



international association of fish meal manufacturers

Hoval House, Orchard Parade, Mutton Lane, Potters Bar, Hertfordshire, EN6 3AR
Tel: (Potters Bar) 0707 42343/4/5

	CORN ^a	SOYBEAN ^a MEAL (49%)	MENHADEN ^b MEAL (FULL)	ANCHOVY ^b MEAL	HERRING TYPE ^b MEAL
CRUDE					
PROTEIN %	8.5	49	62	65	70
CRUDE FAT %	4	1	9	9	9
CRUDE					
FIBRE %	2.7	3.2	0	0	0
CRUDE ASH %	—	—	18.0	15.4	10.1
M.E. kcal/lb	1560	1100	1375¹	1430¹	1490¹
LYSINE %	0.24²	3.16²	4.69²	5.07²	5.41²
METHIONINE %	0.20²	0.73²	1.86²	1.95²	2.10²
METHIONINE +					
CYSTINE %	0.35²	1.46²	2.48²	2.60²	2.80²
TRYPTOPHAN %	0.09	0.70	0.66	0.78	0.81
HISTIDINE %	0.25	1.46	1.44	1.59	1.69
LEUCINE %	1.03	3.95	4.43	4.98	5.25
ISOLEUCINE %	0.36	2.46	2.73	3.06	3.14
ARGININE %	0.36	4.07	3.75	3.81	4.09
PHENYLALANINE %	0.44	2.86	2.45	2.75	2.74
TYROSINE %	0.18	1.85	2.00	2.22	2.19
THREONINE %	0.35	2.25	2.46	2.82	2.98
VALINE %	0.50	2.51	3.16	3.46	3.79
GLYCINE %	0.34	2.30	4.20	3.68	4.18
SERINE %	0.47	3.03	2.24	2.51	2.67

	CORN ^a	SOYBEAN ^a MEAL (49%)	MENHADEN ^b MEAL (FULL)	ANCHOVY ^b MEAL	HERRING TYPE ^b MEAL
CALCIUM %	0.02	0.20	5.26	3.95	1.95
TOTAL					
PHOSPHORUS %	0.29	0.65	2.98	2.60	1.50
AVAILABLE					
PHOSPHORUS %	0.10	0.26	2.98	2.60	1.50
SODIUM %	0.04	0.01	0.78	0.87	0.70
MAGNESIUM %	0.12	0.27	0.14	0.25	0.11
POTASSIUM %	0.40	2.04	0.72	0.65	1.20
SELENIUM ppm	0.075 ^b	0.1 ^b	2.22	1.39	2.78
IRON ppm	35 ^c	150 ^c	438	246	150
COPPER ppm	4.5 ^c	20 ^c	11.4	10.6	5.4
ZINC ppm	10 ^c	45 ^c	151	111	120
MANGANESE ppm	5 ^c	40 ^c	35.6	9.7	2.4
CHOLINE ppm	595	2767	4396	4396	4396
PANTOTHENIC					
ACID ppm	5.7^c	14.5^c	8.8³	9.3³	30.6
RIBOFLAVIN ppm	1.3 ^c	3.1 ^c	4.8 ³	6.6 ^c	7.3
NIACIN ppm	22 ^c	22 ^c	55 ³	95 ³	126
FOLIC ACID ppm	0.36 ^c	3.6 ^c	0.2 ^c	0.16 ³	0.5
B ₁₂ ppm	—	—	0.06 ³	0.18 ³	0.25
BIOTIN ppm	0.06 ^c	0.32 ^c	0.26 ³	0.26 ³	0.42
PYRIDOXINE ppm	7 ^c	8 ^c	3.5 ^c	3.5 ^c	3.7 ^c
ESSENTIAL					
FATTY ACIDS %	1.9^b	0.4^b	4.5⁴	4.5⁴	4.5⁴

1. These figures apply to fish meals with the stated content of crude fat and crude protein. Fish meals with different levels of protein or fat should be assigned different ME values using table below.
2. Total amino acid figures. Amino acids in fish meals, corn and soybean meal are equally available (see Food and Agriculture Organization Fisheries Reports No. 92 entitled "Available Amino Acid Content of Fish Meals" 1970).
3. Data probably obtained with press-cake meal.
4. These figures do not correspond to content of linoleic acid, but to other essential fatty acids in stabilized fish meal for chick growth— see footnote (b) for more details.

a Data mainly obtained from "1978 Maryland Feed Composition Data" published by Department of Poultry Science, University of Maryland, Maryland, U.S.A.

b Data mainly given in "Handbook of Nutrition and Food - Fishery By-Products Section" published by CRC Press Inc. U.S.A. - in press

c Data obtained from Nutrition of the Chicken (1976) by Scott M.L., Nesheim, M.C. and Young, R.J. Second Edition Published by M.L. Scott & Associates, Ithaca, New York.

**ENERGY VALUE (kcal/lb) OF FISH MEAL WITH VARYING LEVELS
OF PROTEIN AND FAT**

% CRUDE PROTEIN	CRUDE FAT %	7	8	9	10	11	12	13
		ANCHOVY AND MENHADEN MEALS	59	1260	1290	1320	1350	1380
60	1280		1310	1340	1370	1395	1425	1455
61	1300		1330	1355	1385	1415	1445	1475
62	1315		1345	1375	1405	1435	1465	1490
63	1335		1365	1395	1420	1450	1480	1510
64	1350		1380	1410	1440	1470	1500	1530
65	1370		1400	1430	1460	1485	1515	1545
66	1390		1415	1445	1475	1505	1535	1565
67	1405	1435	1465	1495	1525	1555	1580	
68	1425	1455	1480	1510	1540	1570	1600	
HERRING MEAL	69	1415	1445	1475	1500	1530	1560	1590
	70	1430	1460	1490	1520	1550	1580	1610
	71	1450	1480	1510	1540	1565	1595	1625
	72	1470	1495	1525	1555	1585	1615	1645
	73	1485	1515	1545	1575	1605	1630	1660
	74	1505	1535	1565	1590	1620	-	-

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