

FRA[®] LeciMax

- » Improves fat emulsification
- » Maximizes energy from dietary fats
- » Maximizes nutrient absorption from feed
- » Lowers feed conversion rate
- » Save on feeding costs

Lysso-Lecithins

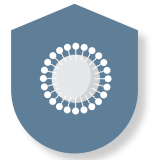
**MAXIMIZING
FAT EMULSIFICATION**

LOWERING FCR

FRA[®]

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FRA[®] LeciMax



The Challenge

Due to the growth of the aquaculture industry, the demand for major ingredients of aqua feed, such as fish meal and fish oil, continues to increase. Fish meal contains high levels of essential amino acids and fatty acids and is highly digestible. Moreover, it is low in carbohydrates and anti-nutritional factors. Due to growing demands, prices are increasing.

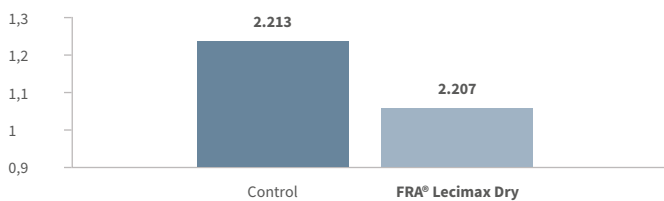
Alternative protein sources are for instance those originating from plants. However, vegetable protein sources contain high fiber contents, which do not have any value for fish and should be restricted. Moreover, the phospholipid content of the diet will be greatly reduced. Although there is no phospholipid requirement determined for fish, it appeared to be an important nutrient in fish diets, for instance to avoid accumulation of lipid droplets in the gastrointestinal tract. As synthesis of phospholipids is limited and the pancreas is found to be less well developed in teleost species, addition of an emulsifier is needed to improve fat digestion.

Fish oil can partially be replaced by vegetable oils such as rapeseed, soya bean, linseed and palm oils. Feeding vegetable oils can lead to a decrease in protein and fat digestion. Again the addition of an emulsifier is needed to improve digestion.

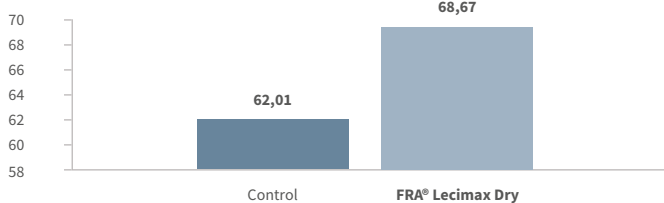
Trial results

The effect of FRA[®] LeciMax Dry on performance of European sea bass (*Dicentrarchus labrax*).

Feed Conversion Ratio



Weight increase (g)

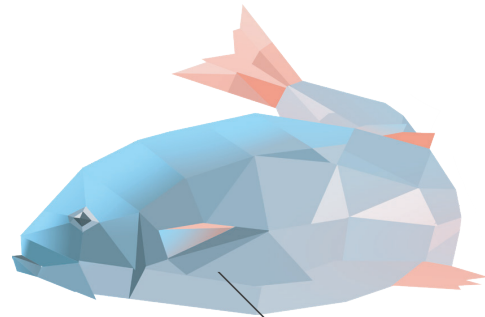


Adding 750 gram FRA[®] LeciMax Dry per ton of feed on top of the diet of sea bass containing 38.8% fish based raw materials and 56.2% vegetable based raw materials, resulted in significant improvement of performances. Weight gain was increased over a period of 92 days and FCR was significantly improved ($P = 0.005$) with FRA[®] LeciMax Dry compared to the control group.

The Solution

FRA[®]melco has developed FRA[®] LeciMax Dry, a natural source of hydrolyzed lecithins acting as a bio-surfactant. The hydrolyzed lecithins assist bile phospholipids to emulsify fats and to form highly dispersible micelles. Hence, fat digestion is improved resulting in improved growth and FCR.

Moreover, carotenoids are a naturally occurring group of pigments that pass on colour to the tissue of a variety of fish and crustaceans. Results have shown that lysophospholipids improve carotenoid and vitamin uptake in mixed micelles. FRA[®] LeciMax Dry can therefore be an effective tool to reduce levels of costly fat-soluble nutrients in the diet.



IMPROVED PERFORMANCE

Characteristics

- Available in highly concentrated dry form
- Free flowing and non-caking
- Heat stable
- Produced in GMP+ certified facilities
- Available in 20 kg bag, 1000 kg big bag
- Available in GMO, and Non-GMO

Usage

Advised dosage is as follows:

- For fish: 0.75 - 6.0 kg per ton of feed
- For shrimp: 1.0 - 5.0 kg per ton of feed
- FRA[®] LeciMax Dry can be added on top or reformulated into the diet. Replacing part of the fat content is possible as well.
- It is recommended to contact your local FRamelco technical sales manager to determine farm specific dose levels and reformulation options.

Los datos de este folleto se basan en nuestra experiencia y nuestros conocimientos actuales. Dado que numerosos factores, durante y después de la aplicación, pueden influir en el rendimiento de nuestro producto, los procesadores serán responsables de llevar a cabo sus propias pruebas e investigaciones. Es posible que ciertas afirmaciones no se puedan aplicar en todas las regiones geográficas. Las reclamaciones relacionadas con el producto podrán diferir en función de los requisitos gubernamentales.

FRA[®]

Formulating Revolutionary Additives