

INFLUENCE OF VARIETY, MANURING AND GERMINATION ON VITAMIN B₁ CONTENT OF GROUNDNUT-ARACHIS HYPOGAEA

AMONG plant materials groundnut is a very rich source of vitamin B₁. The utilisation of groundnut as a source of vitamin B₁ necessitated the study of this important oil-seed from various angles.

Among 40 varieties of groundnut analysed, wide differences were noted in their vitamin B₁ content (the values varying from 5 to 20 per gram of defatted flour). These differences are attributable mainly to varietal differences since all other conditions under which they were grown are identical.

In groundnut about 48 per cent. of the total vitamin B₁ is present in bound form. The bound vitamin can be released by treatment with papain, but taka-diastase has no effect. Sodium chloride (10 per cent.) extracts completely the bound form of the vitamin. It can also be precipitated with trichloroacetic acid. These results indicate that the combined vitamin exists bound to protein, and not as co-carboxylase.

It was found that both the bound and the free vitamin in groundnut are completely available, as judged by rat-growth experiments.

There was a gradual decrease in the total vitamin B₁ as the germination advanced. But the bound form of vitamin B₁ is rendered free during germination. This is attributable to the action of proteolytic enzymes formed during germination on the protein-carrier of the vitamin.

The influence of organic and artificial fertilizers on vitamin B₁ content of groundnut was studied in plot experiments at the Mysore Agricultural Farm, Hebbal. The results showed no significant differences in the vitamin B₁ content of groundnuts under different treatments.

Full details of these investigations will be published elsewhere.

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RATE OF REDUCTION OF SULPHATE BY VIBRIO DESULPHURICANS, KONÆ

THE formation of the black ferrous sulphide associated with certain types of low-lying and boggy soils in river estuaries, coastal areas and sedimentary deposits of stagnant lakes, has generally been attributed to bacterial action; these bacteria are referred to by previous workers as *Vibrio desulphuricans*.¹ A closely allied type of organism was isolated from the black clay at a depth of about 8-10 feet on the eastern sea coast of India, where, surprisingly, a

fairly rich (35 per cent.) deposit of elemental sulphur has been found to occur.²

The morphological and biochemical characteristics of this organism, have been described earlier.^{3,4} The organism differs from the spirillum of Czurda⁵ in that (1) it can reduce sulphate even in absence of carbon dioxide and (2) it is capable of utilising ethyl alcohol and sucrose as the sources of carbon; in other respects they agree. The present communication deals with a study of the rate of reduction of sulphite by *Vibrio desulphuricans*, Konæ.

The nutrient medium was composed of sodium chloride (6 per cent.), recrystallised sodium sulphate (1.0 per cent.), dipotassium hydrogen phosphate (0.2 per cent.), ammonium lactate (0.4 per cent.) and ferric chloride (0.2 per cent.). The salts were dissolved in distilled water, the pH adjusted to 7.4 and the volume made up to 100 ml. and sterilised.

Aliquots (10 ml.) of this medium were distributed into sterile bacteriological tubes and the tubes again sterilised at 10 lbs. for 30 minutes. The tubes were then inoculated, each with 1 ml. of a suspension of carefully washed bacterial cells dispersed on 6 per cent. saline and incubated at 30° C.

For estimating the initial concentration of the sulphate, a couple of tubes, immediately after inoculation, were heated in a boiling water-bath to inactivate the bacteria. The sulphate was estimated volumetrically by the benzidine sulphate method.⁶ The filtered culture medium (2 c.c.) was acidified with HCl in a centrifuge tube, mixed with a solution of benzidine hydrochloride. The tubes were then cooled in a freezing mixture for 30 minutes and 2 ml. of 95 per cent. alcohol were then added. This facilitated the sedimentation of the thin platelets of benzidine sulphate on centrifugation. The precipitate was washed (four times) with ice-cold 50 per cent. alcohol and transferred to a 25 ml. conical flask and titrated against 0.02 N sodium hydroxide from a microburette. The results are given in Table I and are graphically represented in Fig. 1.

TABLE I
Rate of Reduction of Sulphate by *Vibrio desulphuricans* Konæ

No. of days	SO ₄ ^{''} present (mgm./2 c.c.)	SO ₄ ^{''} utilised (per cent)
0	5.91	4.40
1	4.40	25.50
2	3.95	33.10
3	3.27	39.10
4	1.47	75.30
5	1.24	79.40
6	0.99	83.30
7	0.84	85.90
9	0.68	88.50
10	0.65	89.00
12	0.53	91.00
13	0.23	96.30
14	0.23	96.30

The data (Fig. 1) reveal many interesting facts. The rate of reduction of sulphate does