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Preliminary chemical and physical evaluation of some formulated feeds for *P. monodon*

By

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The culture of *P. monodon* has explicitly defined the need for diet formulations or supplementary feeds that would promote optimum growth and survival of the animal. Previous exploratory studies in the laboratory (Annual Report 1976) show that shrimp head is an acceptable and potential feed. Rice bran, in combination with shrimp head, has been found to promote significant growth rates in the animal. In addition, it provides the necessary fiber for bulk in the diet. Soybean, on the other hand, contributes similar nutrients and fiber and may substitute for rice bran. Fish meal and *Ascetes* spp. meal are abundant protein sources and have been found to promote growth.

A total of 28 feed combinations were developed for *P. monodon*. Fish meal, shrimp head meal, squid head meal, *Ascetes* spp. rice bran, and soybean cake were used as primary ingredients in these feeds (Table 1). The commercial vitamin mix No. 22 was added to the dry ingredients (Table 2). Gelatinized corn starch and wheat flour were used as binders. The pellets were extruded using a portable kitchen grinder with a diameter of 4 mm. The products were either sun-dried for 8 hours or oven-dried overnight at 50°C to stabilize moisture at 8-10%. The pellets were then kept in covered glass bottles and stored in the laboratory at room temperature.

The cost of the feeds excluding labor were also computed. The pellets were analyzed for protein, fat, carbohydrate, crude fiber, ash, and moisture contents using standard procedures. They were also analyzed for water stability.

To test the stability of pellets in water, 2-g samples were placed in plankton nets (mesh #40) and suspended in water for two, and six hours. The undissolved samples were then vacuum-dried and the moisture determined. To compute for stability, the following formula was used:

$$\text{Stability (\%)} = \frac{\text{Final weight} \times \text{percent dry matter}}{\text{Original weight} \times \text{percent dry matter}} \times 100$$

Cost of the feeds ranged from P1.10 to P2.60 per kg. depending on the feed ingredient (Table 1). Squid and *Ascetes* spp. were rather expensive for use as basic ingredients. Proximate analysis of dry weight showed percentage protein content ranged from 20-63 g; fat, 8-20 g; carbohydrate (by difference), 11-36 g; ash, 8-28 g; moisture, 6-11 g; and crude fiber, 5-13g.

Stability tests showed that after two hours, 35-88% of solids remained intact and after 6 hours, 20-55% of the pellet remained undissolved. When a pellet disintegrates easily, pollution of the water occurs. Chances for the shrimp to feed on the pellet is minimized when the pellet is unstable. Thus, the search for a more compact feed pellet has to be continued.

Table 1. Composition of feed formulations

Ingredients	A	B	C	D	E	F	G	H	I	J	K
JFM – 1											
Shrimp head	8	8	8	8	8	8	36	–	18	–	31
Fish meal	32	32	32	18	36	–	–	36	18	36	8
Rice bran	18	36	–	32	32	32	8	8	8	32	34
Soybean cake	18	–	36	36	–	36	36	32	32	8	3
Flour	15	15	15	15	15	15	15	15	15	15	15
Corn starch	5	5	5	5	5	5	5	5	5	5	5
Corn oil	3	3	3	3	3	3	3	3	3	3	3
Vitamin mix	1	1	1	1	1	1	1	1	1	1	1
Cost/kilo	P1.15	P1.17	1.15	1.14	1.18	1.11	1.53	1.07	1.28	1.06	1.49
JSQ – 2											
Fish meal	8	8	8	8	8	8	8	8	8	8	8
Rice bran	16	16	28	15	44	–	7	17	22	27	37
Shrimp head	–	3	10	38	19	31	31	31	31	31	31
Squid meal	52	49	30	15	5	37	30	20	15	10	–
Flour	15	15	15	15	15	15	15	15	15	15	15
Corn starch	5	5	5	5	5	5	5	5	5	5	5
Corn oil	3	3	3	3	3	3	3	3	3	3	3
Vitamin mix	1	1	1	1	1	1	1	1	1	1	1
Cost/kilo	P2.59	2.54	2.08	2.04	1.49	2.60	2.40	2.09	1.95	1.79	1.49
JSH – 3											
Shrimp head	22	22	22	22	22	22	–	–	–	–	–
Fish meal	8	8	8	–	–	–	–	–	–	–	–
Rice bran	50	–	30	50	–	30	–	–	–	–	–
Soybean cake	–	50	20	–	50	20	–	–	–	–	–
Mysid shrimp meal	–	–	–	8	8	8	–	–	–	–	–
Flour	10	10	10	10	10	10	–	–	–	–	–
Corn starch	6	6	6	6	6	6	–	–	–	–	–
Corn oil	3	3	3	3	3	3	–	–	–	–	–
Vitamin mix	1	1	1	1	1	1	–	–	–	–	–
Cost/kilo	P1.27	1.24	1.26	1.71	1.68	1.70	–	–	–	–	–

**Table 2. Composition of Vitamin Mix 22 per
500 grams**

Vitamin A	880,000 USP
D ₃	330,000 USP
E	385 IU
K	60 mg
B ₁	220 mg
B ₂	440 mg
B ₆	55 mg
B ₁₂	2,200 mg
Niacin	3,000 mg
Calcium pantothenate	600 mg
Choline chloride	22,000 mg
Folic acid	11 mg
Iron (ferrous sulfate)	4,400 mg
Iodine (potassium iodide)	220 mg
Calcium (carbonate, phosphate, sulfate)	60,000 mg
Cobalt sulfate	22 mg
Copper sulfate	220 mg
Magnesium sulfate	3,300 mg
Potassium sulfate	33 mg
Zinc sulfate	8,800 mg
Manganese sulfate	6,000 mg
L-lysine hydrochloride	3,300 mg
Methionine	4,400 mg

