

# MOBA

GRADING - PACKING - PROCESSING

## OvoPro

END PRODUCTS



THE PARTNER FOR PROFIT

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## End products

Once the eggs are broken and the liquids are separated, blended and pasteurized, the products need to be prepared for the end user. In this stage of the production process, careful handling is required to maintain quality. There are three basic end products:

- 1) Liquid form: Packed in small packs or bags, containers or complete tank trucks.
- 2) Frozen form: Identical to liquid handling except for the extra treatment of freezing the product.
- 3) Powder: Albumen, yolk or whole eggs can be turned into powder. However, producing egg-white powder requires totally different technologies than those used for yolk or whole-egg powders.

*'The true art of packaging is 'extended shelf-life packaging'; the combination of cost-effective equipment with maximum shelf life of the end products.'*

Any liquid can be called sterile if heated over 121°C, but egg liquids cannot withstand such high temperatures. This is why egg processing is not about sterile handling, but rather about ensuring the lowest possible bacterial load. The output of a well-designed egg processing plant will have a very low bacterial load, but will never be zero. It is Moba OvoPro's vision to ensure that the bacterial load remains low in the ultimate end product.

'Aseptic handling' essentially means that a product remains sterile during handling. This is not applicable for egg products since there are no true sterile egg products. This is a common mistake in the industry; what we are really talking about is 'extended shelf-life packaging'.

Our vision is to incorporate the most cost-effective filling and bagging equipment ensuring maximum shelf life and avoiding investments that do not provide added value. Investing in inferior equipment for handling the end products might destroy the carefully obtained shelf life, while investing in aseptic equipment (cleaning beyond normal CIP conditions) will add no shelf life at all.

# Storage

## OUR FOCUS

- Creating an efficient setup: Flexibility in the process rather than investing in too much storage
- Avoiding the blending of products and /or ingredients after pasteurization.
- Tanks made according to latest hygienic standards

A typical misconception is that any tank will do as long as the correct storage temperature is maintained. This is not true at all. After pasteurization, the bacterial load is very low, but never zero. If traces of bacteria can survive in a tank after cleaning, all efforts made in previous steps of the process are in vain. Any defects in design or construction of a storage tank can destroy your valuable end products

Storage quality should always be suitable for egg products. Absence of horizontal, defects and polished metal are vital elements.

Most storage tanks used in egg processing are single-walled, insulated or insulated jacketed. All Moba OvoPro storage equipment and design meet the 3-A™ sanitary standards.

Planning of good logistics is also vital for storage. Aiming for only one tank per product and the shortest possible storage time before final packing are keys to the best return on investment. Besides good cleaning ability, storage is all about choosing the correct balance between flexibility, efficiency and economical aspects. Excessive investments in this part of the process is a common mistake. It comes from a weak total concept.

## WE OFFER

- Tanks in all sizes and dimensions, from 500 liter up to 150,000 liters
- Absence of horizontal surfaces or liquid traps, which ensures easy cleaning by CIP (Cleaning In Place) system
- Single wall
- Insulated
- Insulated/jacketed
- Silos for large storage outside



Large storage silos for tanker-truck loads

*‘One single wrong defect can destroy your valuable end products.’*

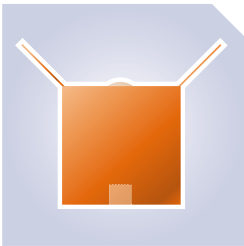
ESL filling equipment for buckets



Gable top filler



## Packaging



### OUR FOCUS

- ESL (Extended Shelf Life) packaging systems that combine the best return on investment with the longest possible shelf life.
- Designing proper procedures around packaging, which is just as important as the equipment itself.

At the end of the process, the liquid egg products need to be packed before freezing and/or final transport. Pack types include buckets, containers, plastic bags ("bag-in-box"), gable top packs up to tanker trucks varying from 250ml to 20,000 liter or more.

General filling systems operate on volume or weight (preset amount needed per pack) or are specifically designed for a dedicated task such as bag-in-box or gable top fillers.

Assuming that all preceding steps in your process are near perfect, the packaging process starts with perfect products that have a very low bacterial load, yet never zero. It is vital that packaging will not reduce the maximum shelf life. This means that the product should not be contaminated by pre-packaging, the packaging materials, or the equipment itself.

Other industries use complete aseptic packaging lines for sterile products (like juices or milk) and it might be logical to conclude that using this technology for eggs will avoid all the aforementioned contamination risks.

What holds true for sterile products is an overshoot for egg products. The best egg product will always have a certain bacterial load. Even after the initial packaging cycle, the equipment can no longer be considered sterile. To a certain extent, valuable investments are simply wasted.

Although Moba OvoPro can supply all types of packaging systems, the recommended types are the Extended Shelf Life (ESL) systems. These systems combine an excellent return on investment with the best possible shelf life of the end products.

The procedures related to packaging must also be organized properly. Sanitizing the equipment and packaging materials should be done no more than 2 hours before use. The airflows during packaging should also be filtered and disinfected by means of ultra-violet light. To avoid risks, the logistics between pasteurizing and packaging should be optimized and if extensive tank storage before packaging can be avoided, this not only reduces contamination risks but also saves time and money.

**WE OFFER**

- Standard or ESL packaging systems to pack products for a shelf life of 14 to 100 days
- Bag-in-box, which can fill bags from 2-1000 kg
- Automatic bag feeding
- A versatile system that can fill buckets/pails/jugs
- Gable top filling solutions
- Simple bucket/ pail filler
- Tanker fillers

*'Aseptic packaging is in most cases a technical overshoot.'*

## Freezing

**OUR FOCUS**

- Advice on freezing that matches your specific requirements
- Aiming for maximum possible shelf life
- Avoiding loss of functional properties
- Advising on how to build the perfect freezing room in your plant



After completing a liquid egg-product, two methods are available for long-term preservation: freezing or spray drying. Both methods result in a shelf life of approximately one year, but with freezing the functional properties are maintained better.

If egg yolk is frozen below  $-7^{\circ}\text{C}$  /  $19.4^{\circ}\text{F}$ , it will turn into gel. This process is called 'gellation' and it is irreversible, making the product unusable. However, if we add salt to the yolk, the lowest limit is  $-22^{\circ}\text{C}$  /  $7.6^{\circ}\text{F}$  before the yolk starts to get a gel structure.

Also the time needed to freeze a product is crucial. Too slow will have a negative effect on the shelf life. Too fast will create relatively big crystal structures that cause the pre-packed substance to expand too much. USDA requires total freezing within 72 hours.

Examples are 'blast freezers' that freeze with air temperatures of  $-60^{\circ}\text{C}$  /  $-76^{\circ}\text{F}$ . These systems can be beneficial in many situations, but are also dangerous when applied incorrectly. They can overshoot to lower temperatures and will often cause irreversible gelling.

Spray nozzle section

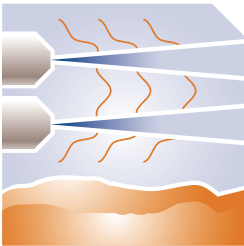


Bag house of the spray drying Chamber



- Moba OvoPro helps you specify your building requirements and integrates the freezer into the complete plant operating process.

## Spray drying whole egg or yolk



### OUR FOCUS

- Vbox spray dryer: the most efficient system up to 750kg water evaporated / hour
- Minimized product retention
- Highest energy efficiency (heat recovery can save up to 30% on fuel costs)
- Easy cleaning and servicing
- Super-long life cycle (in and outside fully-welded stainless steel)

After completing a liquid-egg product, two methods are available for long-term preservation: freezing or spray drying. Both methods result in shelf life of approximately one year, but spray drying reduces transport costs to the minimum because of the low weight and volume (9 kg of liquid albumen is reduced to approximately 1 kg powder). In addition, the powder does not require cooled storage. Powder products also have less risk of contamination as a result of mishandling; in other words, it is a relative safe product to handle and transport.

The principle of spray drying is spraying the egg liquids with high pressure (130-200 bar/ 2000-3000 psi) into hot air. Heating systems can operate by direct use of gas, steam coils or by heated air (indirect air system). Temperatures vary from 160°C / 320°F (steam coils) to 194°C / 381°F (direct use of gas). Within 12 seconds after spraying, the egg product turns into powder, ready to be packed. Humid air is filtered to retain as much powder as possible and the powder is automatically collected from the drying chamber by using augers or pusher bars.

In order to maximize performance and avoid losing powder particles, the out-flowing air is filtered through cyclones or bag-shaped filters. The airflow in cyclone filters is arranged as such that even very fine particles are separated by centrifugal force. For better performance (3.7% more powder collected) fabric filters are preferred, also because they are easier to

Spray drier control panel



maintain and clean. Regular cleaning is fully automatic by applying reversed pulses of air. Whole egg and yolk are pasteurized before spray drying while albumen is sprayed in an unpasteurized form and later pasteurized as powder in a hot room. This is the best method for preserving the functional properties of albumen. Since albumen contains glucose, it must be removed before spraying to avoid browning (caramelization).

After spraying, the average moisture in the resulting powders is 6-7% for albumen and 3-4% for whole egg and yolk. Typical albumen powder products are for whipping, non-whipping or instant dissolving. The instant dissolving type requires a special, multi-stage agglomerating dryer in order to let the particles agglomerate to bigger particles. The typical applications for whole egg and yolk powders are standard quality, glucose-free and free-flowing products. In addition to adjusting the spray-dry conditions to any of the above products, agents can also be added before spray drying, such as a whipping agent in albumen or an agent that increases the flow ability in various products. Stopping and re-starting a spray dryer consumes time and energy. To achieve the best return on investment, the capacity of a spray dryer must be adjusted appropriately for the entire plant. An accurate calculation based on plant-related requirements is needed to choose the most effective type of spray dryer.

#### WE OFFER

- V-box, flat bottom and tower spray dryers depending on capacity and final product requirements.
- Multi-stage agglomerating dryers
- High pressure pumps and specific nozzle systems to atomize the liquid into the drying chamber in combination with hot air.
- Forced air cooling of the spray nozzles to eliminate 'burn-on' of the product
- Air filtering via bag houses or cyclones
- Removal of the dried product from the drying chamber by means of augers or pusher bars.
- Sifting and filling of the dried product
- V-Box spray dryers increase from 100kg/h up to 750kg/h H<sub>2</sub>O evaporation per hour.
- For higher capacities 'Flat floor' or 'tower' spray dryers are used. They can handle from 800kg up to 3,000kg H<sub>2</sub>O evaporation per hour.



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Revision 03|2011 • 149-110038 - Moba continually endeavours to improve its products and reserves the right to change specifications without previous notice

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