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# New trends in the use of "differentiated feeds" in Mediterranean aquaculture

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**SUMMARY** – We can call "differentiated" or "special feeds", those feeds whose formulation and composition differ from the feeds formulated traditionally and used more frequently. The demand for this kind of feed comes from the fish farmers, who want or need to differentiate their fish by using these special feeds. From the beginning of the Mad Cows Crisis, three years ago, the general psychosis and the doubt about the foods for human consumption, have brought about stricter control over their sources. This trend has been reinforced by the apparition of new crisis and polemics (dioxins, GMO). In Aquaculture this control, specially encouraged by the big supermarket chains, includes the fish-feed used on the farms. This requirement very often means removing the raw materials considered "dangerous". Also, these special feeds arose through the search of the fish farmer to voluntarily differentiate his product from the rest of the market. Fish feed is a basic tool in this differentiation. In Mediterranean aquaculture, where the composition of the feeds has more variability than in other markets (North of Europe and South America), generally this differentiation is translated into a simplification of the ingredients, reducing the raw materials used. This simplification generally caused an extra price of these "feeds" and thus a higher production cost of fish.

**Key words:** Feed, traditional formula, raw materials, differentiated feeds, natural feeds

**RESUME** – "Nouvelles tendances dans l'utilisation "d'aliments différenciés" en aquaculture méditerranéenne". Nous pouvons appeler "aliments différenciés" ou "aliments spéciaux" les aliments dont la formulation et la composition diffèrent des aliments formulés de façon traditionnelle et utilisés plus fréquemment. La demande de ce type d'aliments provient des éleveurs aquacoles, qui souhaitent ou nécessitent différencier leurs produits en utilisant ces aliments spéciaux. Depuis le début de la crise des vaches folles, il y a trois ans, la psychose générale et le doute concernant les aliments pour la consommation humaine ont entraîné un contrôle plus strict de leurs origines. Cette tendance a été renforcée par l'apparition d'une nouvelle crise et d'une polémique (dioxines, OGM). En aquaculture, ce contrôle, spécialement encouragé par les grandes chaînes de supermarchés, porte également sur l'aliment poisson utilisé dans les exploitations. Cette exigence signifie bien souvent l'élimination des matières premières considérées "dangereuses". De même, ces aliments spéciaux ont surgi à travers les éleveurs aquacoles qui ont cherché volontairement à différencier leur produit du reste du marché. L'aliment poisson est un outil fondamental pour cette différenciation. En aquaculture méditerranéenne, où la composition des aliments présente plus de variabilité que sur d'autres marchés (Nord de l'Europe et Amérique du Sud), en général cette différenciation se traduit par une simplification des ingrédients, réduisant les matières premières utilisées. Cette simplification entraîne en général un supplément de prix pour ces "aliments" et partant un coût de production du poisson plus élevé.

**Mots-clés :** Aliment, formule traditionnelle, matières premières, aliments différenciés, aliments naturels.

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## Introduction

In the south of Europe, the feeds for aquaculture have always been made up from a wider variety of components than the feeds used in other areas, such as the Scandinavian countries. The main difference has been the use of mostly animal by-products in the industries of the South, whereas the industries of the North use almost exclusively fishmeals as the main protein component. This difference in raw materials used as ingredients has not been due to an exclusive function of the species farmed, but to various reasons, such as the availability of raw materials, and to what we can call philosophy or school of nutrition followed in different areas.

For this reason, I should like to clarify what I mean by "traditional" and "differentiated" feeds in this paper.

"Traditional feeds" are those that, in their ingredients and manufacture, only use the nutritional criteria for the species farmed, without forgetting the other criteria that are normally considered in the feed industry, such as the economical or manufacturing criteria (type of machinery used, etc.).

"Differentiated feeds" are those which consider the criterion that we would call final consumer marketing, when choosing their ingredients; that is, the consumer of the fish that are given these feeds, besides the nutritional and manufacturing criteria mentioned previously for the traditional feeds.

## Development

The "traditional" composition, whenever we refer to the feeds from Mediterranean countries, is based on fish meal and fish oil as main raw materials accompanied by soya meals, cereals and meal and by-products from land animals, such as blood meals, meat meals and feather meals (Table 1).

The latter components, land animal by-products, are those that are not included in differentiated feeds (Table 1). This is why they have also been called "special" or "natural" feeds. These denominations will be used indistinctively throughout the paper.

Table 1. Main Ingredients used in the formulation of Mediterranean fish feeds

Traditional	Differentiated	Future Differentiated
Fish oil	Fish oil	Fish oil
Fish meal	Fish meal	Fish meal
Soya	Soya	Soya (Not GMO) Soya oil (Not GMO)
Cereals	Cereals	Cereals (Not GMO)
Blood meal		
Meat meal		Concentrates
Feather hydrol.		
Vitm+Minerals	Vitm+Minerals	Vitm+Minerals

The demand for differentiated feeds – that is feeds free from land animal by-products, arose following the crisis of the mad cow disease in 1997. Faced with the psychosis that existed in the sector of human nutrition, many large food companies and retail outlets obliged their fish suppliers to certify that the fish sold had not eaten feed containing land animal by-products. This meant that many aquaculture feed manufacturers had to eliminate these raw materials from their formulas and had to issue guarantees and certificates assuring that they did not contain doubtful raw material in their feeds.

After this first crisis, the demand for differentiated, special or natural feeds has been handled differently by the different countries of the South of Europe (see Table 2).

In some cases this implementation has been 100% as in Portugal, whose legislation expressly prohibits the incorporation of mammal meal in feeds for aquaculture. In others, the implementation is of almost 100 %, as in France, where the demands of the large supermarket chains and of the French fish consumer, oblige aquaculture fish to be fed on special feeds.

In other countries such as Italy and Spain, the implementation of these differentiated feeds is at present lower, responding more to criteria of market opportunity. That is, the fish-farmer, given the general situation of crisis undergone in the human nutrition sector, tries to differentiate his products by using these special feeds. Together with this he adds this characteristic to label-type differentiations which he uses to defend himself against competition.

Also, in these countries where differentiated feeds are not so widely implemented, special feeds

are appearing because of the international supermarket chains that are already working in countries with more stringent demands (France, Germany) and that apply their quality criteria to all their delegations in order to harmonise their products.

Table 2. Use of differentiated feeds in Mediterranean countries

Country	Differ F.	Type	Reason	Degree of Implementation	Trend
Portugal	Yes	Only free from meal and blood	Law	100%	Stable
Spain	Yes	Free from all land animal by-products	Market	30%	Rising
France	Yes	Free from all land animal by-products	Market	90%	Rising
Italy	Yes	Free from all land animal by-products	Market	30%	Rising
North Africa	Yes	Only free from meal	Market	70%	Rising
Greece	Yes	Free from all land animal by-products	Market	30%	Rising

The consequence of using differentiated feeds is initially negative for the fish farmer as they are more expensive to buy. Differentiated feeds are at least 10 to 15% more expensive than traditional feeds and the greater cost of these feeds does not necessarily mean that they have a greater yield.

The yield of a traditional feed is similar or even higher than a "special" feed, since the raw material rejected in the differentiated feeds has a nutritional value that is not always in the new feeds. Greater cost is always incurred to provide this nutritional value. That is to say, the differentiated feeds cost more for the same yield as the traditional feeds, thus raising the production cost of farmed fish.

Furthermore, fewer ingredients can be used in the differentiated feeds. This means that the special feeds are more sensitive to market fluctuations and suffer the repercussions of the prices of these ingredients. Thus, as occurred with the fish oils and meals during the "Niño" phenomenon, any rise in the price of the raw materials has a more direct repercussion on the cost of the feeds since the feed manufacturers cannot resort to other alternative sources of ingredients.

For all these reasons, the fish farmer is forced to transfer this increase in costs to the final price of the fish, which is not always possible, thus reducing the farmer's margins.

## Conclusions

The market trend towards use of differentiated, special or natural feeds is rising. These feeds should not include any ingredients considered doubtful for human consumption. Thus, since the first crisis of the mad cow disease, the different food scares that have arisen, such as dioxins and GMOs are leading to greater control in the composition and manufacture of concentrate feeds for aquaculture.

This control implies knowing what type of feed is consumed by farmed fish and setting the appropriate limits for each particular feed.

The reduction in the number of ingredients that can thus be currently used in feeds, means that at the same time research must work towards incorporating new, "healthier" components in the eyes of the general public, that substitute the rejected raw materials.

In coherence with the present situation of a greater control of food for human consumption, this control should be accompanied by more rigorous scientific and technical research for the selection or rejection of the raw materials that make up the feed, avoiding the unfounded rejection of raw materials.