

# New Advances for Warmwater Aquaculture



Dr. Lou Crouch, Schering-Plough Research Institute, USA

## AQUAFLO<sup>®</sup> offers tilapia producers novel tool for fighting bacterial infections without prolonged withdrawal

- Key Points
- Withdrawal times calculated

### Key Points

- Average AQUAFLO<sup>®</sup> residues in tilapia fall below the tissue-tolerance concentration of 1.0 ppm within 2 days after drug withdrawal.
- The short withdrawal period possible with AQUAFLO lets tilapia producers effectively manage bacterial disease as the fish approach market weight.

Recent research indicates that AQUAFLO<sup>®</sup> (florfenicol) treatment of tilapia does not require a prolonged withdrawal period, enabling producers to better control bacterial infections in fish nearing market weight, according to Dr. Lou Crouch of the Schering-Plough Research Institute.

AQUAFLO, known as AQUAFEN<sup>®</sup> in some markets, is a potent, palatable, feed-grade, broad-spectrum antimicrobial designed specifically for use in fish.

A study with AQUAFLO was conducted to determine the amount of florfenicol residues in edible tissues of market-weight fish. Over 240 Nile-strain and 260 hybrid-strain tilapia — representing most commercial tilapia production — received feed medicated with AQUAFLO at a target total dose rate of 150 mg florfenicol (15 mg/kg for 10 days) per kg body weight. To compensate for daily dose variations, the dosing period was 12 instead of 10 days, thereby delivering 76% to 105% of the total target dose to Nile-strain tilapia and 68% to 97% of the target dose to hybrid-strain tilapia, Crouch said.

The investigators then determined concentrations of florfenicol amine (FFA), a major metabolite of florfenicol that is considered the “marker residue” by the United States Food and Drug Administration (FDA). Fish were removed from tanks and filleted, and FFA was determined at various days up to day 28 of the post-dosing period, he said.

The tissue-tolerance limit for FFA in fish is 1.0 ppm (1.0 µg/g). In the Nile-strain fish in the study, the mean FFA concentration was 1.71 µg/g at 1 day post-dosing (as corrected from actual dose to 15 mg/kg per day) and by day 14, only 11 of 20 of the sampled fish had FFA levels at or above the detection limit of 0.04 µg/g, Crouch said.

In the hybrid-strain fillet tissue, FFA concentrations were 0.94 at 1 day post-dosing (as corrected from actual dose to 15 mg/kg per day) and by day 14, only 6 of 20 sampled fish had FFA levels above the detection limit (Table 1).

Mean tissue residues in the hybrid-strain tilapia were below the tolerance limit by 1 day after treatment was stopped, and mean FFA

table 1

| Day | FFA concentration in fillet tissue (µg/g, ppm) <sup>1</sup> |               |
|-----|---|---------------|
|     | Nile strain   | Hybrid strain |
| 1   | 1.71  | 0.94          |
| 2   | 0.38  | 0.98          |
| 4   | 0.33  | 0.30          |
| 7   | 0.09  | 0.17          |
| 14  | 0.05  | 0.07          |
| 21  | 0.07  | 0.05          |
| 28  | 0.06  | 0.11          |

<sup>1</sup> Only specimens with detectable residue levels were used to calculate means (limit of detection: 0.04 µg/g). Residue levels below 0.10 µg/g are considered approximate. Values corrected for feed consumption and average daily dose in mg/kg. n=20 per strain sampled for each interval with 6-20 per interval >0.04 µg/g. Tolerance limit=1.0 ppm

Table 1: Mean florfenicol amine (FFA) concentrations in fillet tissue of Nile- and hybrid-strain tilapia.

figure 1

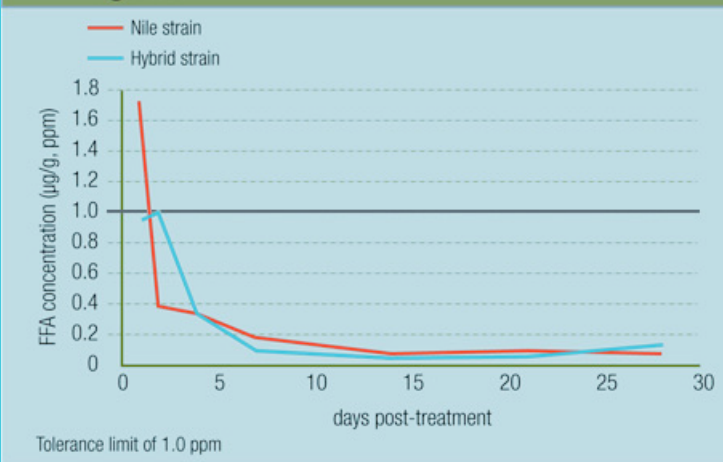


Figure 1: Mean florfenicol amine (FFA) concentrations in tilapia fillets.

concentrations in the Nile-strain tilapia were below the limit within 2 days, Crouch said (Figure 1).

#### Withdrawal times calculated

Additional statistical evaluations to determine withdrawal times were conducted using FDA guidelines and included adjustments for the actual mean daily mg dose of florfenicol, corrected to the clinical dose of 15 mg/kg daily. The computed withdrawal time is 7 days for the Nile strain and 8 days for the hybrid-strain tilapia, Crouch said, noting that final FDA approval for use in tilapia and including withdrawal times is still pending.

“A withdrawal time of 8 days ensures that tissue concentrations of the FFA residue marker are far below the tolerance level of 1.0 ppm for both Nile and hybrid tilapia strains. In fact, average FFA concentrations fell below the tolerance limit after only 1 and 2 days after treatment stopped,” he said.

“If tilapia producers can effectively manage bacterial diseases without a prolonged withdrawal period, virulent bacterial pathogens won’t have the opportunity to reestablish themselves in medicated fish that are approaching market weight,” Crouch said.

“Once a bacterial pathogen such as *Streptococcus iniae* or *Aeromonas hydrophila* has established itself into a recirculating system such as those used to raise tilapia, eradication is nearly impossible and antibiotic treatment becomes a critical management tool,” he added.

Because AQUAFLOr employs a different mode of action compared to other antibiotics used in aquaculture, it is likely to be effective against pathogens that are resistant to other antibiotics, he said.

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