

Oxytetracycline Dihydrate Does Not Enhance Growth or Conversion Efficiency in Fish

Lack of Growth Promotion Effect Suggests Virtually No Incentive for Antibiotic Misuse

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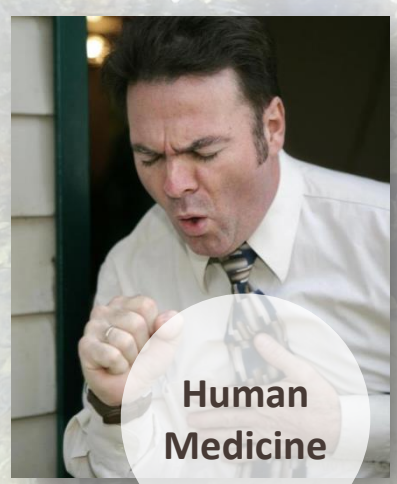
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USES OF ANTIBIOTICS



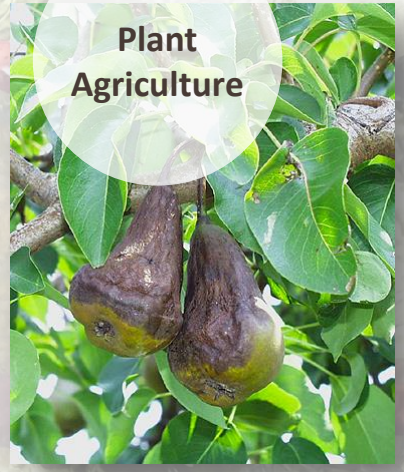
Human Medicine

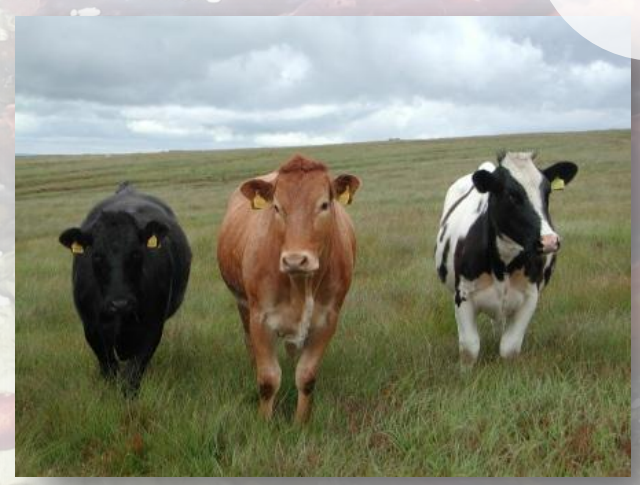




Animal Agriculture

Plant Agriculture







THERAPEUTIC VS. NONTHERAPEUTIC USES



Therapeutic Claim(s)
20 g/ton

Production Claim(s)
10-50 g/ton



Therapeutic Claim(s)
100-500 g/ton

Production Claim(s)
10-50 g/ton

FDA-APPROVED USES OF OXYTETRACYCLINE DIHYDRATE PRODUCTS



Therapeutic Claim(s)
50-200 mg/head/d

Production Claim(s)
25-75 mg/head/d



Therapeutic Claim(s)
2.5-3.75 g/100 lbs./d

No production claims are approved for fish

ANTIBIOTICS AS GROWTH PROMOTERS

Nontherapeutic use of antibiotics to enhance terrestrial animal growth performance is a common, but controversial practice

Misconception that antibiotics are used this way in U.S. aquaculture

Such uses are illegal, generally believed to be ineffective in fish

Little quantitative data available that unequivocally demonstrate the effect(s) of antibiotic administration on fish growth

This study was conducted to demonstrate whether oral administration of oxytetracycline dihydrate (OTC) affects growth performance in fish

THIS STUDY WAS NOT CONDUCTED IN SUPPORT OF PRODUCTION CLAIMS FOR ANTIBIOTICS IN U.S. AQUACULTURE

EXPERIMENTAL DESIGN AND ANALYSIS

Control	Commercial feed + 50 mL tap water/kg feed + 5 g fish oil/kg feed	**0 mg** OTC/kg fish/d if fed at 3% BW/d
Standard Dose OTC	Commercial feed + 1.2 g OTC/kg feed + 50 mL tap water/kg feed + 5 g fish oil/kg feed	**80 mg** OTC/kg fish/d if fed at 3% BW/d
Low Dose OTC	Commercial feed + 0.24 g OTC/kg feed + 50 mL tap water/kg feed + 5 g fish oil/kg feed	**16 mg** OTC/kg fish/d if fed at 3% BW/d

EXPERIMENTAL DESIGN AND ANALYSIS



Weight gain, specific growth rate (SGR), feed conversion ratio (FCR), hepatosomatic index (HSI), viscerosomatic index (VSI)

One-way ANOVA with Tukey's HSD pairwise comparison tests, PROC GLIMMIX, SAS 9.4

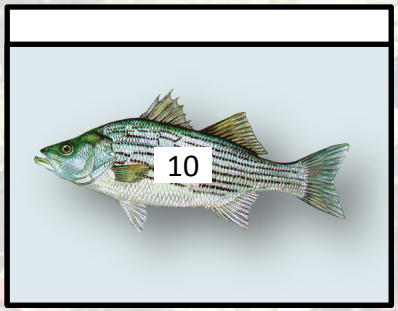
Normal vs. abnormal appearance of external and internal features

Chi-square test for differences in the frequency of normal vs. abnormal observations, PROC FREQ, SAS 9.4

EXPERIMENTAL DESIGN AND ANALYSIS

Hybrid Striped Bass

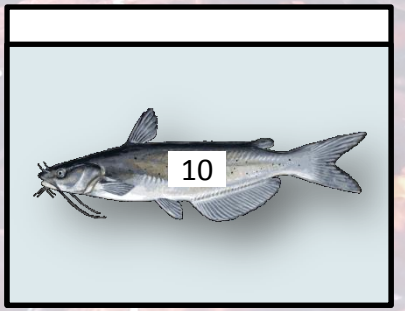




26.5°C

Channel Catfish

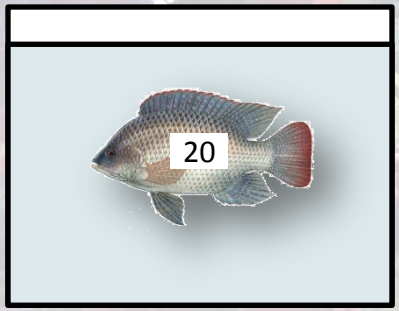




26.8°C

Nile Tilapia



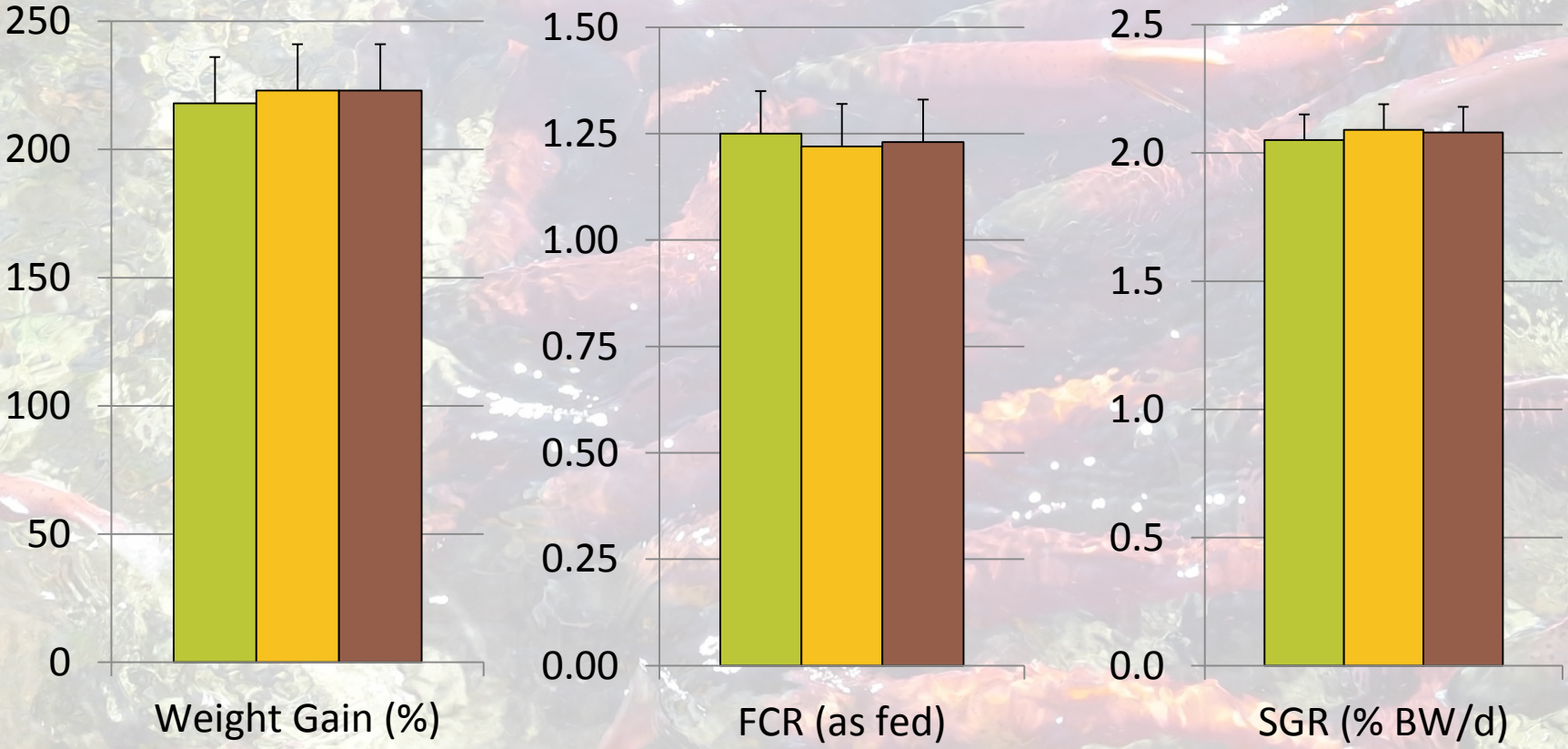


28.8°C

RESULTS

Weight Gain *P* = 0.122
FCR *P* = 0.120
SGR *P* = 0.119

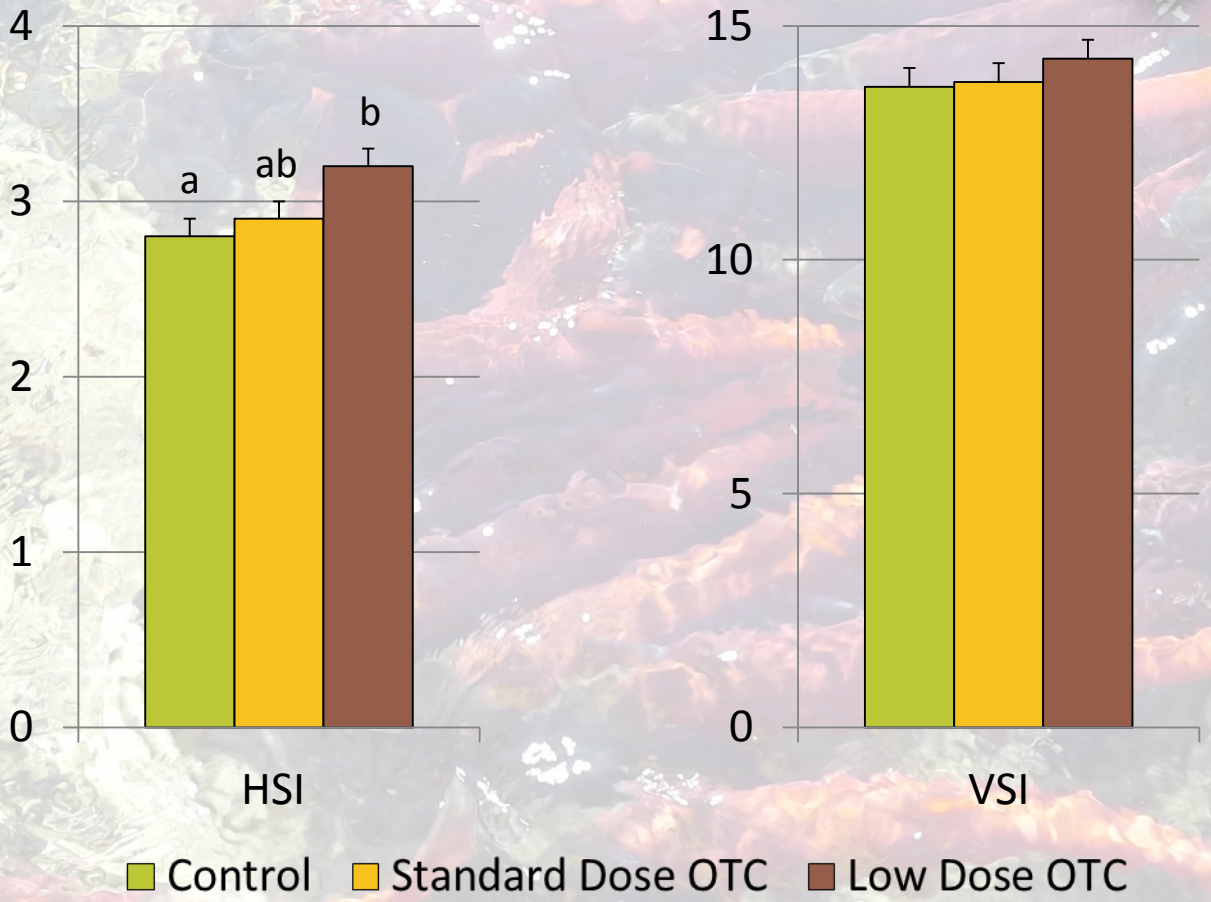




RESULTS

HSI $P = 0.021$
VSI $P = 0.243$

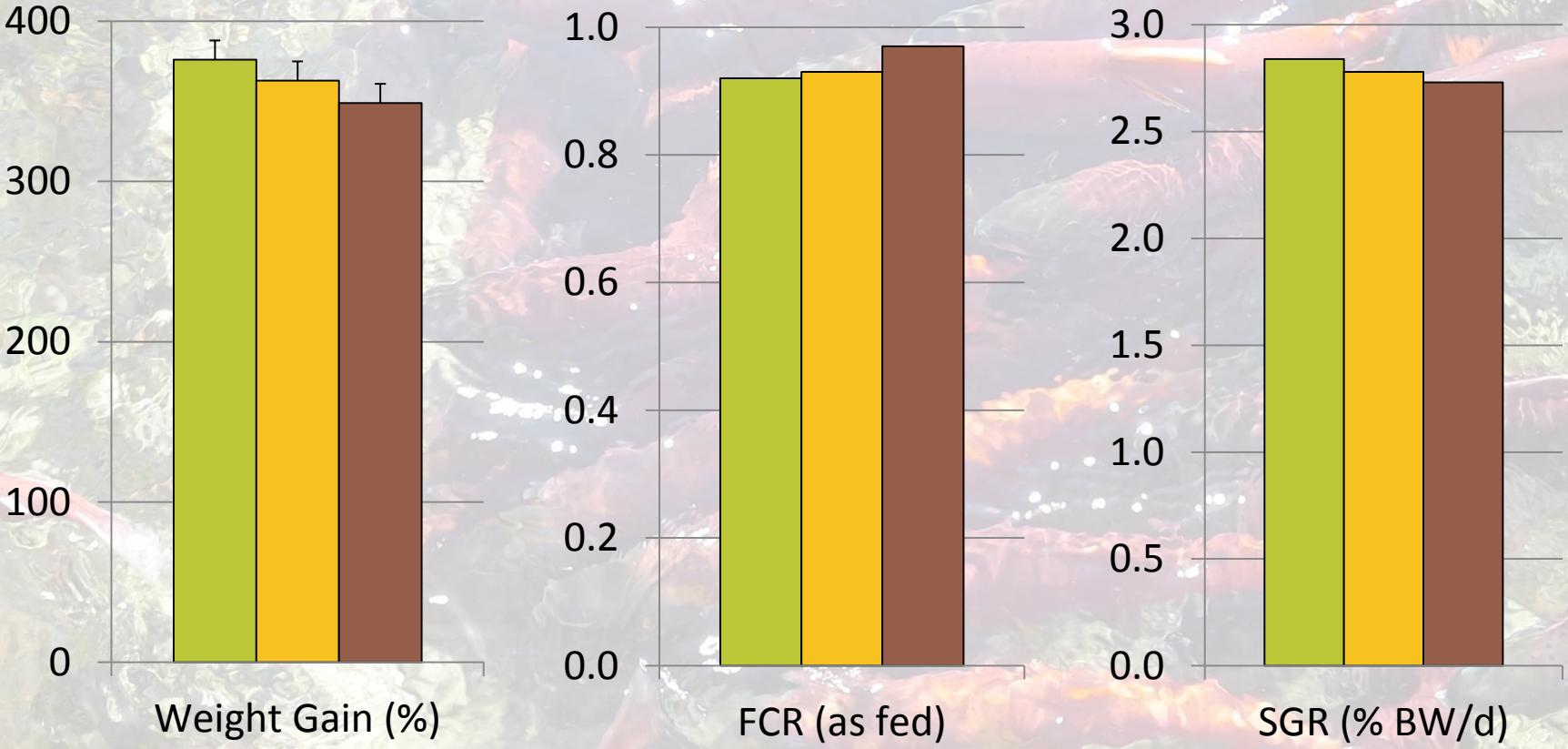




RESULTS

Weight Gain $P = 0.122$
FCR $P = 0.120$
SGR $P = 0.119$

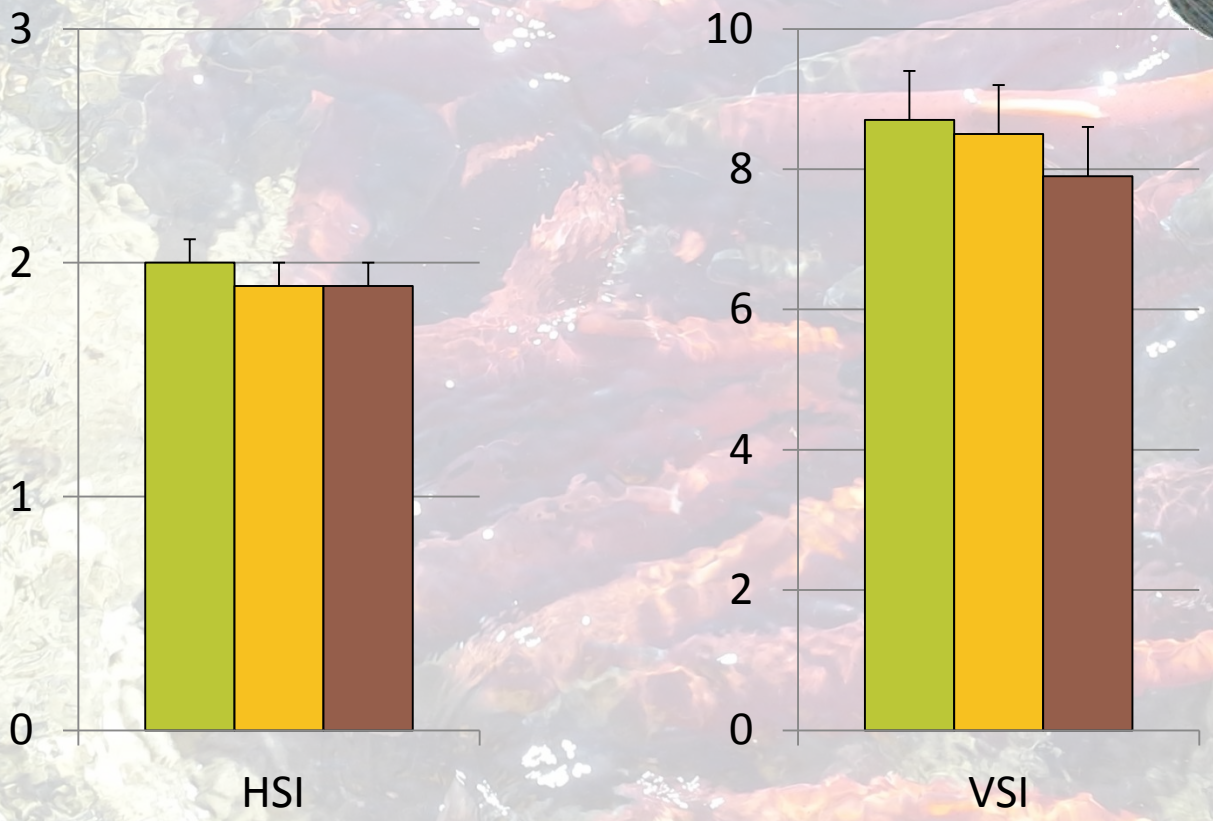




RESULTS

HSI $P = 0.728$
VSI $P = 0.518$

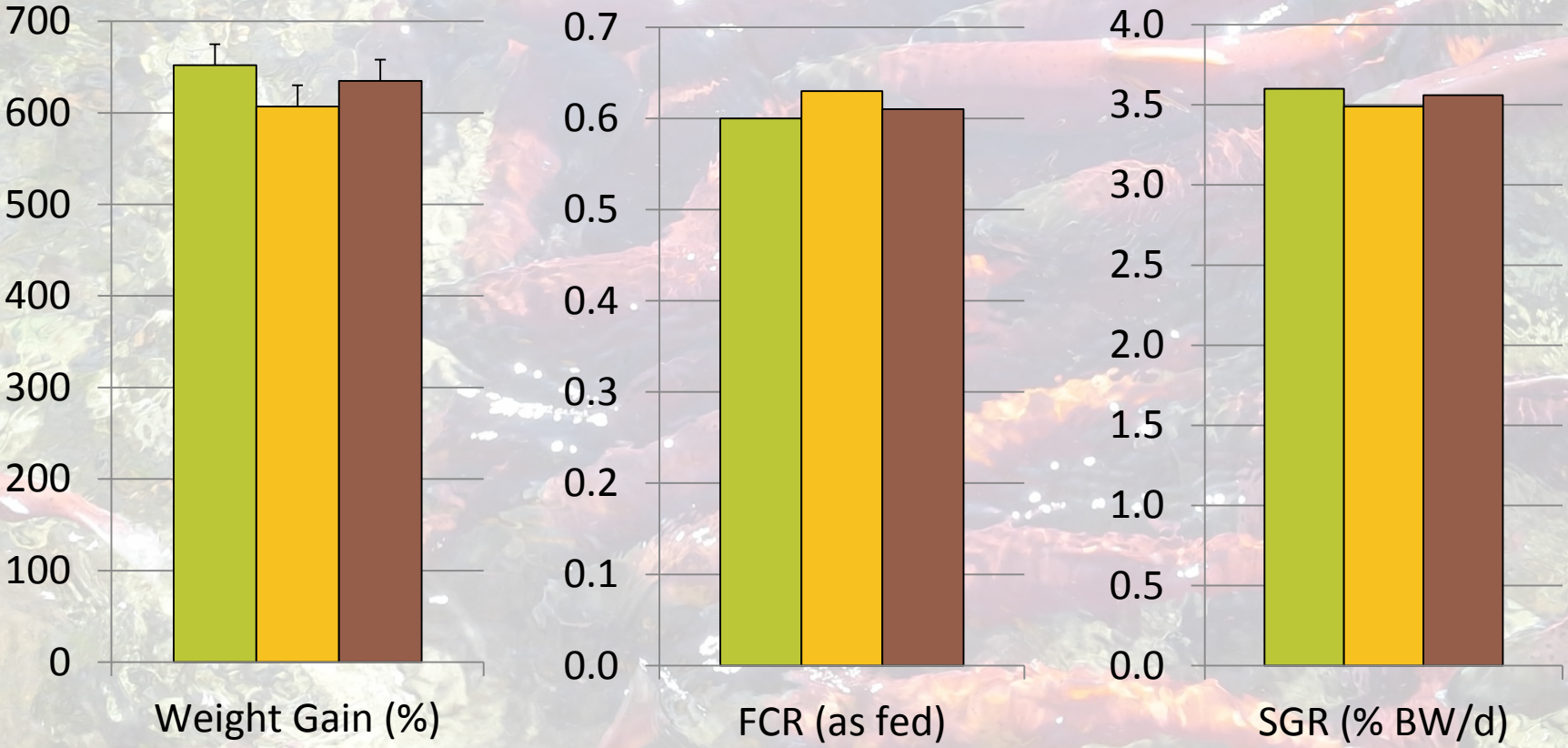




RESULTS



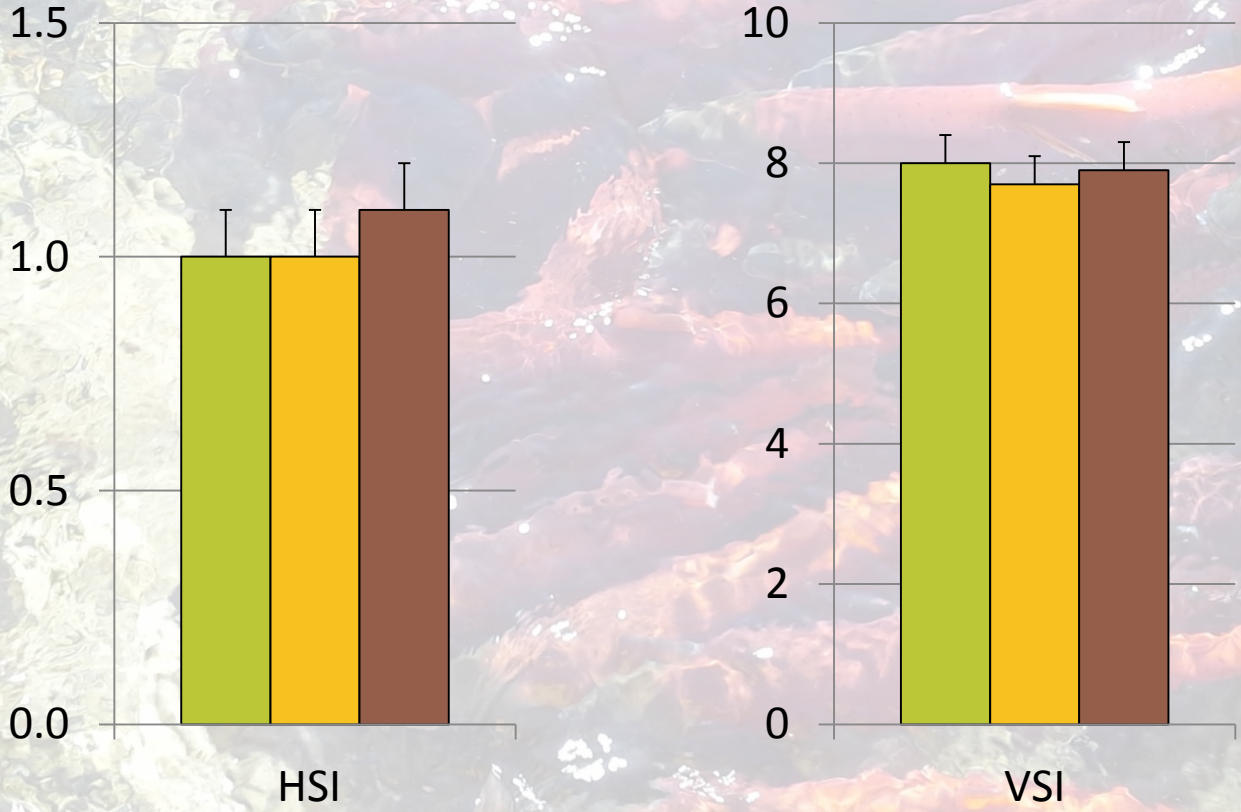
Weight Gain *P* = 0.201
FCR *P* = 0.281
SGR *P* = 0.197



RESULTS



HSI $P = 0.972$
VSI $P = 0.579$

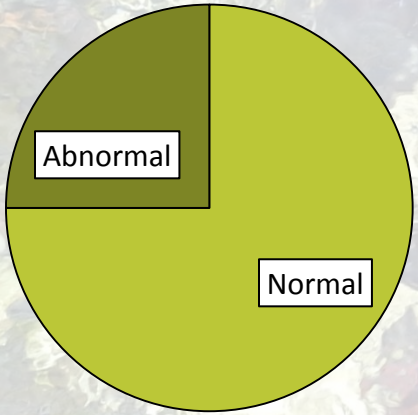


RESULTS

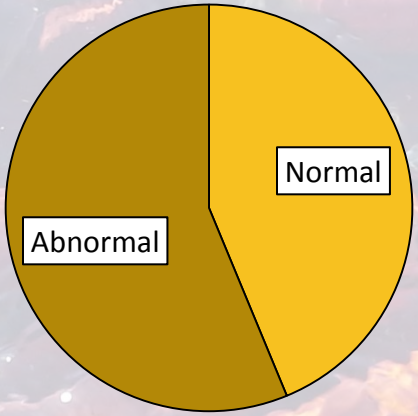


Skin & Body Surface $P = 0.017$

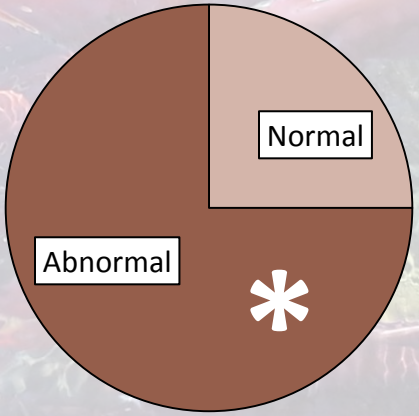
Control



Standard Dose OTC



Low Dose OTC





CONCLUSIONS AND FUTURE WORK

Continuous feeding of OTC, at a standard therapeutic dose or a low dose, had no significant effect on growth performance of the taxa tested

- Nonsignificant trends, when apparent, suggested a negative effect of OTC
- Only significant difference in the frequency of normal vs. abnormal tissues indicated greater incidence of abnormalities among fish fed OTC-medicated feed

Collectively, our results indicate there is no growth performance benefit associated with continuous feeding of OTC-medicated feed and little-to-no incentive to misuse OTC in fish this way

Additional experiment planned with Rainbow Trout

As of 2017, antibiotics will be accessible only with veterinary oversight

- FDA is encouraging drug sponsors to voluntarily withdraw production claims

Questions? Please ask!

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The Eagle Fish Health Laboratory provides comprehensive, responsive fish health services to the Idaho Department of Fish and Game and its partners