

# FACT SHEET

L-1018

## Oral Administration of Antibiotics to Fishes

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Treating fishes with antibiotics as part of their diet has become a common practice in the fish culture industry. Oral administration of antibiotics has been a successful corrective measure in cases where light kills caused by bacterial invasion begin to occur. Several antibiotics have widespread use in fish culture, but only one (Terramycin) has been cleared by the Food and Drug Administration for use on warm water fishes destined for human consumption. Other clearances probably can be expected with the maturity of research in the fish disease field.

In certain areas, commercially prepared fish feeds with antibiotic additives are available. Use of this type of product has convenience and in many cases is more economical than feeds with self-applied antibiotics.

A farmer may decide, however, that the "do it yourself" approach would be the better choice for his particular needs.

### SUGGESTED METHOD FOR PREPARING COATED FEEDS

Thoroughly mix the correct amount of powdered antibiotic in oil. Fold the oil-antibiotic mixture into the daily pellet allotment. Stir gently until the pellets are uniformly coated. Cod liver oil seems to have a more appealing taste to fishes than does vegetable oil. The proper amount of oil to use is that which will provide a thin film of coating around the pelleted fish food.

### Dosage

Recommended dosages of antibiotics usually are expressed as weight of drug per weight of fish per day. For example, they are expressed as grams per 100 pounds of fish per day or milligrams per kilogram of fish per day. When figuring the dosage of antibiotic only the weight of the active ingredient (the antibiotic) of the purchased formulation should be considered. The weight of fishes can be estimated by sampling fishes to get an esti-

mated average length and then comparing the length to a length-weight table. Table 1 is modified from Swingle and Shell (Auburn University, Agricultural Experiment Station, 1971, Circular 183) and is based on wild fish populations. Cultivated fish might be expected to run slightly heavier in weight.

Table 2 gives the amount of antibiotic in grams that is to be added to one pound of feed at various dosage rates and feeding rates. From Tables 1 and 2, one may establish the amount of antibiotic that will be used per day during a treatment.

Example: A pond has therein an estimated 10,000 channel catfish fingerlings that average 5 inches in length. The feeding rate of these fishes is 3 percent of body weight per day. The dosage of antibiotic has been suggested to be 4.5 grams of antibiotic per 100 pounds of fish per day. How much antibiotic should be used?

First, by using Table 1, determine how many pounds of fish are present:

A 5-inch fingerling averages 16.1 grams so 10,000 would represent  $16.1 \times 10,000 = 161,000$  grams. In pounds this would be  $161,000 \text{ grams} \div 454 \text{ grams/pound} = 355$  pounds of fish.

Table 1. Length-weight relationships of channel catfish

Inches	$\hat{W}$ /(gm.)	Inches	$\hat{W}$ /(gm.)
2½	2.1	9½	105.6
3	3.5	10	123.3
3½	5.6	11	170.2
4	8.4	12	228.4
4½	11.4	13	296.3
5	16.1	14	380.5
5½	21.4	15	476.0
6	27.2	16	587.1
6½	34.7	17	720.6
7	43.3	18	867.6
7½	53.3	19	1,041.4
8	63.8	20	1,230.1
8½	76.5	21	1,441.4
9	90.9	22	1,686.7

$\hat{W}$  = computed weight; based on fishes from several river systems.

Table 2. Amount of antibiotic in grams added to 1 pound of feed

Percent of body weight fed per day	Dosage in grams of antibiotic per 100 pounds of fish per day										
	1.0	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	8.0	10.0
1%.....	1.00	2.00	2.50	3.00	3.50	4.00	4.50	5.00	6.00	8.00	10.00
2%.....	0.50	1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.00	4.00	5.00
3%.....	0.33	0.67	0.83	1.00	1.14	1.33	1.50	1.66	2.00	2.66	3.33

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Table 3. Cost of drugs required to treat 1,000 pounds of fish for 1 day\*

Rate of dosage (grams per 100 pounds of fish per day)	Cost per gram of drug used							
	0.5 cent	1 cent	2 cents	3 cents	4 cents	5 cents	10 cents	20 cents
0.5.....	\$ 0.025	\$ 0.05	\$ 0.10	\$ 0.15	\$ 0.20	\$ 0.25	\$ 0.50	\$ 1.00
1.0.....	.05	.10	.20	.30	.40	.50	1.00	2.00
2.0.....	.10	.20	.40	.60	.80	1.00	2.00	4.00
3.0.....	.15	.30	.60	.90	1.20	1.50	3.00	6.00
4.0.....	.20	.40	.80	1.20	1.60	2.00	4.00	8.00
5.0.....	.25	.50	1.00	1.50	2.00	2.50	5.00	10.00
6.0.....	.30	.60	1.20	1.80	2.40	3.00	6.00	12.00
7.0.....	.35	.70	1.40	2.10	2.80	3.50	7.00	14.00
8.0.....	.40	.80	1.60	2.40	3.20	4.00	8.00	16.00
10.0.....	.50	1.00	2.00	3.00	4.00	5.00	10.00	20.00
		30 cents	40 cents	50 cents	60 cents	70 cents	80 cents	90 cents
0.5.....		\$ 1.50	\$ 2.00	\$ 2.50	\$ 3.00	\$ 3.50	\$ 4.00	\$ 4.50
1.0.....		3.00	4.00	5.00	6.00	7.00	8.00	9.00
2.0.....		6.00	8.00	10.00	12.00	14.00	16.00	18.00
3.0.....		9.00	12.00	15.00	18.00	21.00	24.00	27.00
4.0.....		12.00	16.00	20.00	24.00	28.00	32.00	36.00
5.0.....		15.00	20.00	25.00	30.00	35.00	40.00	45.00
6.0.....		18.00	24.00	30.00	36.00	42.00	48.00	54.00
7.0.....		21.00	28.00	35.00	42.00	49.00	56.00	63.00
8.0.....		24.00	32.00	40.00	48.00	56.00	64.00	72.00
10.0.....		30.00	40.00	50.00	60.00	70.00	80.00	90.00

\*Modified from Piper and Wolf (1959) *Progressive Fish-Culturist* 21(3):135-137.

Fish fed at 3 percent of the body weight would be fed  $355 \times .03 = 10.65$  pounds. From Table 2 we find that at a 3 percent feeding rate and a dosage rate of 4.5 grams per 100 pounds of fish per day the amount of grams that should be added to one pound of feed is 1.50.

Now to answer the question on how much antibiotic should be added to the feed that is fed each day:

10.65 pounds of feed  $\times$  1.5 grams/pound of feed = 16 grams.

The 16 grams is the weight of the active ingredient that is required but the weight of the total formulation that is to be added must be derived. A 10 percent active ingredient preparation would be added to the feed in an amount of 160 grams.

#### Cost

Consideration should be given to whether or not the cost of antibiotic treatment is economical. Table 3 provides information based on a fish crop of 1,000 pounds and will aid in the derivation of drug cost.

Example: How much will it cost to treat 4,000 pounds of fish for 10 days when the cost of the

drug is 2 cents per gram and the suggested dosage is 4.0 grams per 100 pounds of fish per day?

Consulting Table 3, we find that at a dosage rate of 4.0 grams per 100 pounds of fish per day and at a cost of 2 cents per gram, it will cost 80 cents to treat 1,000 pounds of fish for one day. But there are 4,000 pounds of fish to be treated for a period of 10 days.

Calculating:  $80 \text{ cents} \times 10 \times 4 = \$32.00 =$  cost of treatment.

Unrestrained use of antibiotics as precautionary measures may reduce greatly the expected margin of profit. No evidence is available that shows that feeding antibiotics will enhance growth of fishes in a manner experienced for other cultured animals.

Many antibiotics are available in technical grades such as poultry or veterinary-type formulations. The drugs should be purchased as such since there is a considerable difference in cost compared to the highly-purified and expensive product for human use.

#### Conversions

454 grams = 1 pound = 0.454 kilogram

28.35 grams = 1 ounce = 0.0625 pound

1 gram = 1000 milligrams = 0.001 kilogram