**Introduction**

Why Lecithin? Lecithin is the most accurate example of functionality and health combined in the same food ingredient.

It is naturally present in all living organisms as main constituent of cell membranes and due to its selective permeability; it is responsible of the passage of substances in and out of the cells. (Wikipedia link: membrane cell)

PICTURE (membrane) fotolia nr 52245712

The word Lecithin (wikipedia link) is derived from the Greek word *lekythos* which means egg’s yolk and it was discovered for the first time in 1846 by the French chemist Théodore Nicolas Gobley (Wikipedia link) analyzing the eggs and the brain matter.

The primary commercial source of Lecithin comes from soybeans, only more recently it is available from other vegetable sources like sunflower and rapeseed.

Todays’ consumers are very conscious that food is directly related to their health: Lecithin is the emulsifier of choice for the food industries, which want to offer healthy ingredients to the consumers.

AgroHorizon has the capability and the knowledge to give the best functionality to Lecithin required by the food industries in order to produce safe food with the desired properties.

PICTURE (Lecithin in glass)

**Lecithin Processing**

After harvesting, soybeans are cleaned and conditioned. Then cracked, de-hulled and rolled into flakes.

Flakes are extracted to obtain the vegetable oil. The addition of water to the crude oil hydrates the phosphatides (the main components of Lecithin), making them oil-insoluble. The material is then dried and fluidized to produce standard grade Lecithin or used as source to produce more functional or easy-to-use products.

The composition of Lecithin can vary depending on its origin, processing (extraction method) and of course quality of the soybeans.

Lecithins can be enzymatically modified by hydrolyzing a fatty acid (Lyso-Lecithin): This modification gives a variety of new different properties to the Lecithin, extensively useful for the food industries.

Here is the main function of AgroHorizon: selecting the most appropriate Lecithins, controlling the analytical parameters and generating even more functional or flexible products by the addition of other ingredients.

**Chemical Composition**

Chemically Lecithin is a mixtures of different phospholipids (Wikipedia link) presenting generally the structure of triglycerides, but one of the fatty acids being substituted by a functional group. Phospholipids consist mainly of Phosphatidylcholine (PC), Phosphatidylethanolamine (PE), Phosphatidylinositol (PI) and Phosphatidic Acid (PA) combined with other minor phospholipids, glycolipids and other substances like triglycerides, sugars, tocopherols and free fatty acids.

PICTURE (composition)

**Functional Properties**

Lecithin is a mixture of surface-active agents. Most of the surfactant properties of Lecithin can be attributed to the phospholipids. These contain a hydrophobic (lipophilic) part with an affinity for fats and oils and a hydrophilic (lipophobic) part with an affinity for water. This double behaviour gives a strong surface activity to the Lecithin able to reduce the surface tension between immiscible liquids like water and oil (emulsification).

The emulsification properties of the different types of Lecithins can be assigned based on the well-known hydrophilic-lipophilic balance (HLB). (Wikipedia link)

Picture HLB

HLB reflects the size and the strength of the hydrophilic (the polar part of the molecule) and the lipophilic (the apolar or oil loving) groups on emulsifiers.

Due to the surface activity Lecithin can form stable O/W and W/O emulsions and stable dispersions with a wide range of uses.

Picture emulsion

In addition to its emulsifying strength, Lecithin has the capacity to modify the rheology of sugars and fats due to its lubricity and viscosity reduction properties, by reducing the contact surface of incompatible solids, like in cream fillings and chocolate.

**Nutritional Properties**

Lecithin is a source of unsaturated fatty acids especially linoleic (C18:2), precursors of Omega 3 and the most active source of choline, being associated to phospholipids (Phosphatidylcholine).

FDA has assigned to choline a RDI (Recommended Daily Intake) having recognized its functions in many biological functions. (Wikipedia link)

Lecithin functionality was also studied in the 1980s in relation to cholesterol reduction, and a mechanism for transforming LDL cholesterol into HDL cholesterol was speculated.

Lecithin is a source of phosphorus and is rich of natural tocopherols (vitamin E) of up to 2000 mg/kg.