

This Week's Citation Classic

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Dean W F & Scott H M. The development of an amino acid reference diet for the early growth of chicks. *Poultry Sci.* 44:803-8, 1965.
[Dept. Animal Science, Univ. Illinois, Urbana, IL]

A crystalline amino acid diet was used to re-evaluate the amino acid needs of the young chick. The resulting diet, containing optimal amino acid levels established individually in a series of growth assays, supported early chick growth equal to that obtained with a natural diet. [The SCF[®] indicates that this paper has been cited in over 100 publications since 1965, making it the 6th most-cited paper published in this journal.]

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"The development of a chemically defined amino acid reference diet, capable of supporting rapid early chick growth, was the result of over a decade of research at the University of Illinois guided by the paper's coauthor, Harold M. Scott. I was privileged to participate in these studies during a particularly exciting phase when a highly efficient amino acid mixture was first achieved. The amino acid diet resulting from our studies, which contained a relatively low protein equivalent (17.7 percent) in relation to its caloric content (4,200 kcal. of metabolizable energy/kg), supported early chick growth equal to that of chicks fed a practical corn-soybean meal diet containing 25.6 percent protein and 2,830 kcal. of metabolizable energy/kg. Our work, as well as related preceding studies, was prompted in part by Scott's long-held concern about the extremely slow rate of chick growth supported by amino acid diets used in research conducted during the 1940s and 1950s and the validity of results obtained with such diets. We strongly suspected what

our work later confirmed, that improper balance among the amino acids was the major obstacle to obtaining normal performance in chicks fed amino acid diets. Our approach to the problem was to redetermine the chick's quantitative amino acid requirements for maximum growth, one at a time, using the best starting amino acid mixture available. Our choice of a starting mixture was one of the keys to the successful outcome of our work. We used an Illinois amino acid mixture that had been improved over earlier mixtures by the efforts of George Klain and Daryle Greene, who had worked previously in Scott's laboratory. This mixture contained a relatively favorable amino acid pattern and what we later learned was more than adequate levels of all amino acids except methionine. Fortunately, we determined the methionine requirement first, and since we revised our amino acid mixture to contain the optimal amount of an amino acid, once this level was established, all of our assays were conducted with adequate levels of all amino acids present except the one under study.

"Our amino acid chick diet and subsequent refinements have been used widely as a research tool not only for amino acid investigations but for the study of other nutrients as well, particularly those that are difficult to eliminate from diets containing intact protein. This probably accounts for our paper being cited so frequently.

"The Illinois amino acid chick work was continued under Scott's leadership until his retirement in 1969, and has been carried on since that time by Dave Baker and co-workers. A review of the work during Scott's tenure has been published.¹ Typical recent work from the Illinois laboratory can be found in reports by Baker and associates."^{2,3}

1. Scott H M. Amino acids in avian nutrition. 2. Development and application of amino acid diets. *Poultry Sci.* 51:9-16, 1972.
2. Baker D H, Robbins K R & Beck J S. Modification of the level of histidine and sodium bicarbonate in the Illinois crystalline amino acid diet. *Poultry Sci.* 58:749-50, 1979.
3. Baker D H, Halpin K M, Czarnecki G L & Parsons C M. The choline-methionine interrelationship for growth of the chick. *Poultry Sci.* 62:133-7, 1983.