

Vitamin E vs. Wheat Germ Oil

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THE literature reporting the advantages to be gained by the use of wheat germ oil, or vitamin E, in the treatment of various types of muscular disturbances is so confusing in respect to the type of material used, that this note is submitted with the hope that it will aid in clarifying the situation.

This statement seems especially important in view of a recent report by Vogt-Moeller (1). In a symposium held in London in 1939 Vogt-Moeller stated "Finally, let it be kept in mind that wheat germ oil, which so far has been the preparation most commonly employed for therapeutic trials, may contain many biologically active substances other than Vitamin E, and one must consider the possibility that some of these may have contributed to the observed effects. Even though this appears to me rather unlikely, the question can soon be settled with certainty by repeating the experiments with pure tocopherols."

In the recent work referred to above, Vogt-Moeller gives the results of just such an experiment. He points out that the various reports on the influence of vitamin E on neuromuscular disorders are confusing because vitamin E was used in some experiments while wheat germ oil was used in others. It has been shown previously that wheat germ oil contains factors other than vitamin E (2). Certain investigators (3) postulated that several factors may be involved in the positive results obtained in treating neuromuscular disturbances, and that vitamin E was not alone in bringing about beneficial results.

Because Vogt-Moeller's paper is not readily accessible in this country, a fairly detailed report of it is included in this communication.

Dogs attacked by the distemper virus usually develop typical neuromuscular symptoms. Vogt-Moeller planned an experiment involving 90 dogs affected by this disorder. All dogs, including the controls, were placed on a balanced diet with a supplementary vitamin B complex preparation. Before instituting treatment, he waited until all dogs had developed the initial symptoms of distemper. These usually preceded the development of neuromuscular disturbances.

Thirty dogs were the control group.

Thirty dogs were injected daily with 10 milligrams of tocopherol (vitamin E).

Thirty dogs were injected daily with 5 c.c. of wheat germ oil, which contained approximately 10 milligrams of alpha tocopherol.

It appears that, for the first time, evidence has been presented of the presence in wheat germ oil of a factor that exerts a beneficial effect in neuromuscular disturbances other than vitamin E. For many years we, in our laboratory, have suggested that research workers in reporting their work make a sharp distinction be-

tween vitamin E (tocopherol) and wheat germ oil. Vogt-Moeller's work now makes such differentiation imperative.

The results are tabulated as follows:

Treatment	Control	Tocopherol	Wheat Germ Oil
Total number of dogs	30	30	30
Died	14	16	12
Dogs developing neuromuscular symptoms—died	10	11	3
Dogs developing neuromuscular symptoms—survived	11	12	2
Total developing neuromuscular symptoms	21	23	5

The effect of Vogt-Moeller's work will be far reaching for it will demand a reexamination, reappraisal and, in many instances, a repetition of much of the work already done in this field. Research has long been subjected to such penalties but, while it makes progress slow, it assures an ever closer approximation of the truth.

The various reports in which the statement is made that vitamin E does not control habitual abortion can no longer be given full credence. The work of Currie (4) and others (5, 6, 7) must, somehow, be fitted into the picture. Furthermore, it would seem that doubt should be given to the statements that *vitamin E* will not help cows and sows to conceive rather than to the reports of Vogt-Moeller (8) and others (9, 10, 11, 12, 13) that *wheat germ oil* is successful in treating 'shy breeding.'

Among those reports where the statement is made that it was not possible to confirm a given work even when using wheat germ oil, it would be desirable to know something about the nature of the oil used. Was the oil "cold pressed" or solvent extracted? What were the temperatures involved? What was the nature of the solvent used? What was the age of the oil? To a great degree, the answers to these questions hinge mainly on two points, namely; the stability of the oil and the presence of substances in the oil other than the tocopherols. The incorporation of tocopherols other than the alpha form in vitamin E concentrates might be considered an admission of the fact that the performance of vitamin E (alpha tocopherol) was disappointing.

Mackenzie, Mackenzie and McCollum (14) indicate the importance of stability. In their work, the pressed oil was unfit for making their concentrate of vitamin E; only the solvent extracted oil could be used. Shute (15) states that the wheat germ oil he used (pressed) will lose its value for treating habitual abortion in 8 days unless it is kept in the cold. Pressed wheat germ

oil is obviously not the same product as solvent extracted wheat germ oil. It is important to note that Currie's work was done with a concentrate of a solvent extracted oil (Glaxo). A similar product was used by Hain and Sym (16) in their work on the control of menopause flushes. Other investigators have called attention to the difference in character of extracted and pressed oils (17). Yet, it should not be assumed that a pressed wheat germ oil will not be effective. These considerations emphasize the point made above, that the wheat germ oil should be stable, whether it is pressed or solvent extracted. Should the factor postulated by Vogt-Moeller be unstable, there is a likelihood that this factor is not present in wheat germ oil that has a high free fatty acid content or a high peroxide value.

It is commonly understood that vitamin E is unstable. On the contrary, vitamin E in foods is quite stable. It is far more stable than vitamin A. In our own laboratory, rancid pressed wheat germ oil with a 30 m.e. peroxide value and 18 per cent f.f.a. (free fatty acid) revealed three-fourths of the quantity of vitamin E present in pressed oil containing 2 per cent f.f.a. and a 3 m.e. peroxide value. Ordinary livestock feed subjected to room temperature for one year retains adequate vitamin E as we understand livestock requirement. This stability of vitamin E and its widespread occurrence in foods should be considered in the light of Shute's views on the instability of the factor that controls habitual abortion. May it be that this factor is not vitamin E at all?

It appears that studies involving vitamin E should specifically state the manner in which the vitamin was prepared, its form and its source as well as the stability of the material used. Tests should be made for its stability throughout the course of the experiment.

Finally, the fact that a stable wheat germ oil appears

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to be effective in preventing neuromuscular disorders in dogs affected by distemper, while vitamin E alone seems ineffective, should stimulate studies to elucidate further Vogt-Moeller's suggestion that solvent extracted and stable wheat germ oil contains factors other than the tocopherols which exert a beneficial effect in such disturbances.

It must be concluded that dismissal of wheat germ oil as an effective aid to breeding of livestock, and as an aid to contributing to viability of the young, by those who have assumed that it is ineffective because there is plenty of vitamin E in most rations, or by those who have had negative results with a wheat germ oil of variable and questionable origin and undetermined stability, is unwarranted.

Only controlled experiments with a wheat germ oil of known stability and of constant and satisfactory origin can clarify this important problem.

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