

NATURAL vs. SYNTHETIC OR CRYSTALLINE VITAMINS

Most people realize that there is a vast difference between natural and synthetic products, but fail to recognize that it is impossible to separately identify and list on a label all the parts of a natural product.

To clarify the point, assume that you wanted to have all your separate food elements like fats, carbohydrates, proteins and minerals separately purified and put up in chemically assayable form. What would it cost to eat in that case? What about all the unknown factors that would be thrown away in the rejected "impurities" that might later be found necessary to life?

To judge a natural complex in the light of pure chemicals is just absurd. Natural complexes of the various vitamins are to be considered as functional mechanisms the oxidation-reduction enzyme system of which ascorbic acid is a part, or the various enzyme systems that form the complicated vitamin B and G complexes in nature, must be considered as much of a mechanism as a watch, and to chemically analyze a watch to determine its ability to keep time would be as reasonable as to remove the ascorbic acid from the vitamin C complex and call it the "vitamin C".

The value of a watch will be established by its ability to keep accurate time. Natural fats contain some unknown factor in addition to vitamin A that also controls and prevents the reactions of vitamin A deficiency.) *proc. Soc. Exp. Biol. & Med.* vol.75 p.322, 1950).

The value of a natural vitamin B complex will be demonstrated by its ability to correct the arrhythmias of the heart as shown by any cardiograph five minutes after the administration of a potent form of the vitamin. Severe damage to the heart was found in human beri-beri cases, confirmed by animal tests. (*Tr. Am. Physicians*, vol. 51, p.341, 1936).

The value of natural vitamin C complex is demonstrated by its ability to promote phagocytic activity, by its ability to hour by hour lower the temperature of a fever patient with an infection. It is easy to check, far easier than to separate the brass of the watch and get its weight in milligrams. The value of a natural vitamin P complex is demonstrable by its ability to stop gingival hemorrhage ("pink toothbrush") overnight.

The value of a natural fraction of the vitamin E complex (E₂) will be demonstrated by its ability to wipe out cardiac pains in angina pectoris as efficiently but far more permanently than nitroglycerine.

Some naive individuals often become imbued with the notion that they can build a watch by weighing and dumping together a prescribed quantity of brass, iron, sapphires, gold and glass. Or that they can concoct a vitamin complex that will function as well as a natural product as found in foods by the same "prescription" method.

(2)

The attached reports on careful tests made on both animal and human subjects tell the story of the dismal failure of such idiotic ideas. In spite of such failures, there continues to be an apparently inexhaustible procession of gullible buyers of synthetic vitamins and "enriched" foods.

These poor deluded victims do not know that double the daily requirement of crystalline or synthetic thiamin has caused the castration of offspring of test animals fed such mild overdoses. (See Jol. of Nutrition, 18, 2:192-193, 1939, Barnett Sure).

They do not know that the nutritional action of a vitamin complex may be very different from the drug effect of a heavier dosage of one of its separate components.

The effects of natural sugar cane juice is to build teeth and protect them from destruction. The effect of refined sugar is the opposite. White sugar has been shown to attack tooth enamel, whole raw unrefined sugar protects tooth enamel. (See "The Vitamins in Medicine" by Bicknell & Prescott (1946) page 688.) "The protective substance present in unrefined food has not yet been isolated, but its action is not dependent on any change of acidity in the saliva. It explains the puzzling observations that dental decay may be absent in the mouths of native children whose teeth are always coated in sticky sugar from eating raw sugar cane all day (104)";

There is the same difference between vitamin complexes and the pure crystalline or synthetic product. The refined food industry and the synthetic chemical industries have so warped scientific thought that these ideas are considered heretical, and unorthodox by the famed "consensus of opinion" of the medical hierarchy that can excommunicate any physician who dares to accept his own findings of facts in connection with foods and vitamins.

No wonder that a medical education has been defined as "The warping of unsuspecting immature minds into a meticulous system of commercial superstition."

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THE EFFECT OF IMBALANCE IN THE "FILTRATE FRACTION" OF THE VITAMIN B COMPLEX IN DOGS¹

The graying of fur and damage to the adrenal cortex of rats first reported² from this laboratory as due to deficiency in the "filtrate fraction" of the vitamin B complex has been confirmed and extended in several other laboratories. Long-continued experiments are required for adequate observation of these deficiencies in dogs and these have now been under way in this laboratory for about two years. Even in very young animals several months are required for the development of overt symptoms of deficiency in any of the B vitamins, with the possible exception of B₁. Since these experiments appear to be the first in which dogs have been reared exclusively on crystalline vitamins and since some unexpected failures of nutrition occurred when certain vitamins were added to the deficient diet it seems desirable to offer this preliminary report.

Four lots of pure-bred cocker spaniels have been reared from weaning at four to six weeks of age on purified diet of washed casein, sucrose, crisco, salt mix, carotene and codliver oil, wheat germ oil and crystalline thiamin chloride, vitamin B₆ (pyridoxin) and riboflavin. The variables in all cases were (a) filtrate factor, that is the concentrated filtrate from fuller's earth-treated acetone extracts of yeast, (b) nicotinic acid and (c) pantothenic acid.³ The filtrate factor preparation contained pantothenic acid, 0.6 mg per cc by rat growth comparison and traces of nicotinic acid. At first only filtrate fraction and nicotinic acid were used, but later crystalline synthetic calcium pantothenate was administered in some cases, either with or without the filtrate preparation. One litter of four dogs has been on the diet for nineteen months, a second group of six dogs for twelve months, the third litter of three dogs for eight months and the fourth litter of six dogs for six months.

There were nineteen dogs in the four experiments, but on three of these dogs, we will not report at this time. These three dogs were placed on salt-free (NaCl-free) diet, and this complicated the effect of the vitamin deficiencies in an unexpected way. The other sixteen dogs were found to react as described below.

(I) Three which were positive controls, receiving adequate amounts of all vitamins, are alive and well, although not quite as heavy as stock dogs of the same age.

(II) Two of which received no nicotinic acid, no pantothenic acid and no anti-gray preparation are alive and well, but with progressively graying fur. No black tongue symptoms have been seen, but inactivity, impaired digestion and sedate elderly behavior characterize these dogs. The third died of an infection after 6 months on the diet.

(III) Four received an ample amount of nicotinic acid but no pantothenic acid or "filtrate factor." Three of these are dead of progressive flaccid paralysis; one when helpless and near death was cured with filtrate fraction and is now, a year later, alive and well, her fur darkened.

(IV) Four were given ample amounts of "filtrate factor" and/or pantothenic acid but no nicotinic acid. Two of these are dead, one after showing slowly progressing paralysis over five or six months' time and one within three months. The third is now plainly showing the beginnings of the same condition and the fourth, which has received filtrate fraction for eighteen months, is still alive and apparently well. This dog has now been placed on pantothenic acid instead of filtrate fraction, since the latter is not entirely free from nicotinic acid.

(V) The two remaining dogs receive pantothenic and nicotinic acids but no "filtrate factor." After six months on the diet one of these dogs, the male, is still well, growing and so far showing no graying of the fur. However, the fur is dull and powdery instead of glistening black and the dog is beginning to show some failure of neuro-muscular control. The other animal, a female, has lost appetite and weight, and is exhibiting much more advanced failure of neuro-muscular control. Her condition is not as good as that of her brother which has at no time received any of the filtrate factors (Group II above).

The following conclusions appear to be justified by these results:

1. Dogs require one or more of the vitamins of the B complex in addition to thiamin, riboflavin, pyridoxin, nicotinic acid and pantothenic acid.
2. Young dogs which receive none of the filtrate fraction, that is, no nicotinic acid, pantothenic acid or so-far unidentified factors, survive, grow moderately well but exhibit gradual depigmentation of hair, lack of activity and elderly behavior.
3. The administration of nicotinic acid or pantothenic acid alone to animals receiving ample amounts of all necessary vitamins except those of the "filtrate fraction" results in their gradual loss of neuro-muscular control and sometimes sudden death.

Attention should be given to the possible danger of the administration of large amounts of certain vitamins such as nicotinic acid to persons subsisting on diets having multiple deficiencies. Fortification of foods with those vitamins such as thiamin or nicotinic acid which are available in large quantities may precipitate conditions worse than the subacute deficiency state produced by the usual diet balanced in its inadequacies. Improvement in all directions equally is essential.

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² Morgan, Cook and Davison, *Jour. Nutrition*, 15: 27, 1938; Morgan and Simms, *Jour. Nutrition*, 19: 233, 1940.

³ We are grateful for gifts of crystalline pyridoxin and of calcium pantothenate from Merck and Company, Rahway, New Jersey.

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Influence of Vitamins on Growth and Fitness.—Bransby and his associates give a summary of a vitamin feeding test carried out between November 1941 and August 1942 on 1,400 school children and adults. The aim was to ascertain whether a supplement of synthetic vitamins to the ordinary diet would improve growth, health and physical efficiency. Each capsule contained 4,000 international units of vitamin A, 333 international units of thiamine, 2 mg. of riboflavin, 1,000 international units of ascorbic acid, 20 mg. of nicotinamide and 600 international units of vitamin D. The school children were examined before, during and after the period of feeding. They were divided into two equal groups; one group received a vitamin capsule every school day and the other a capsule containing a similar quantity of arachis oil, which is practically devoid of vitamins. The factory tests

were conducted at zinc smelting works, where the labor is extremely strenuous and exhausting. In the children it was found that the vitamins had no statistically significant effect on the rate of growth, nutritional status, muscular strength, condition of the teeth and gums or absence from school on account of illness. In the factory tests on 214 adult men the results showed that the vitamin capsules had no significant effects on weight, hemoglobin, blood pressure, absence from illness or output of material.—
J.A.M.A. 125; 2, 175 (May 13, 1944)
