

CAROPHYLL[®] CHECK

Adding value to your egg products

a **DSM** Service

CAROPHYLL[®]
Check

With DSM iCheck[®] 



DSM Nutritional Products

Unlimited. **DSM**

DSM Nutritional Products serving the food industry

At the very end of the food chain are consumers, with their diversity of habits and preferences. DSM, world leader in the marketing of carotenoids and vitamins for human and animal nutrition, knows this, and is continually carrying out market research, to understand consumer attitudes and provide the food industry with solutions for all cultures, needs and uses.

DSM's drive for innovation led us to develop the CAROPHYLL® Check concept, which gives the egg processing and food industry a powerful and reliable means to produce eggs to suit consumers' preferences.



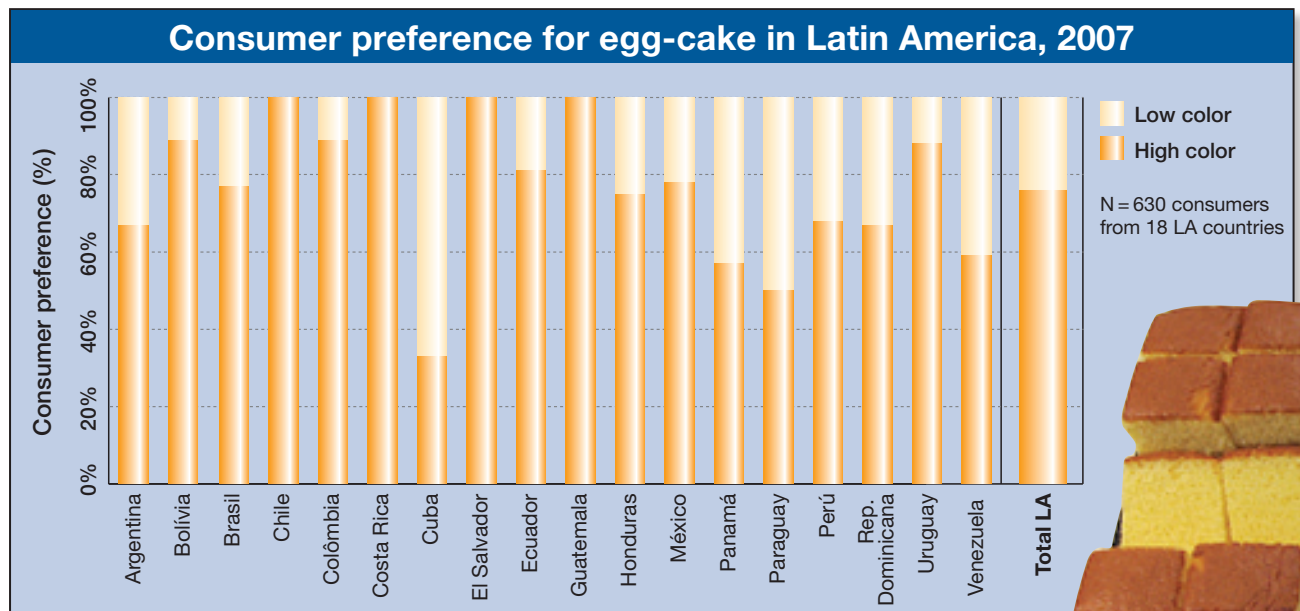
Why CAROPHYLL® Check?

Egg products in foodstuffs are being used more and more, worldwide, since egg yolk can be found in all kinds of everyday products: pasta, mousses, mayonnaise, biscuits, pastries etc. Food professionals need raw materials such as egg yolk to be consistent in quality, to guarantee a uniform colour for their food products, since colour can be a decisive factor at the moment of purchase.

Many studies, like the one recently run in Latin America, have shown how most consumers show a clear preference for cakes made with highly coloured yolks, as well as for other food products where eggs are a main ingredient.

So, what are the main needs for the food and egg processing industry with regards to colour?

- A common language: a reliable colour standard, allowing egg processors and producers to develop the colour specifications they require, and feed nutritionists to prepare the most effective diets for laying hens.
- A fast and simple way to control colour specifications in eggs and egg products.
- Peace of mind: using feed carotenoids of the highest quality and from the best-traceable and safest possible source, to provide the right colour demanded by consumers.



CAROPHYLL[®] Check and its measuring tool DSM iCheck[®] Eggs

To face this important industry challenge, DSM has developed an innovative concept that once again provides the egg industry with added value, by ensuring reliable coloration for egg-based products: CAROPHYLL[®] CHECK, a DSM solution for food industry professionals. This new concept is based on three key points:

1 - **Dietary recommendations for laying hens**, for cost-effective and homogeneous eggs of the required yolk colour, as demanded by the egg processing industry.

2 - **The iCheck[®] Eggs**, a kit for rapid monitoring of the colour of eggs and egg products, and recently awarded in France with the prestigious innovation prize Innov'Space 2008. It is easy to use and gives results in less than 10 minutes.

3 - **The DSM CAROPHYLL[®] carotenoid portfolio**. Identical to natural carotenoids, DSM carotenoids contain an innovative, high-quality animal-free formulation that has been certified according to FAMI.QS (Feed Additive and Pre-Mixture Quality System). Produced in France, CAROPHYLL[®] products are manufactured according to the DSM standard, based on guaranteeing maximum Quality, Traceability, Reliability and Sustainability for optimal colour performance and peace of mind.

- For feed and egg producers, there is subsequent validation throughout the chain, by means of DSM iCheck[®] Eggs, that the CAROPHYLL[®] recommendations are being followed.
- For egg processors, a starting material is available which can guarantee to keep its promises of consistent colour for their customers in the food industry.
- For food manufacturers, products with a starting material derived from CAROPHYLL[®] ensure production of food with the right colour preferred by consumers, irrespective of the product: mayonnaise, biscuit products, etc.

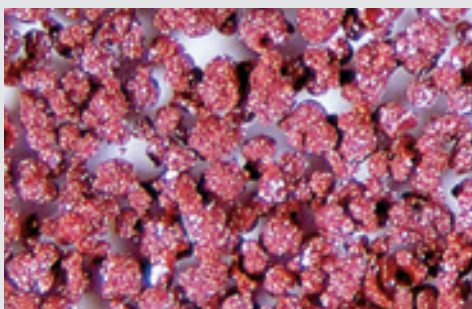
At each stage, CAROPHYLL[®] CHECK can be measured using DSM iCheck[®].

DSM iCheck[®] Eggs is a portable spectrophotometer which in few minutes can carry out a quantitative evaluation of the carotenoid content of a product sample containing liquid egg or powdered egg.

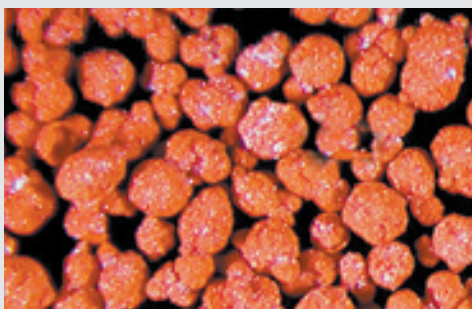
DSM iCheck[®] Eggs comprises a rapid and reliable extraction unit, iEx[®]. The integrated software allows the quantitative carotenoid content to be measured in beta-carotene equivalents.



CAROPHYLL® Portfolio:



CAROPHYLL® Red 10 %



CAROPHYLL® Yellow 10 %

Widespread in nature, carotenoids are mainly known as the yellow to red colours of fruits and vegetables. Forming a family of over 600 fat-soluble pigments, they are synthesized by plants and some micro-organisms, while humans and animals can obtain them only through food or feed.

CAROPHYLL® Red 10 %

Contains **Canthaxanthin**, the red carotenoid of the chanterelle mushroom, the skins of certain crustaceans, and the skins and the bodies of many species of birds and fish.

CAROPHYLL® Yellow 10 %

Contains **Apo-ester**, the yellow carotenoid present in nature as a metabolite of apocarotenal, which has been isolated from many plants such as grass, alfalfa and green vegetables.

CAROPHYLL®, part of Quality for Life™

Recent contamination scares presents feed and food retailers, ingredient producers, as well as governments, with a serious challenge in the reassurance of consumers regarding the foods they buy. That's why DSM, the world's leading producer of ingredients and premixes for animal and human nutrition and health, has developed a quality seal, Quality for Life™, for all its food and feed products which also covers its CAROPHYLL® portfolio.

The Quality for Life™ programme assures food and feed companies that they are buying product quality, reliability and traceability. It guarantees that products have been manufactured using the highest standards of processing and personnel safety. The programme also indicates that the products themselves are safe, and they have been produced in a sustainable way that takes full account of the needs of our environment, food chain partners and the regulatory framework governing all manufacturing operations (www.qualityforlife.com).



Follow the CAROPHYLL® Check protocol to obtain the right colour in your egg products

1

Define the level of egg product colour (beta-carotene equivalents) for your food application

* Misto = liquid whole egg
** β -carotene equivalent method according to AOAC

Misto* categories β -carotene equivalent** (mg/kg)	Colour	Usual application
10	Pale yellow	Mayonnaise
20	Yellow	Sausage, Bakery
40-45	Intense yellow	Bakery, Pasta
60-65	Deeper yellow	Pasta

2

Call DSM and ask for your customized CAROPHYLL® formula in layer feed

Example of customized CAROPHYLL® formula for eggproducts

DSM YOLK COLOR OPTIMIZER (DYCO)

Recommendation for industrial Egg Pigmentation

Step 1: select the liquid egg specifications (beta-carot eq.)	35,00	ppm beta-carotene equivalent			
Step 2: select the feed type	Mash Feed				
Step 3: select the feedstuffs Raw material	Step 4: Input %	Total Xanthophylls (mg/kg)	Yellow pigmenting Xanthophylls Feed (mg/kg)	Stable Yellow Pigm. Xanthophylls Feed (mg/kg)	* Stable Yellow Pigm. Xanthophylls Liquid Egg ppm β C-eq.
Maize	47,00	7,52	7,14	7,00	2,57
Corn Gluten Meal 60 %	0,00	0,00	0,00	0,00	0,00
New raw material 1	0,00	0,00	0,00	0,00	0,00
New raw material 2	0,00	0,00	0,00	0,00	0,00
New raw material 3	0,00	0,00	0,00	0,00	0,00
Raw material totals	47,00	7,52	7,14	7,00	2,57
Additional Beta-Carotene equivalent required in liquid egg				32,43	ppm β C-eq.
Step 5: here are the DSM recommendations →	CAROPHYLL® Yellow				278,2 mg/kg or g/t feed

* Yellow Xanthophyll Efficiency rates Feed:Liquid Egg as published in Hernandez, Steinberg and Blanch (European Symp. Quality Egg Products, Bologna 1999).

3

Check in less than 10 minutes the colour of your egg products with the innovative iCheck® Eggs.



Why DSM Nutritional Products?

DSM Nutritional Products is the world's leading supplier of vitamins, carotenoids, enzymes and eubiotics to the Animal Nutrition & Health Industry. The company has a comprehensive range of value-added, branded product forms, enabling efficient feed and food production which it supplies worldwide via a unique and extensive network of dedicated premix facilities. DSM Nutritional Products, headquartered in Switzerland, has implemented quality systems around the world

to ensure safety and traceability of products to the final consumer. These systems are validated by third party certification bodies to comply with standards such as FAMI.QS, ISO and HACCP. DSM Nutritional Products adds value to the food chain through the provision of innovative solutions based on quality, traceability, reliability and sustainability, benefiting our customers, the consumer, the environment and animal welfare.



For DSM, quality is a way of life. This is the core of Quality for Life™.

Quality for Life™ is the mark of quality, reliability and traceability. It means that DSM customers are getting the best nutrition & health ingredients, knowing the source on which they depend.

Quality for Life™ means sustainability. It symbolizes our commitment to our environment, consumers, our business partners, our people and the regulatory framework that governs our operations.

With the Quality for Life™ seal, we guarantee peace of mind for you and for your customers.

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