Each person on the planet consumes 165 eggs per year. Egg is the first and cheapest source of proteins, with 6g of protein per egg. Eggs can be found under different forms. They can be sold as whole eggs (table eggs) or transformed (egg products) and used in many industries mainly as powder or liquid. In the industry, eggs are appreciated for their coloring, binding, gelling, foaming, emulsifying and nutritional properties.

SELENIUM IN EGGS

Selenium (Se) is a well known antioxidant that prevents cell components from oxidation and deterioration. It also supports embryo development. Se is transferred from the albumen to the embryo during the 2 first weeks of the embryonic development. Source and level of Se in laying hens diet will impact Se content of eggs. When organic selenium form like hydroxy-selenomethionine (OH-SeMet, Selisseo®) is fed to laying hens, the level of Se in eggs increases significantly. The majority of the selenium is almost equally distributed between egg yolk (58%) and egg albumen (42%) (P.Surai,2018).

Compared to inorganic selenium source, the use of OH-SeMet increases Se concentration in albumen (x3) and in the egg yolk (x2), after 4 weeks of dietary supplementation at 0.3 ppm Se. (Egg trial in Asia, 2014) (Figure 1)

THE BENEFITS OF SELENIUM-ENRICHED EGGS

Feeding laying hens with 0.3 ppm Se as Selisseo® can enrich eggs to approximately 25 µg Se per egg. Thus, eating one egg a day can meet 50% daily Se requirements. (Figure 2)

Eggs are also rich in others key nutrients including Vitamin B12, Vitamin D, phosphorus ...
**BENEFITS OF SELENIUM IN EGGS**

**SELISSEO® IMPROVES TECHNOLOGICAL PROPERTIES OF EGGS**

**Viscosity:** Viscosity is a measure of a fluid’s resistance to flow. The viscosity of the albumen is an important quality variable because it is related to its functional characteristics, such as its whipping, emulsifying, and gelling properties, among others. Selisseo® significantly improved albumen viscosity, which is interesting for the egg yolk to stay in the middle when mirror eggs are cooked. (INRA Agrocampus, France, 2016) (Figure 3)

**Foaming properties:** Bulk foam is an agglomeration of gas bubbles separated from each other by thin liquid films. Foam quality is the volume percent gas within foam at a specified pressure and temperature. The egg white foaming properties are a major issue for the food industry and the factors influencing them are still poorly understood. Selisseo® improved egg white cohesion from 29 week-old White Leghorn laying hens compared with negative control and sodium selenite. (INRA Agrocampus, France, 2016) (Figure 4)

**Gelatinization properties:** For cooked eggs, high rupture can be observed, but it does not appear to be a major problem in food industry. Industries prefer eggs with a low gelatinization temperature, in order to pasteurize egg without causing protein coagulation. Selisseo® allows to show a better resistance of the rupture test and a lower speed of gelatinization compared to sodium selenite. (INRA Agrocampus, France, 2016) (Figure 5)

**Eggshell quality:** The eggshell plays a crucial role in protecting the contents of the egg from the microbial, physical environment and in controlling the exchange of water and gases. The quality of the egg shell relates to the quality factors which can be observed such as soundness of the shell, shape of the shell and colour of the shell. Eggshell quality means increased shell thickness and shell breaking strength to reduce number of cracked eggs, and thus increase the number of saleable eggs. Selisseo® tended to improve eggshell quality through enhanced static stiffness and fracture force. (INRA Agrocampus, France, 2016)

**Freshness:** Haugh units are indicative of the protein content of the egg white, and thus the quality of the egg (freshness). Haugh units are known to decrease with age. Selisseo® tended to stretch egg freshness after 8 days of storage compared to sodium selenite for 56 week-old Brown Rhode Island laying hens. (INRA Agrocampus, France, 2016). In another trial made in Thailand, Selisseo® was confirmed to improve Haugh units. (Figure 6)

Selisseo® not only improves selenium deposition in eggs, but also enhances technological properties of eggs (viscosity, foaming properties, gelatinization properties, eggshell quality, freshness...), which can contribute to higher profitability for egg industry.

As a highly efficient source of organic selenium, Selisseo® is recommended to be used (0.3 ppm Se) for the production of selenium enriched eggs. The concept of super egg is more and more extended and now also applies to other types of food: selenium-enriched pork, turkey, beef, as well as milk.