



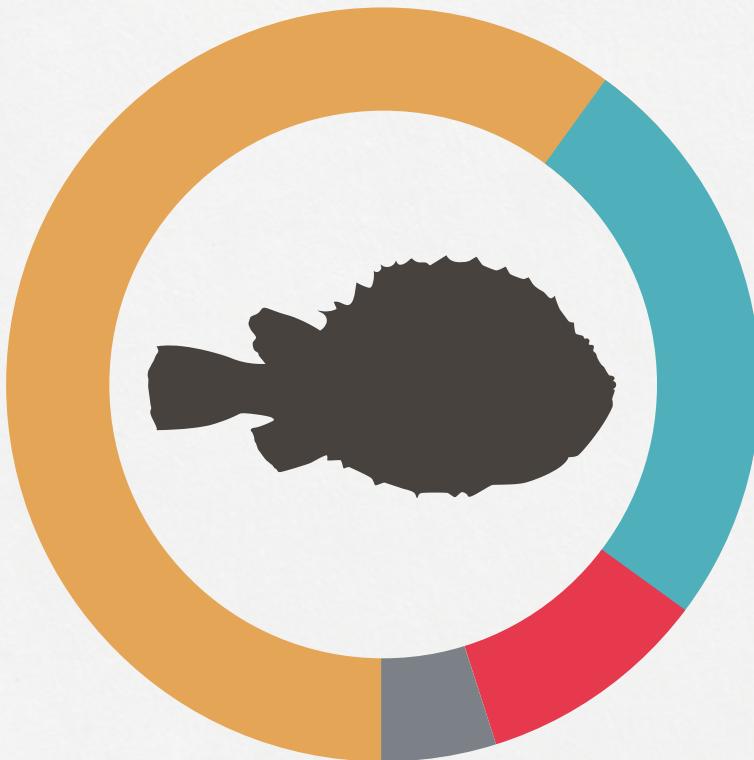
## Key for cleanerfish success



Skretting has dedicated a complete product range for lumpfish to ensure optimal quality and vitality from hatcheries to sea cages.



# Nutrition



## **PROTEINS**

Premium quality fishmeals  
Fish protein hydrolysate  
Krill meal  
Squid meal  
Hydrolysed calanus



## **FATS**

Fish oil  
Phospholipids



## **CARBOHYDRATES**

Pregelatinized starch  
Wheat gluten  
Macro algae



## **MICROINGREDIENTS**

Micro algae  
Vitamins and minerals  
Astaxanthin  
Functional ingredients

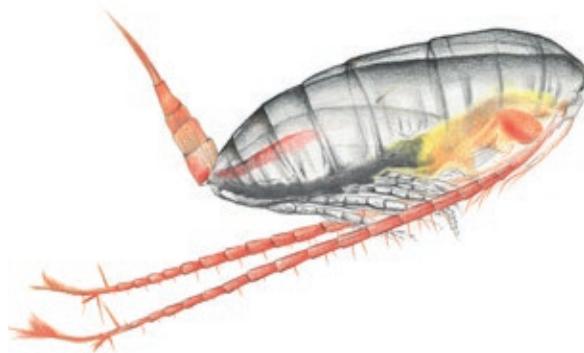
## Inspired by Nature

A broad spectrum of marine ingredients are utilized in the CLEAN range to mimic the natural wild prey diversity. The new range also includes calanus copepod, along with fishmeal, krill and marine algae. The range is balanced for precision nutrition and boosting health throughout the whole life cycle.

The CLEAN range consists of hydrolysed raw materials to ensure easier digestibility. The high levels of phospholipids and DHA/EPA ratio are essential for the development and fluidity of membranes within cell metabolism. Our proprietary algal blend coupled with astaxanthin enhance natural pigmentation and gut health.

The CLEAN range is the first diet range to incorporate the use of the marine copepod, *Calanus finmarchius*.

Calanus, squid and krill ensure high attractability. Pre-gelatinized starch secures particle binding and improved water quality.



The marine zooplankton species calanus is a free-living copepod with a one-year life cycle. Calanus is one of the most numerous animal species on the planet, and in the food chain, it is located between algae and fish. Hence, the copepod is a natural prey and is ecologically key in the lifecycle of the species.

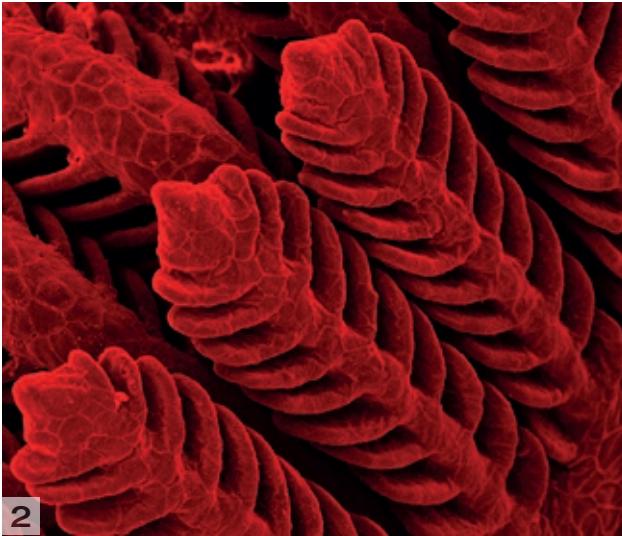
The calanus hydrolysate is a pure protein extract of gently processed calanus with excellent nutrient properties. Hydrolysatation is the process whereby, complex protein structures are pre-digested into smaller, less complex protein molecular weights, which makes it a highly digestible protein source.

A combination of an excellent amino acid profile and a natural marine flavor results in a product for optimized gut-health and enhanced feed acceptance.

# Health

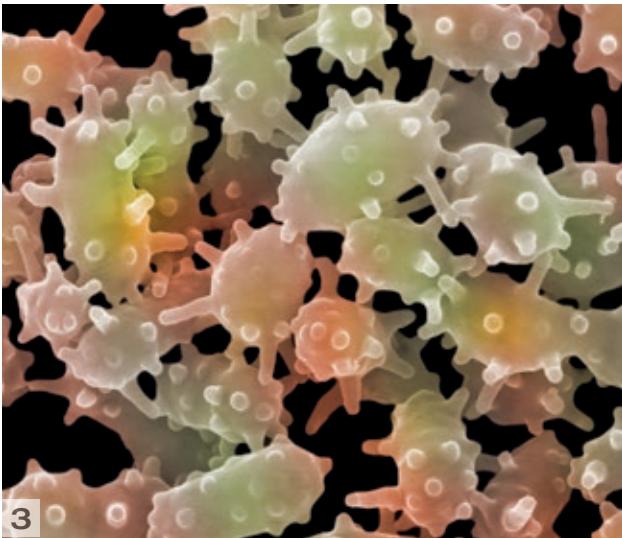
The background of the slide is a photograph of two lumpfish swimming in an aquarium. The fish are light-colored with numerous dark spots. They are positioned in front of large, green, leafy seaweed. The water is a deep blue color.

Lumpfish rearing requires frequent handling, vaccination and transfers. The highly dynamic situation constantly challenging the immune system of the lumpfish. CLEAN diets contain specific immune promoting functional ingredients that together support vital organs and immune functions, while limiting oxidative stress.



## Protec health package

A fortified immune system can assist to foster the natural defence system of the animal. It not only improves the viability of each individual but reduces the potential of infection in the whole group. This concept reduces the epidemic potential of an infectious outbreak. CLEAN diets contain Protec health package in order to optimize the balance between fish, microbes and the environment.



## Mucus protection

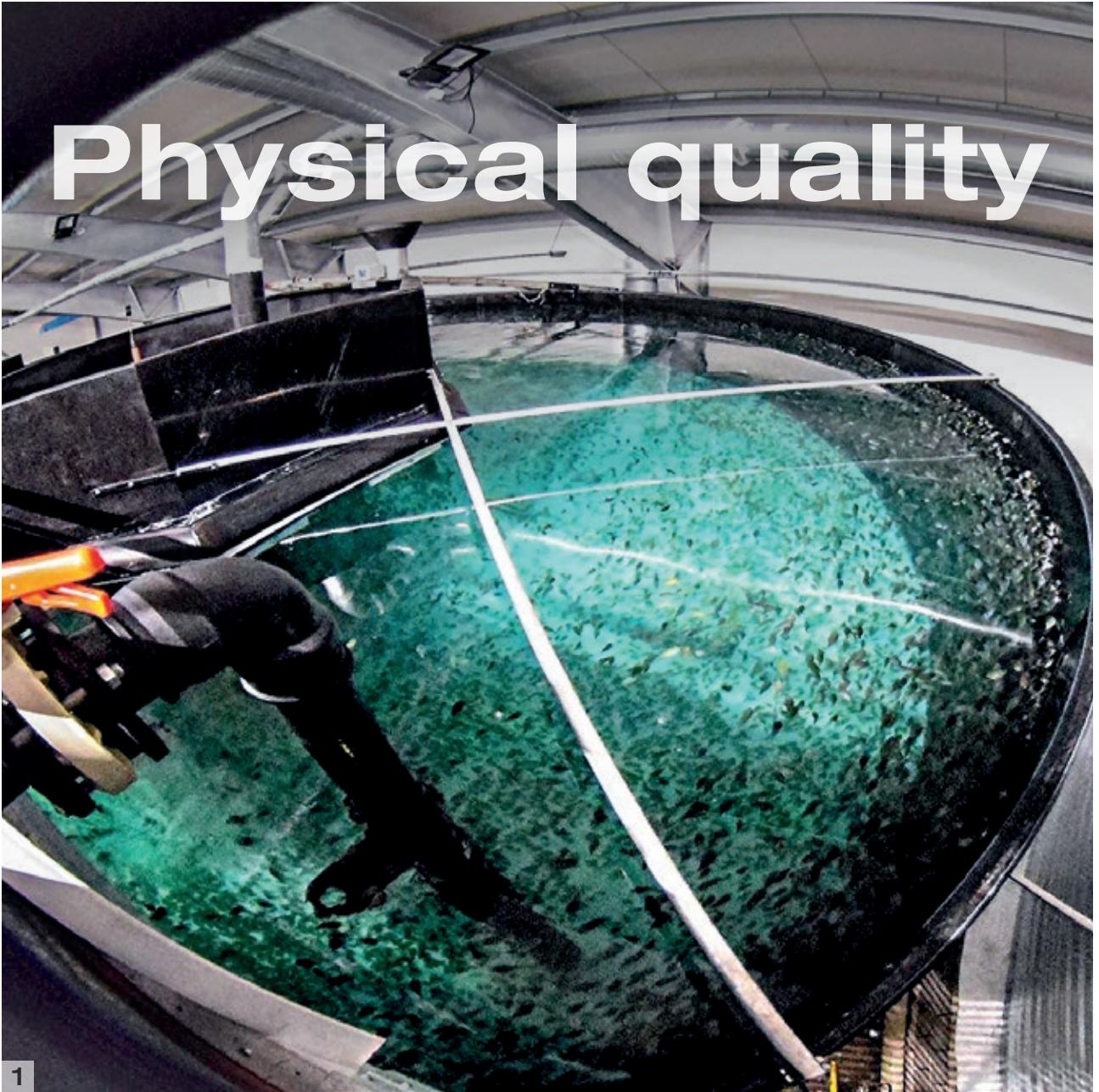
CLEAN diets include functional ingredients that actively enhance mucus quality helping to shield skin, gut and gills.

## Natural antioxidant

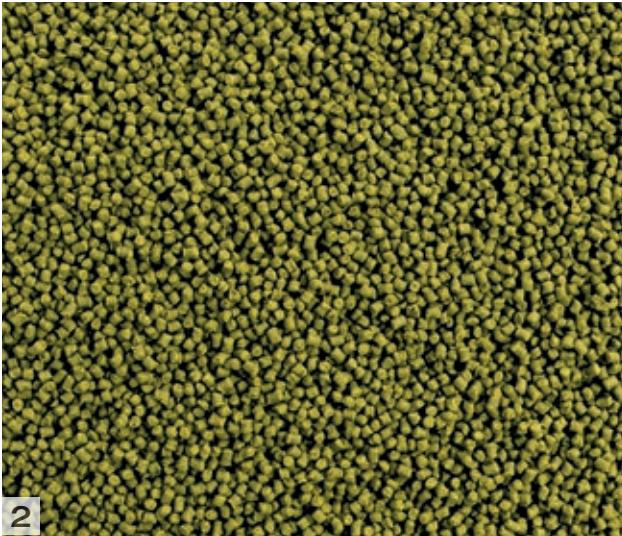
CLEAN contains high levels of astaxanthin, which is a carotenoid and a natural antioxidant found in algae and crustaceans. The red colored liver in lumpfish indicates effective astaxanthin uptake and a functional antioxidant-reservoir.

1. Lumpfish
2. Fish gills
3. Bacteria

# Physical quality



1



1. Nursery tank
2. CLEAN Assist CF 1.8 (photo scale 1/1)
3. Hatchery tanks

## Cold-extrusion process

CLEAN is produced according to a sophisticated process that ensure fresh, uniform and highly palatable feed particles. The diet is produced using a low temperature marmurization process leading to less protein denaturation and a softer, more homogenous, dust free particle, essential for eliminating nutrient loss and waste.

CLEAN particles exhibit low dust, excellent dispersion and a high water affinity resulting in a sponge like pellet. Reduced dust and waste also reduces pressure on mechanical filtration systems. Each particle offers complete nutrition and the possibility to eliminate the use of live feed. The innovative CLEAN strategy minimises the need for fresh diets and live feed while enhancing larval rearing quality and juvenile production. The elimination of the live feed vectors vastly improves biosecurity, reduces disease transmission and complexity.

The diets have been developed to exhibit a slow sinking rate to maximise feed availability & uptake. In addition, Skretting has implanted our latest findings on RecircReady to ensure the diet is fully compatible with all production systems and to maintain the highest water quality

In an industry first, Skretting has developed an image analysis based quality control system to ensure consistent particle size, shape and accurate quantification of micro particles.

# Product range



## Product overview

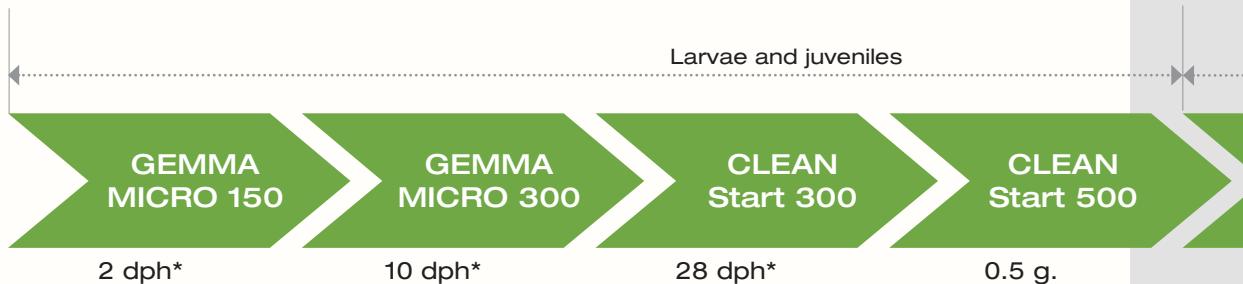
Product	Pellet size	Composition					Packaging
		Protein (%)	Lipids (%)	Ash (%)	Fiber (%)	Phosphorus (%)	
<b>GEMMA Micro</b>	150-300µm	59	14	13	0.2	2.0	2.5kg bag
<b>CLEAN Start</b>	300-500µm	62	14	8	0.2	1.6	10kg bag
<b>CLEAN Assist CF</b>	0.8-1.8mm	57	15	10.5	0.2	1.6	16kg bag
<b>CLEAN Transfer</b>	1.5-2mm	55	15	10.8	0.6	1.6	25kg bag
<b>CLEAN Lumpfish</b>	2-4mm	57	15	10.5	0.2	1.6	25kg bag
<b>VITALIS Clean</b>	4.5-7mm	59	11	11.5	0.3	1.3	20kg bag



## Our product range for cleanerfish

All our hatchery and broodstock diets have a 24-month shelf life while our transfer and maintenance feeds have a 6-month shelf life.

# Feed programme



2 dph\*

10 dph\*

28 dph\*

0.5 g.

\*dph = days post hatch

Lumpfish are highly selective and will only consume feed with an appropriate size, taste and texture. Skretting has developed a customised feeding program for lumpfish based on high protein digestibility, low fat and functional ingredients for optimal health.

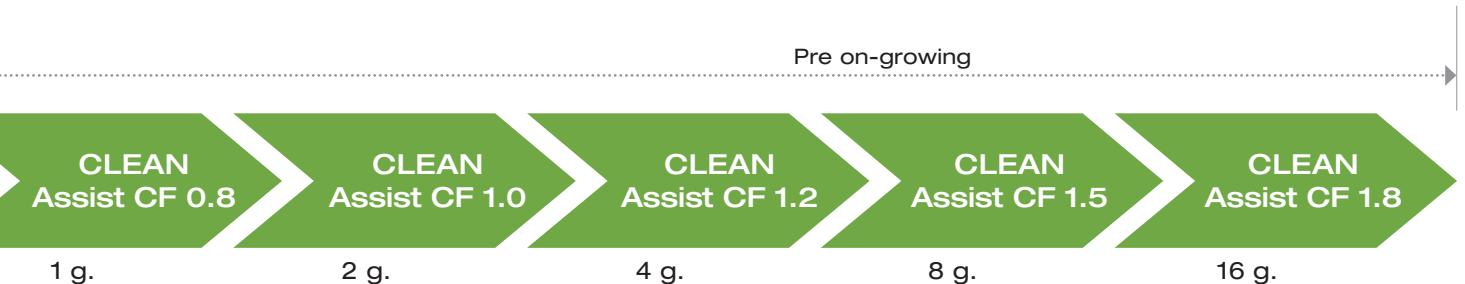
## First feeding

For the first 3-4 weeks of feeding, we advise using GEMMA Micro. This patented diet will ensure ideal feed uptake and digestion in the developing digestive tract through the use of hydrolysed marine proteins and phospholipids.

As the larvae continue their development, we advise transitioning onto CLEAN Start to facilitate the switch from larval nutrition to nursery nutrition. We advise the use of CLEAN Start until the animals have reached 1 gram. From 1 gram, we advise the use of CLEAN Assist CF. At this stage uniform and fast growth is required until the animals reach vaccination size.

## Pre on-growing

CLEAN Assist CF is the ideal pre-growing diet in order to prepare juveniles for frequent handling and vaccination. The low fat content combined with hydrolysed calanus enhance gut digestion and liver health. It contains specific immune promoting natural ingredients that together assist the immune system and support the optimal well-being of lumpfish juveniles. Thanks to its slow sinking properties, CLEAN Assist CF contributes to a more uniform population size and optimum water quality.



# Broodstock nutrition



**Broodstock nutrition has a profound influence on the quality, quantity and performance of the offspring. The VITALIS range has been designed to meet these specific demands of broodstock management and therefore contains all the essential requirements for a broodstock diet.**



1. Lumpfish broodstock
2. Lumpfish eggs
3. Lumpfish larvae

## VITALIS Clean

VITALIS Clean is a formulated diet for lumpfish broodstock based on essential requirements that provides advanced broodstock nutrition and biosecurity for egg and larval production.

## Formulation

The formula is based on a high inclusion of hydrolysed marine protein components, algae, omega-3 fatty acids (DHA/EPA), astaxanthin, vitamins and minerals. VITALIS Clean contains a specific combination of natural functional ingredients that enhance the immune system, strengthening the lumpfish against disease and provide high maximum vitality for offspring.

## Feeding guideline

To maintain optimal transfer of nutrients for offspring production, VITALIS Clean should be offered to the brood fish not less than 4 months before target spawning. During the spawning period, lumpfish should continue to be fed VITALIS Clean and it is available in 4.5 and 7mm pellets.

# Lumpfish at sea



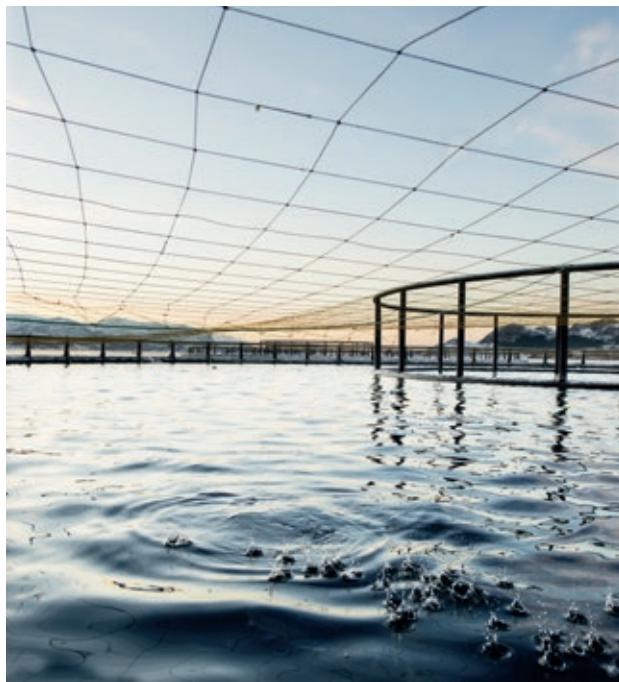
**Skretting has developed two specific diets to offer full control over lumpfish feeding management at sea.**

## **CLEAN Transfer**

CLEAN Transfer is our dedicated transition diet for the challenging first phase at sea. CLEAN Transfer contains high levels of krill that reduces the time before the fish reach full appetite. High levels of vitamin and minerals increase the level of antioxidant and enables lumpfish to better cope with the challenges of viruses and pathogenic bacteria in their new environment. Skretting recommends CLEAN Transfer 6 weeks after transfer.

## **CLEAN Lumpfish**

CLEAN Lumpfish is a maintenance feed, securing a balanced nutritional diet so the lumpfish can always perform at its most efficient as a lice grazer. CLEAN Lumpfish has precise levels of nutrients to obtain energy for maintenance purposes, while supporting well-being. The diet includes the health package of Protec, which enhances the immune system. As well as having the ideal nutritional content, our CLEAN products have the right size distribution and appropriate sinking speed for salmon cages.



## **Feeding advice**

Establish a cleanerfish territory with shelters in the salmon cage. Growth is not necessarily a desirable goal for lumpfish at sea, but energy for maintenance is certainly important for their welfare and survival. Ensure that all fish has access to enough feed by giving daily meals delivered near the shelters, preferably in combination with the salmon meal. Skretting recommends a daily feed ratio of 2% during summer, and 2% every second day during winter. Take into consideration sea current direction, as well as shelter position and depth when using automated pulse feeding systems.



Skretting is a world leading producer and supplier of feed for farmed fish and shrimp. Total annual production of high quality feed is approximately 2 million tonnes. Skretting has operating companies in five continents to produce and deliver feeds, from hatching to harvest, for more than 60 species of farmed fish and shrimp.

OUR MISSION:

feeding  
the future

*Drawings from Laura Hidalgo Lopez*

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