

**Origin and Source**

Panaferd® is sourced from a bacterial microorganism found in natural aquatic environments



Synthetic pigment is produced by the chemical industry from oil-based compounds

**Type of Process**

A natural fermentation process develops the microorganism which is then concentrated and dried.



The chemical technique most widely used involves a Wittig reaction combining, through a complex reaction, phosphonium salts with a dialdehyde

**Types of Pigments**

In Panaferd®, several naturally found carotenoids include astaxanthin, in the highest concentration, and others such as adonirubin and canthaxanthin. As is the case at the start of the food chain, astaxanthin in Panaferd® is found in the same isomeric form as in wild salmon.



In chemical synthetic pigments the only carotenoid contained is astaxanthin. Unlike Panaferd®, synthetic astaxanthin contains a mixture of isomers not found in wild fish.

**Efficiency**

The bio-availability of the 2 products is equivalent. The salmon and trout flesh color expressed by color fan scales such as SalmoFan™ or by colorimetric measures are similar. Pigmentation strategy, usually based on astaxanthin level in the feed, does not change.

**Stability**

In proper storage conditions, Panaferd® has the same stability over time as the synthetic form. During the feed process (extrusion, drying), Panaferd® average loss varies from 10 to 20% according to production line designs.



During the feed process, average loss is around 10% varying according to the production design being used.

**Approvals and Markets**

Panaferd® is fully authorized in many countries and markets. It is included in European Union organic aquaculture standards and accepted by many retailers such as Whole Foods and Marks and Spencer.



Only authorized in discerning markets; banned in organic processes and by some food retailers.