



Land Raised™ Atlantic salmon FEED FACT SHEET

KUTERRA salmon eat very little wild fish.

- Our feed contains 5% fishmeal and 11% fish oil.
- Our feed conversion ratio averages 1.18, and is on an improving trend downward.
- Our Fish-In-Fish-Out (FIFO) factor is 0.71. This means that for every kilo of wild fish in our feed we grow almost one-and-a-half kilos of KUTERRA salmon.
- Our fish live in very controlled conditions, so they don't have to use much food energy to cope with environmental stresses, and can use more food energy to grow instead. It means our fish can grow quickly and eat fewer wild fish over their lifetime.
- Our fish are not genetically modified. KUTERRA salmon grow quickly simply because they live in optimum, controlled, low-stress conditions.

KUTERRA salmon is a great source of high-quality protein and omega oils.

- Every kilo of protein in our feed produces more than two-and-a-half kilos of protein in our fish.
- This is based on calculations by the Monterey Bay Aquarium of net protein gain of 159%.
- The fish oil in our feed ensures that KUTERRA salmon contains healthy omega-3 oils.

The sustainability of our feed is constantly improving.

- All the wild fish in our feed come from fisheries that are certified as sustainable and traceable.
- Our feed supplier is constantly working on ways to reduce dependence on wild stocks and make feed more sustainable, as are other suppliers and researchers around the world. The result is the amount of fishmeal and fish oil in feed has been decreasing for several years [Sealey 2014]. The feed industry is investigating other sources of protein and oil, such as insects, algae and aquatic plants, land plant products such as nuts, and micro-organisms.
- In 2012, Skretting became BAP-certified (Best Aquaculture Practices), the first in North America. It became GlobalGap-certified in 2014.

FAQS

Where does your feed come from?

- Our feed is made by Skretting Canada in its Western Canada plant in Richmond, BC.
- Skretting sources approximately 66 % of our feed ingredients from Western Canada.
- Skretting sources fish from fisheries that certified as sustainable and traceable.
- Our supplier sources from fisheries in more than 15 countries, and changes as needed to ensure sustainability.
- At times our feed includes trimmings that are byproducts from processing fish that are caught for other consumption.
- To learn more you can go to Skretting's sustainability document, found at <http://sustainability.skretting.com/2013/>. Then go to Chapter 4 on marine ingredients.

What is in your feed?

- Our feed is Skretting's Optiline RC feed, developed for recirculation (RAS) facilities. It has a plant-based binder to help in the water cleaning and recycling process.
- Our feed contains fishmeal and fish oil, poultry byproducts, and plant proteins and oils, which are from wheat, corn and canola.
- Our feed also contains a natural pigment called Panaferd, which found in nature. Panaferd is extracted from fermented bacteria that live in natural environments. It has the same chemicals that are the pigment in wild salmon.

	4 mm pellets (for the smallest fish)	9 mm pellets (for the largest fish)
protein content	50 %	41 %
oil	24 %	31 %
moisture	8.5 %	8.5 %
axaxanthin (from Panaferd)	45 ppm	20 ppm
canthaxanthin (from Panaferd)	30 ppm	30 ppm

Do you have any animal products in your feed?

- Our feed contains poultry ingredients, which are by-products in the processing of poultry for human consumption.
- Using animal ingredients helps us decrease our reliance on wild fish for protein and oil.

Do you use colourant?

- Yes, we use a substance called Panaferd, which is a naturally occurring pigment extracted from fermented bacteria. It has the same compounds found in the feed of wild salmon, which give wild salmon their colour.

Do you have any GM products in your feed?

- Yes, our feed contains grain, mainly wheat that has been genetically modified.
- Use of grain for feed is common across North America. The availability of non-modified grains is very low, and the price is very high.
- The challenge of sourcing grain that has not been modified is that it would require resources we need to commit elsewhere at this stage in our development. We will revisit the issue of organic grains after we achieve our goal of proving the technical, biological and economic feasibility of growing Atlantic salmon on land for consumers.
- While our feed has some genetically modified ingredients, our fish **are not** genetically modified. They grow much faster than ocean-grown fish simply because they live in controlled conditions, which lets them use food energy more efficiently for growing rather than for dealing with environmental stress.

Why do you need to use fish at all in your feeds?

- While research has made dramatic improvements in reducing the need for fishmeal and fish oil, salmon still need a certain amount of fish in their diet. Over time that may well be reduced or eliminated if alternative ingredients are found. But the research isn't there yet.
- There are several criteria that determine whether an alternative ingredient will work. For example it has to be palatable - that is, will the fish eat it. And it has to have the right nutrient mix. For example, it's been shown that some alternative ingredients decrease the

amount of omega-3 oils and throw off the optimum balance between omega-3s and 6s. We need to avoid that, since salmon are such an excellent source of these oils.

If your feed has wheat, do your fish contain gluten?

- No, all the gluten in the grain is fully digested by the fish, so that none remains.

REFERENCES

1. Skretting sustainability report

<http://sustainability.skretting.com/2013/>

<http://sustainability.skretting.com/2013/finding-alternatives-limited-marine-resources/#traceability-of-marine-ingredients>

2. Monterey Bay Aquarium assessment report - Feed section pp 23-26

<http://www.seafoodwatch.org/->

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