ABSORPTION SPECTRA OF POTASSIUM PERMANGANATE IN DIFFERENT MEDIA

THE characteristic intense colour of potassium permanganate is attributed mainly to absorption by the permanganate ion. No data are, however, available in the literature in regard to the influence of the medium. The present note reports marked changes in the permanganate absorption produced by the addition of an alkali and acid.

TABLE I

Wave-lengths in Å.U. of the Absorption Maxima

Other observers[1] ..	5710, 5473, 5256, 5054, 4870, 4707, 4544, 4395
Authors	5495, 5255, 5060, 4900

Table I shows the results of one typical series of experiments made with a 0·5 cm. column of 0·0026 N $KMnO_4$. An almost pointolite type bulb run at a constant potential was used as a source of continuous radiation. The absorption spectra were photographed with a Hilger's constant deviation glass spectrograph. The agreement between the wave-length positions of the absorption bands as observed by previous workers and our data is quite good. The bands at λλ4707, 4544 and 4395 were not prominent on our plate due to the poor transmission of the glass prism used and of the weak intensity of the source of radiation; for the same reason, the band at λ5710 was very weak on our plate.

It was very interesting to observe this entire group of bands disappear suddenly as the concentration of the added acid (H_2SO_4) and alkali (KOH) is increased beyond 11·2 N. and 1·0 N. respectively. It is considered that 'complexes' are formed between the permanganate ions and the medium beyond the above range of concentration whose absorption spectrum does not lie in the region investigated.

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December 12, 1941.

[1] *Die Qualitative Spectrallanalyse anorganischer und organischer*, Körper, Berlin, 1905, **132**; *cf.* also Karim and Samuel, *Bull. U. P. Academy*, **3**, 163.

A SAMPLE OF SHARK LIVER OIL UNUSUALLY RICH IN VITAMIN A

OVER a hundred samples of fish liver oil, the great majority of which were shark liver oil, have been tested in the Nutrition Research Laboratories within the last 2 years. The results of 51 tests were given in a previous paper by the author.[1] Values obtained by the spectrophotometric and the tintometric methods ranged from 450 to 50,100 international units of vitamin A per gramme, with an average of about 13,600 in the case of shark liver oil. No oil giving a value higher than 50,100 was included in this series.

A sample was recently sent for test by the Director of Industries, Sind. This was examined by both the spectrophotometric and tintometric techniques. By the former method, applied both to the whole oil and the non-saponifiable fraction, the very high value of 190,000 I.U. per gramme (in round figures) was obtained. A medium quartz spectrograph, and a 1 cm. cell were used. The method of saponification was that of Dann and Moore.

Calculations were as follows:—

1. *Whole oil in absolute alcohol.*
   Dilution: 3·774 mg. in 100 ml.
   Density readings recorded: 0·30 to 0·70.
   Extinction co-efficient: 0·45.
   $E^{1\%}_{1\,cm.}$ at 328 mμ = 119
   119 × 1,600 = 190,400 I.U. of vitamin A per gramme.

2. *The non-saponifiable fraction was prepared and diluted in absolute alcohol.*

Dilution: 3·428 mg. in 100 ml.

Density readings recorded: 0·25 to 0·70.

Extinction co-efficient: 0·40.

$E^{1\%}_{1\ cm.}$ at 328 mμ = 117

117 × 1,600 = 187,200 I.U. of vitamin A per gramme.

The conversion factor of 1,600 is that recommended by the League of Nations.

With the Lovibond Tintometer, a Carr-Price value of 3,735 was obtained on the whole oil. If the factor suggested by the author[1] for the conversion of the Carr-Price value given by the non-saponifiable fraction of shark liver oil into international units (50-55) is applied, the value obtained in terms of international units approximates to that given by the spectrophotometric technique. With oils of very high blue value, the Carr-Price values given by whole oil and the non-saponifiable fraction are usually of the same order. The calculations in the case of the tintometric test were as follows:

Dilution of whole oil in chloroform: 3·32 mg. in 100 ml.

0·2 ml. of this solution and 2 ml. of $SbCl_3$ gave 6·2 blue, 1·5 yellow and 0·6 neutral units on the Lovibond scale.

Carr-Price value = 3,735.

In the series of vitamin A values for fish liver oils given by Fixsen and Roscoe,[2] only two oils are listed giving values higher than the above sample. These were halibut and California mackerel liver oils respectively.

At present little is known about the factors responsible for the very considerable range of variation in the vitamin A content of shark liver oil. If samples like the above can be frequently obtained, they should be of great value as a substitute for proprietary vitamin A concentrates now in the market. The supply of the latter to India is likely to be restricted as a result of the war.

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Nutrition Research Laboratories,
Indian Research Fund Association,
Coonoor,
January 17, 1942.

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[1] Rajagopal, K., *Ind. Jour. Med. Res.*, 1941, **29**, 575.
[2] Fixsen and Rosco, *Nutr. Abstr. and Rev.*, 1939, **9**, 795.

STUDIES IN INSECT NUTRITION—ASSAY OF 'QUALITY' IN CROPS

THE present communication relates to a study of the rice moth (*Corcyra cephalonica*, Staint), as the test animal for a determination of the 'quality' in crops.

Two of the cereals, jowar and ragi, both of which constitute the staple food in Mysore and parts of South India, have been investigated. Varieties of the two cereals were obtained from Coimbatore Agricultural College, through the kind courtesy of Rao Bahadur G. N. Rangaswamy Ayyangar, Millet Specialist to the Government of Madras. Diets from these samples were prepared in granulated form and feeding experiments conducted with several batches of insects. A proximate analysis of the samples was also carried out.

A study of the data given below (Table I) will reveal the close relationship which exists between the proximate composition and the nutritive value of the grain as revealed by the growth data. With a given cereal, the total nitrogen and the ether extract are the two components which appear to contribute towards the nutritive value of the grain. The two varieties of jowar, A.S. 29 and A.S. 1093, have the same percentage of total nitrogen, but they differ in their fat content. The higher fat content of A.S. 1093 is reflected in the higher increase of weight attained by the insects. In a similar manner, it will be seen that the two jowar varieties A.S. 29 and T_1 which have the same percentage of ether extract (fat), but