

F3 Fish Oil Challenge: Forage Fish Savings Estimate

Competitor 1

What we know:

- F3oil Sales: **769,038.25 kg**
- F3oil used for salmon diets.

Assumptions:

1. The calculation is based on a single diet comparison: Customer X's original salmon diet vs. its new salmon diet that uses a competitor's F3oil.
2. FCR is 1.3 for both the original and new diets.
3. Use of byproduct in fishmeal and fish oil production has been set to 33%, [as estimated by IFFO](#), thereby reducing the need for whole forage fish by that amount.
4. The forage fish species used in this calculation is Anchoveta (Peruvian anchovy), which has a composition of [24% fishmeal](#), [5% fish oil](#) and an [average weight of 19.35g](#).

Customer X's Original diet for salmon.

Fishmeal %: 30

Fish oil %: 12

Feed Conversion Ratio: 1.3

Customer X's Improved Diet (w/ F3oil) for salmon:

Fishmeal %: 24

Fish oil %: 8

(F3oil %: 1)

Feed Conversion Ratio: 1.3

Calculation:

1 tonne of salmon produced consumes 1.3 tonnes of feed (based on feed conversion ratio).

1.3 tonnes of the new diet uses 0.104 tonnes (104 kg) of fish oil. (1.3 tonnes * 8%)

1.3 tonnes of the new diet uses 0.013 tonnes (13 kg) of F3oil. (1.3 tonnes * 1%)

Therefore, feeding the new diet, 1 tonne of salmon consumes 104 kg of fish oil from forage fish and 13 kg of F3oil.



Since the competitor sold 769,038.25 kg of its F3oil during the contest, that is enough to produce ~59,156.79 tonnes of salmon. (769,038.25 / 13).

For 59,156.79 tonnes of salmon:

RESULTS*	Customer X's Original Diet	Customer X's Improved Diet (w/ F3oil)
Feed Requirement (tonnes) (production amount * feed conversion ratio)	76,903.8270	76,903.8270
Limiting Ingredient (calculated using Forage Fish Dependency Ratio (FFDR) ¹)	Fish Oil	Fish Oil
Forage Fish Requirement (tonnes) (FFDR of Limiting Ingredient * Feed Requirement * 0.67 ²)	123,661.354	82,440.903
# Forage Fish (Forage Fish Requirement / Weight of a Single Forage Fish ³)	6,390,767,639	4,260,511,759
Excess Amount of Non-Limiting Ingredient (tonnes) (Amount of non-limiting ingredient created by amount of forage fish needed - Amount of non-limiting ingredient needed for production amount)	6,607.57682 (Fishmeal)	1,328.89813 (Fishmeal)

¹The Limiting ingredient (fishmeal or fish oil) is determined by calculating the Forage Fish Dependency Ratio: Ingredient Rate of Inclusion in Feed (%) / Ingredient Yield from Forage Fish (%). Whichever ingredient results in the higher dependency ratio is limiting.

²Use of byproduct in fishmeal and fish oil production has been set to 33%, [as estimated by IFFO](#), thereby reducing the need for whole forage fish by that amount.

³The forage fish species used in this calculation is Anchoveta (Peruvian anchovy), which has a composition of [24% fishmeal](#), [5% fish oil](#) and an [average weight of 19.35g](#).

*See [here](#) for explanation of above table calculations.

Therefore, by using the **improved diet**, 2,130,255,880 forage fish will be saved.



Competitor 2

What we know:

- Competitor F3oil Sales: **84,279 kg**
- F3oil used for tilapia/grass carp diets.

Assumptions:

1. The calculation is based on a single diet comparison: Customer X's original tilapia/grass carp diet vs. its new tilapia/grass carp diet that uses a competitor's F3oil.
2. Use of byproduct in fishmeal and fish oil production has been set to 33%, [as estimated by IFFO](#), thereby reducing the need for whole forage fish by that amount.
3. The forage fish species used in this calculation is Anchoveta (Peruvian anchovy), which has a composition of [24% fishmeal, 5% fish oil](#) and an [average weight of 19.35g](#).

Customer X's Original diet for tilapia/grass carp.

Fishmeal %: 3

Fish oil %: 1.5

Feed Conversion Ratio: 1.3

Customer X's Improved Diet (w/ F3oil) for tilapia/grass carp:

Fishmeal %: 0

Fish oil %: 0

(F3oil %: 1.5)

Feed Conversion Ratio: 1.35

Calculation:

1 tonne of tilapia/grass carp produced consumes 1.35 tonnes of feed (based on feed conversion ratio).

1.35 tonnes of the new diet uses 0.02025 tonnes (20.25 kg) of F3oil. ($1.35 \text{ tonnes} * 1.5\%$)

Therefore, feeding the new diet, 1 tonne of tilapia/grass carp consumes 20.25 kg of F3oil.

Since the competitor sold 84,279 kg of its F3oil during the contest, that is enough to produce ~4,161.93 tonnes of tilapia/grass carp. ($84,279 / 20.25$).

For **4,161.93** tonnes of tilapia/grass carp:



RESULTS*	Customer X's Original Diet	Customer X's Improved Diet (w/ F3oil)
Feed Requirement (tonnes) (production amount * feed conversion ratio)	5,410.5090	5,618.6055
Limiting Ingredient (calculated using Forage Fish Dependency Ratio (FFDR) ¹)	Fish Oil	N/A
Forage Fish Requirement (tonnes) (FFDR of Limiting Ingredient * Feed Requirement * 0.67 ²)	1,087.512	0
# Forage Fish (Forage Fish Requirement / Weight of a Single Forage Fish ³)	56,202,187	0
Excess Amount of Non-Limiting Ingredient (tonnes) (Amount of non-limiting ingredient created by amount of forage fish needed - Amount of non-limiting ingredient needed for production amount)	98.68768 (Fishmeal)	N/A

¹The Limiting ingredient (fishmeal or fish oil) is determined by calculating the Forage Fish Dependency Ratio: Ingredient Rate of Inclusion in Feed (%) / Ingredient Yield from Forage Fish (%). Whichever ingredient results in the higher dependency ratio is limiting.

²Use of byproduct in fishmeal and fish oil production has been set to 33%, [as estimated by IFFO](#), thereby reducing the need for whole forage fish by that amount.

³The forage fish species used in this calculation is Anchoveta (Peruvian anchovy), which has a composition of [24% fishmeal, 5% fish oil](#) and an [average weight of 19.35g](#).

*See [here](#) for explanation of above table calculations.

Therefore, by using the **improved diet**, 56,202,187 forage fish will be saved.

Final Results

So overall, by adding the competitors' individual savings, we estimate that the F3 Fish Oil Challenge saved **2,186,458,067** forage fish in total.

