

Quality Control in Production of Liquid and Powdered Egg Products

Optimizing Egg Product Quality Control: Parmovo's Success with CDR FoodLab®

Dr. Francesca Bruni - Researcher at the CDR Chemical Lab "Francesco Bonicolini"

The term "egg products" refers to all the processed forms derived from shell eggs. These products include whole eggs, egg whites, and egg yolks in frozen, pasteurized and refrigerated liquid and dried forms available in several formulations. The food industry particularly values high-quality egg made from eggs shelled within 4 days and subjected to homogenization and pasteurization.



Parmovo

One of the major players in the egg production market is **Parmovo**, a large company that processes up to 5 million eggs per day to produce pasteurized liquid egg products and powdered egg products. These products are commonly used in baking, cooking and food manufacturing. Both liquid and powdered egg products maintain the nutritional profile of fresh eggs, providing high-quality protein, essential vitamins and minerals. The powdered products are mainly destined for markets outside Europe, such as Asia and Oceania. The products analyzed include whole eggs (egg mix), yolk, and egg white.

Egg products issue

Eggs contain several organic acids, including succinic acid, lactic acid, and D-3-hydroxybutyric acid, which are directly correlated with microbial quality and cannot be altered by thermal

restoration processes. In order to verify the hygienic condition of eggs used in the preparation of egg products, it is essential to analyze indicators of microbial metabolism, such as **lactic acid**. The total bacterial count is not a suitable index, as it is reduced by pasteurization. Eggs are very delicate products that can contaminate quickly, requiring daily checks of lactic acid levels. 90-95% of the shell eggs processed come from a supply chain of farms directly controlled for both feed and veterinary care. The remaining eggs are purchased from qualified suppliers (both Italian and European) and are always tested before use. The legal threshold for lactic acid in egg products is very high, 1,000 ppm, compared to the food industry's needs, with many clients demanding much lower limits depending on the type of products (fresh pasta, creams, mayonnaise, or baked goods cooked at high temperatures). The results obtained during Parmovo's tests generally range from 100 to 250 ppm. If the value exceeds 500 ppm, the product is downgraded. All products are also tested for 3-hydroxybutyric acid, another European legislative index for egg products.

Lactic acid analysis

"Along with colour and type of farming, lactic acid is the criterion around which all production revolves."

Quality Manager, Parmovo

The product needs to be analyzed immediately after pasteurization when it is in liquid form and stored in very large tanks. It is not possible to have the lactic acid analysis done by an external laboratory because the product must be released to clients within 24 hours of production. Before purchasing the **CDR FoodLab®**, Parmovo used enzymatic kits to test lactic acid that required 4

CDR FoodLab®

hours to prepare samples. They had to wait half a day for the results and the testing process was very laborious. Conversely, the short analysis time using the CDR FoodLab®, only 10 minutes, ensures the rapid release of the product. Furthermore, in Parmovo all products are tested for D-3-hydroxybutyric acid using the CDR FoodLab®.



CDR FoodLab® analysis system

The use of the CDR FoodLab® system has made the control routine much more practical: the turnaround time between the start of sample processing and obtaining the result has practically gone to zero, moreover the sample processing is way simpler. Especially reducing procedure time is vital for a product with a shelf life of only 15 days and for clients who require very short delivery times. The large volume of product stored in the tanks ensures that the cost of analysis does not significantly impact the cost of the product.

Parmovo's clients are mainly food producers who use the product as an ingredient or suppliers in the catering industry. Some of them also use the

CDR FoodLab® to analyse the egg-based product before use. Along with the product, a certificate of analysis is provided to ensure traceability in case of client complaints.

CDR FoodLab® analyses on egg products

- L-Lactic Acid
- D-3-hydroxybutyric acid
- Cholesterol
- Colour
- Acidity (Free Fatty Acids)
- Xanthophylls in poultry feed

Short list of the CDR FoodLab® system advantages:

- Analyses are very quick and rely on an analysis method that is reference method compliant
- Analysis can be performed any time inside the plant, in large quantities
- CDR FoodLab® allow time saving and drastic cutback of analysis costs
- The simplicity and rapidity of the analysis method allow everyone to perform the tests with the analyzer
- CDR FoodLab® uses prefilled cuvettes and reagents that does not require an equipped chemical laboratory

Conclusion

The case of Parmovo shows how the CDR FoodLab® helps in improving process efficiency, maintaining quality and consistency through monitoring in real-time.