FATS AND PROTEINS RESEARCH FOUNDATION, INC.

Director's Digest

WERNER R. BOEHME
Technical Director

2720 DES PLAINES AVENUE
DES PLAINES, ILLINOIS 60018
AREA CODE 312-827-0139

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Value of Flash Dried Blood Meals in Swine Diets

The work of Drs. Paul Waibel and R. J. Meade of the University of Minnesota, F. Kratzer of the University of California-Davis and others led to the recognition that blood meals processed by such high temperature-short time methods as flash ring drying, spray drying or flash drum drying are nutritionally superior to conventional or so-called vat dried blood meals. The primary limiting factor is the detrimental effect of overheating on the bioavailability of the essential amino acid lysine. Data on the availability of lysine from blood meals dried by three separate methods as determined by chick, turkey poult and rat assays are presented in Table I.

Most recently Matthew Parsons* at Michigan State University, in work supported by FPRF, determined the bioavailability of lysine in flash ring dried cattle blood (FRDCB) and flash ring dried swine blood (FRDSB) when added to a basal diet as indicated in Table II.

*MS Thesis, 1979, under the guidance of Professor E. R. Miller.

Table I. Availability of Lysine from Blood Meals as Determined by Chick, Turkey Poult and Rat Bioassays.

Blood Meal and Source	Availability (% of Total Lysine) Chick	Poult	Rat
Conventional			
Kratzer, 1957	64-66	49-60	
Doty, 1973		28-42	
Waibel et al, 1974		14.4	19.2
Waibel, 1977		14-43	8.0
Spray Dried			
Kratzer, 1957	68-85	71-76	
Doty, 1973		44-83	
Flash Ring Dried			
Doty, 1973		82-87	
Waibel et al, 1974	90.7	81.5	86.6
Waibel, 1977	93	80-87	97-0

Table II. Calculated Lysine Bioavailability Values for FRDCB and FRDSB in Swine Diets

	Dietary Lysine gms/day	Dietary Lysine % of Diet	Blood Meal Bioavailable Lysine (%)	Blood Meal Lysine Bioavailability (%)
Basal + 1.5% FRDCB	7.3	.76	7.25	74.9
Basal + 3.0% FRDCB	8.2	.84	6.47	66.7
Basal + 1.5% FRDSB	7.5	.77	7.67	79.1
Basal + 3.0% FRDSB	7.9	.86	7.07	72.9

These data indicate that FRDCB and FRDSB have similar available lysine values and that 6.5-7% available lysine appears to be a safe range to use in balancing swine rations. Data shown in Table III likewise indicate that flash drum dried slaughter house blood meal (FDDBM) is similar to FRDCB and FRDSB, and that the same 7% available lysine value can be used in balancing feed rations.

Table III. Performance of Swine on Test Diets and Calculated Available Lysine.

Diet	Average Daily Gain, gms	F/G	Average Daily Feed Intake, gms	Available Lysine (%)
Basal + 1.5% FDDBM	232	2.35	545	6.0
Basal + 3.0% FDDBM	277	2.10	581	7.3

Using a value of 7% bioavailable lysine in flash dried blood meals, Miller and Parsons developed an equation to calculate its nutritional replacement value in typical swine diets.

$$100 \text{ kg } S + 2 \text{ kg } L = 40 \text{ kg } F + 58 \text{ kg } C + 4 \text{ kg } P$$

F = Value per kg of flash dried blood meal
S = Value per kg of soybean meal (48% protein)
L = Value per kg of calcium carbonate
C = Value per kg of corn
P = Value per kg of defluorinated phosphate

This relationship has been corrected for changes in calcium and phosphorus levels in the diet resulting from the partial substitution of blood meal for soybean meal and corn.

Rearranging this equation to read:

$$F = \frac{100 \text{ kg } S + 2 \text{ kg } L - 58 \text{ kg } C - 4 \text{ kg } P}{40 \text{ kg}}$$

and inserting the unit values, i.e., cost per kg (or pound or ton) of each ingredient will yield the unit value of the flash dried blood meal.