I. P. C. R., **24**, 155 (1934).
- (4) J. F. Feaster and V. E. Nelson: Proc. Soc. Exp. Biol. Med., **32**, 1456 (1935).
- (5) R. G. Daggs and R. L. Tomboulion: J. Nutrition, **5**, 581 (1935).
- (6) W. Nakahara and F. Inukai: Sc. Pap. I. P. C. R., **22**, 301 (1932).

On a Substance Causing Turbidity in the Syrup of Canned Mandarin Oranges (*Citrus Unshiu Marc*).

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The canning of mandarin oranges has recently grown to a large industry in Nippon, and occupies the foremost place in the exportation list of this kind. It has, however, a defect of causing turbidity in the syrup after it is manufactured.

The authors observed that the turbidity consisted of two substances, one is amorphous and the other white crystals of very fine needles. So the authors studied the crystalline substance particularly and isolated hesperidin by the following method.

Isolation of the crystalline substance:- The syrup of canned mandarin oranges was centrifuged, and the sediment in the tubes was sacked on a filter paper and dried up in a desiccator. This dried substance was dissolved with 50% alcohol on the boiling water bath. The yellowish solution was filtered in order to remove some insoluble matter. After standing or evaporating a little, light yellow needles were separated from the filtrate. These were redissolved with 50% alcohol containing a few drops of HCl on the boiling water bath. In the filtrate, the crystal reappeared beautifully, it

gives reactions of hesperidin. The melting point is $250 \sim 251^{\circ}\text{C}$ (uncorr.).

Analyses of hesperidin :

	0.1732 g Subst.,	0.3482 g CO_2 ,	0.0927 g H_2O .
	0.1715 " "	0.3435 " "	0.0923 " "
	C %		H %
found	54.83		5.95
	54.62		5.97
calc. for $\text{C}_{50}\text{H}_{60}\text{O}_{27}$	54.95		5.50
" " $\text{C}_{28}\text{H}_{35}\text{O}_{15}$	54.09		5.57

Hesperidin content in the turbid syrup :— After removing the fine pulps of the oranges from 100 cc of the syrup passed through a fine sieve, the turbid substances were filtered upon a dried filter paper of known weight. The total weight of the dried matter of turbid substances was 0.0220 g (average of two experiments).

A solution was made by pouring alcohol gradually into another 100 cc of the syrup until its content reaches to 50% and was warmed on the water bath and while hot filtered on a paper of known weight. By this treatment hesperidin goes into the 50% alcoholic solution, while the amorphous substance remains undissolved. The weight of this dried matter on the paper was 0.0094 g (average of two experiments). Calculated from the above results, the weight of hesperidin content in the syrup was $0.0126 \text{ g} = 57.3\%$ of the total turbid substances, and that of the amorphous crystal was $0.0094 \text{ g} = 42.7\%$.

White speckles on the surface of the skinned segments :— The white speckles on the surface of the skinned segments in a can were observed by the naked eyes to a size not larger than the head of needles or pins and were seen through a microscope to be white needles or tuft-shaped or amorphous crystals. They were collected by a pincette from the segments and dissolved with methanol on the hot water bath. When the filtrate was concentrated, the white crystal was produced. It was purified by the method described above. The melting point was $250 \sim 251^{\circ}\text{C}$ (uncorr.). The white speckles on the segments, thus prepared, showed the same crystal form and the same melting point with those of pure hesperidin and properties and reactions of the both were identical in every respect.