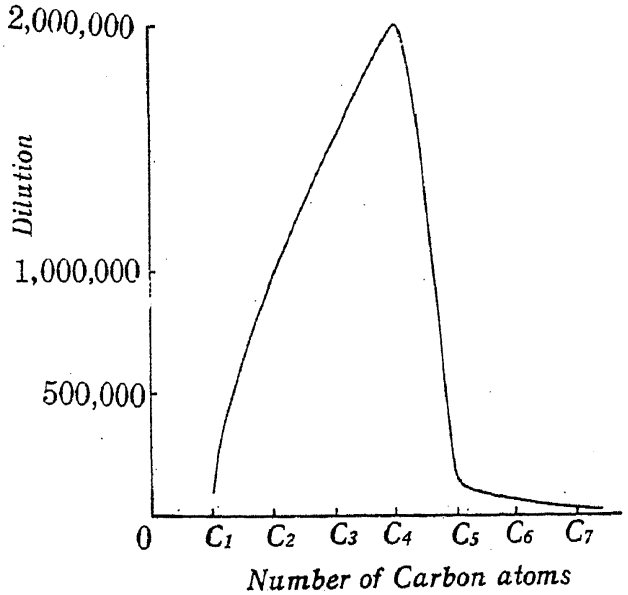
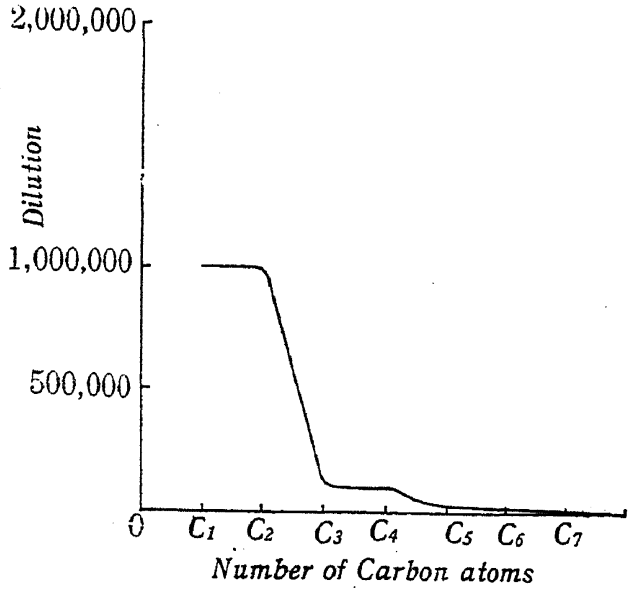


GRAPH No. 1

of the number of carbon atoms in the side chain, which is shown graphically in Graph No. 2.



GRAPH No. 2

Our thanks are due to Prof. P. C. Guha and Dr. N. N. De, for their kind interest during the course of this investigation.

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AN INSTANCE OF GRAPES-POISONING

IT is well known that meat, fish and milk are most important but vegetables, cereals and very occasionally fruits, may be responsible for cases of 'food-poisonings' to ensue. It is equally well known from statistics available that only a small percentage of food-poisoning (3·9 per cent.) cases comprise those of the fruits and vegetables origin. And it must be admitted that cases of microbial poisoning (metallic poisonings occasioned by erosion of the containers are reported to have taken place) in acid fruits and vegetables are relatively unknown. Yet one positive instance of grapes-poisoning had come under our observation and study.

During March 1943, two adults who had partaken a purchase of fresh Nasik grapes showed fairly severe signs of acute gastro-intestinal disturbances; they had only a passing suspicion on grapes, but on our request, however, they sent a sample of their fæces and the remaining supply of grapes to our laboratory for examination. The grapes on macroscopic examination looked very attractive indeed, being fresh and "lively", green-yellow in colour. Almost synchronously, a member on the staff of our College became a victim, presumably of grapes-poisoning. Being a biologist with some information on food-poisoning, he reported the case immediately and sent a bunch of grapes for examination and report thereon. This bunch appeared much the same as the other sample received before so much so that they should be regarded as collected from the same vineyard. All the three victims of poisoning had identical types of symptoms to complain, which principally consisted of intestinal pains and explosive evacuations of diarrhœic fæces one half to two hours after the consumption of the grapes.

The samples of fæces on naked eye examination appeared to be whitish to yellowish-green in colour and were more watery than normal. The fæces and the grapes were then cultured (grapes after treating them with a dilute solution of mercuric chloride as per the technique of Harrison and Barlow) on Endos, Czapek and Blood agar plates. Duplicate sets were made and one set was kept at the room temperature (27° C.), the other incubated at body temperature (37° C.). After the incubation, three organisms of likely ætiological relationship with the disease were picked up and subjected to detailed examination for establishing their identities. Two of them were Gram-negative and short bacteria and the third was an unusual looking yeast culture. The Gram-negative bacteria were easily identified as (1) *Escherichia coli communis* (significant in the report as they were persistently isolated from the grapes and not from the fæces); (2) *Pseudomonas æruginosa* (Bact. pyocyaneus). The yeast culture after some difficulty was spotted as a *Cryptococcus* variety (resembling closely *Cryptococcus plimmeri*, described by Guilliermond), an organism pathogenic to guinea-pigs on intraperitoneal inoculation.

Thus the rare instance of grapes-poisoning proved to be possibly a case of mixed infection of relatively acid-tolerant types of micro-organisms having no apparent relationship to each other: but there is no doubt whatsoever

about the pathogenic actions of the three species referred above.

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ROLE OF MANGANESE IN THE FORMATION OF VITAMIN C AND CAROTENE IN PLANTS

Various factors have been reported in literature to affect vitamin C formation in plants. It is found to be favoured by potash fertilization[1] or by application of calcium nitrate[2] but to be retarded by nitrogen fertilization.[3] Little evidence, however, has been adduced regarding the influence of manganese on vitamin C or carotene formation in plants. Hester[4] observed an increased formation of ascorbic acid in tomatoes grown on soil high in available manganese, but Lyon and Beeson[5] failed to find any appreciable change in vitamin C content of tomatoes grown in solution cultures under manganese treatment. On the other hand Rudra[6] noted in its presence an enhanced production of ascorbic acid by animal tissues—from glucose and by germinated seeds. Manganese, as has been pointed out by earlier workers, plays a vital role as a catalyst in the physiological processes of the plant, e.g., in photosynthesis and nitrogen assimilation,[7] in oxidising enzymes[8] and in various other aspects.[9] Its action as a catalyst has been stressed in the oxidation of organic matter.[10]

An investigation was carried out by the author on *Amaranthus gangeticus*, grown in pot-cultures with local soil low in available manganese. Below are presented the results (average of several replicates) obtained for the control and four treatments, A, B, C and D, of manganese, the amounts applied as $MnSO_4 4H_2O$ being 0·05, 0·1, 0·2 and 0·3 gms. respectively per pot (6 lbs.). The vitamin C estimations in the leaves were made by the method of Harris and Olliver,[11] carotene by that of Moore[12] and manganese according to Piper.[13]

From the results (*cf.* Table), the formation of carotene seems to have been uninfluenced by the treatment while that of vitamin C has been affected to various degrees by the added manganese, a significant point being that it is encouraged upto a certain concentration of added manganese beyond which additional concentrations become increasingly harmful. This action seems to run parallel with its action in promoting the plant-growth and is thus indicative of its overall influence on the metabolic activities of the plant. Note may also be made in this connection of the increasing absorption of manganese by the plant in direct relationship with the treatment. It may act directly as a coenzyme or activator of the enzymatic system responsible for the biosynthesis of vitamin C in plants from carbohydrates, or indirectly through its overall influence on the metabolic activities of the plant. Considerable further work is, therefore, needed before the mechanism through which the vitamin C formation occurs in the plant and the role played by manganese therein are elucidated.

Soil Treatment	Total green wt. yield in gm.	Manganese content of leaves in p.p.m.	% increase in the Mn content over control	Vitamin C content in mg. per 100 gm. of fresh material	% increase in vit. C content over the control	Caroten econtent in μ gm. of fresh material
Control	63·14	109·4	..	253·1	..	98·82
A	76·73	136·8	25·04	352·3	39·19	103·1
B	68·40	145·7	33·17	299·4	18·31	102·9
C	62·69	152·6	39·49	238·3	— 5·848	99·65
D	51·31	161·2	47·34	225·0	—11·10	101·0

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