



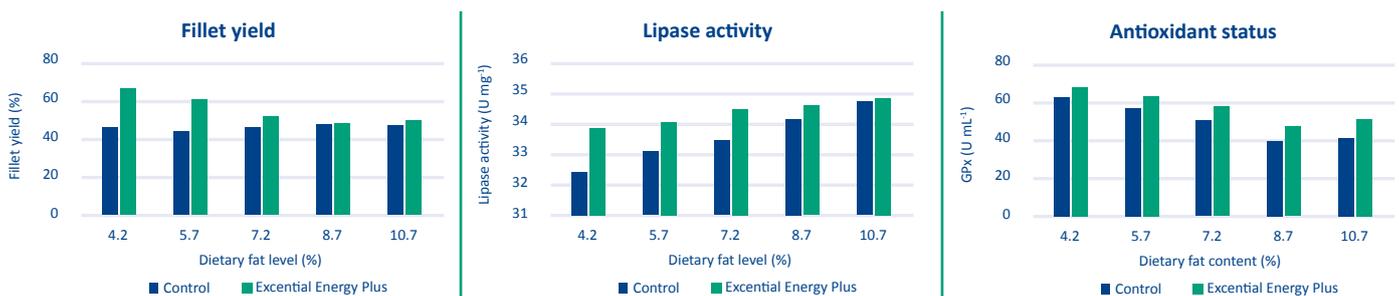
ORFFA



## Excential Energy Plus, a beneficial emulsifier for aquatic species!

As aquaculture is greatly expanding year by year, an increased demand for fishmeal and fish oil is shown. The scarcity has resulted in increasing prices and (partial) replacement of fishmeal and fish oil with plant ingredients. However, not all plant ingredients meet the nutrient requirements of fish species and can even contain antinutritional factors (ANF's). ANF's reduce the utilization and absorption of nutrients, including fat, by the gastro intestinal tract. As fat is expensive and rich in energy, proper digestion in the gastro-intestinal tract is crucial.

**Excential Energy Plus**, a 3<sup>rd</sup> generation nutritional emulsifier, is able to effectively elevate the uptake and digestion of fat by improving its emulsification. While this has been known for livestock, a recent study has reported this is also the case for fish! The Maharakham University in Thailand designed and conducted an in vivo trial with 700 juvenile Nile tilapia (*Oreochromis niloticus*). Ten dietary treatments were formulated, with five graded levels of soybean oil. Improved **growth performance** was shown in fish fed diets that contained 350 mg/kg Excential Energy Plus. The fillet yield, which is **the most valuable piece of the fish**, increased up to 45% through inclusion of the nutritional emulsifier, and this in comparison to the control diet (see graph below).



Excential Energy Plus is a hydrophilic emulsifier. Besides the effective **emulsifying function in the aqueous environment of the gastro intestinal tract**, results indicated that Excential Energy Plus beneficially contributes to the **enzymatic lipase activity** in tilapia which is responsible for breaking down fat after emulsification has taken place (see graph above). The improved fat emulsification also showed to enhance the **antioxidant status** in serum by elevating the level of first line defense enzymes against oxidative stress; catalase, superoxide dismutase and glutathione peroxidase (GPx) (see graph above).

Excential Energy Plus, developed and manufactured by Orffa, is being sold and marketed globally. In light of the transition to plant ingredients in fish feeds, the effect of the nutritional emulsifier provides an opportunity to improve the utilization of fat as an energy source in diets.



A hydrophilic emulsifier, most effective in an aqueous environment



Supports fish performance



Enhances antioxidant status



Elevates enzyme activity

For more information please visit our website and contact one of our specialists ([www.orffa.com](http://www.orffa.com)).

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