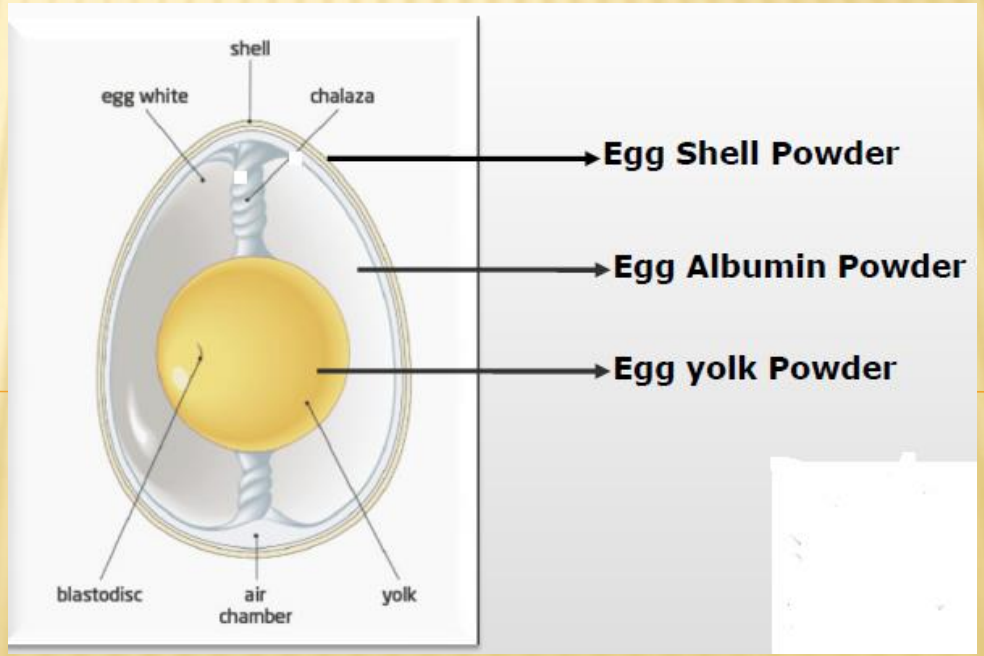
EGG DRYING

POWDERED EGGS

- Powdered eggs are fully dehydrated eggs.
- They are made using spray drying mainly.
- Eggs are a very nutritious source of food that is one of the cornerstones in baking.
- It's low-cost but high-quality source of protein.
- Powdered eggs can be used without rehydration when baking, and can be rehydrated to make dishes such as scrambled eggs and omelettes.

A LARGE EGG CONTAINS:

- Calories : 75 kcal
- Protein : 7 grams
- Fat : 5 grams
- Cholesterol : 213 mg
- Vitamins : A, D, E, K, and B vitamins
- Minerals : selenium, iodine/zinc, iron



THE EGG HAS FIVE MAJOR COMPONENTS

1. Egg yolk

2. Albumen (egg white)

3. Shell Membranes

4. Air Cell

5. Shell

PROCESS FLOW CHART

BREAKING OF EGGS AND REMOVAL OF SHELLS

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FILTRATION

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STORAGE AND DRYING

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PACKING

DRYING METHODS OF EGG

SPRAY DRYING
FREEZE DRYING
FOAM MAT DRYING

1.SPRAY DRYING PROCESS

- The Manufacture of dried egg powder starts with breaking of eggs and removing egg-shells.
- After removal of shells, the mixture is filtered and stored in storage tanks at about 4° C.
- Then it is taken to tubular heater where in it is dried at about 65° C for 8 to 10 minutes and it is filtered
- Then passed to high pressure spray drier with the help of high pressure pump.
- The spray drying process enables the removal of nearly all the water from eggs.

- The basic feature of spray drying that enables this is the atomization of the liquid egg product into a spray of droplets that are dispersed into hot air.

- The spray has an extensive surface area and moisture evaporation is virtually instantaneous. Because of that, the product temperature is maintained well below levels that cause potential heat damage and deterioration in the valuable properties of egg products.

- The material which comes out of high pressure spray drier is dried and powder form of egg.

- Which is then packed in poly-lined boxes.
- The average yield is around 80%.

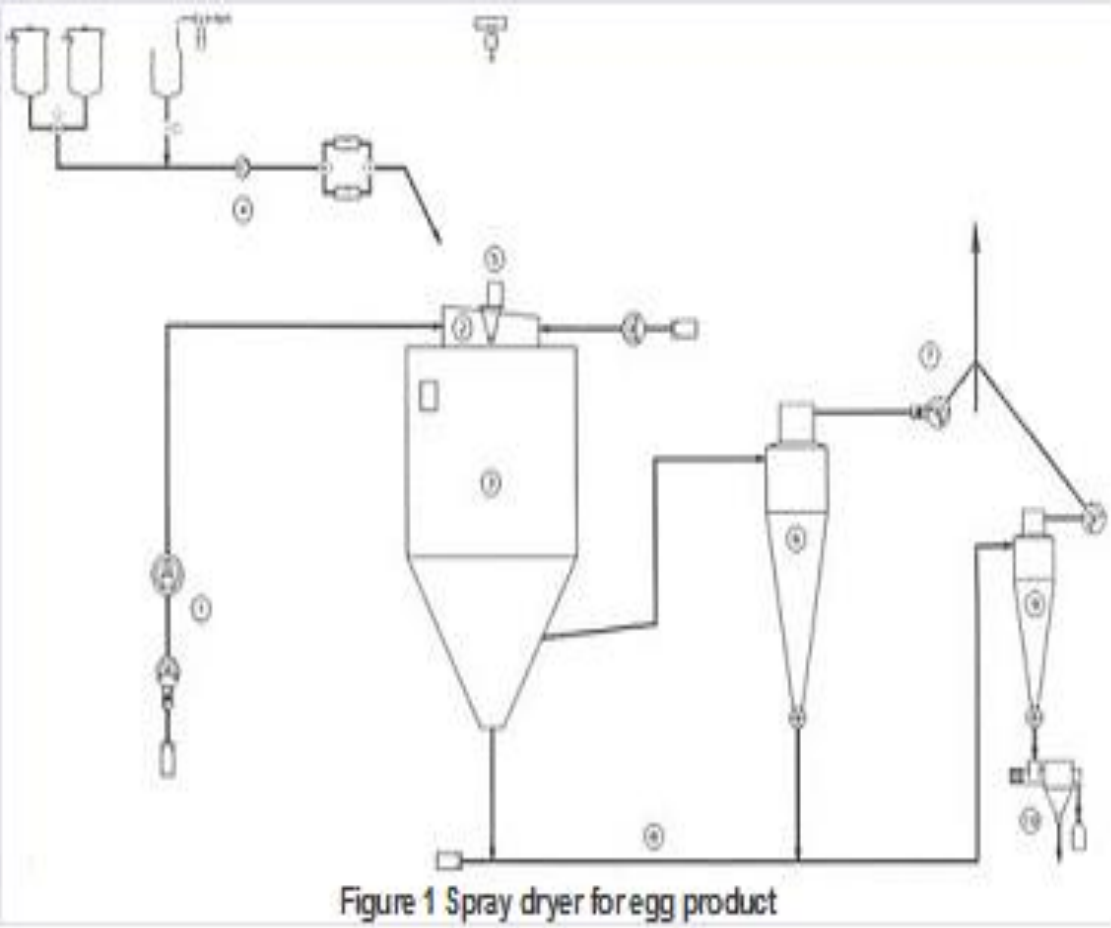


Figure 1 Spray dryer for egg product

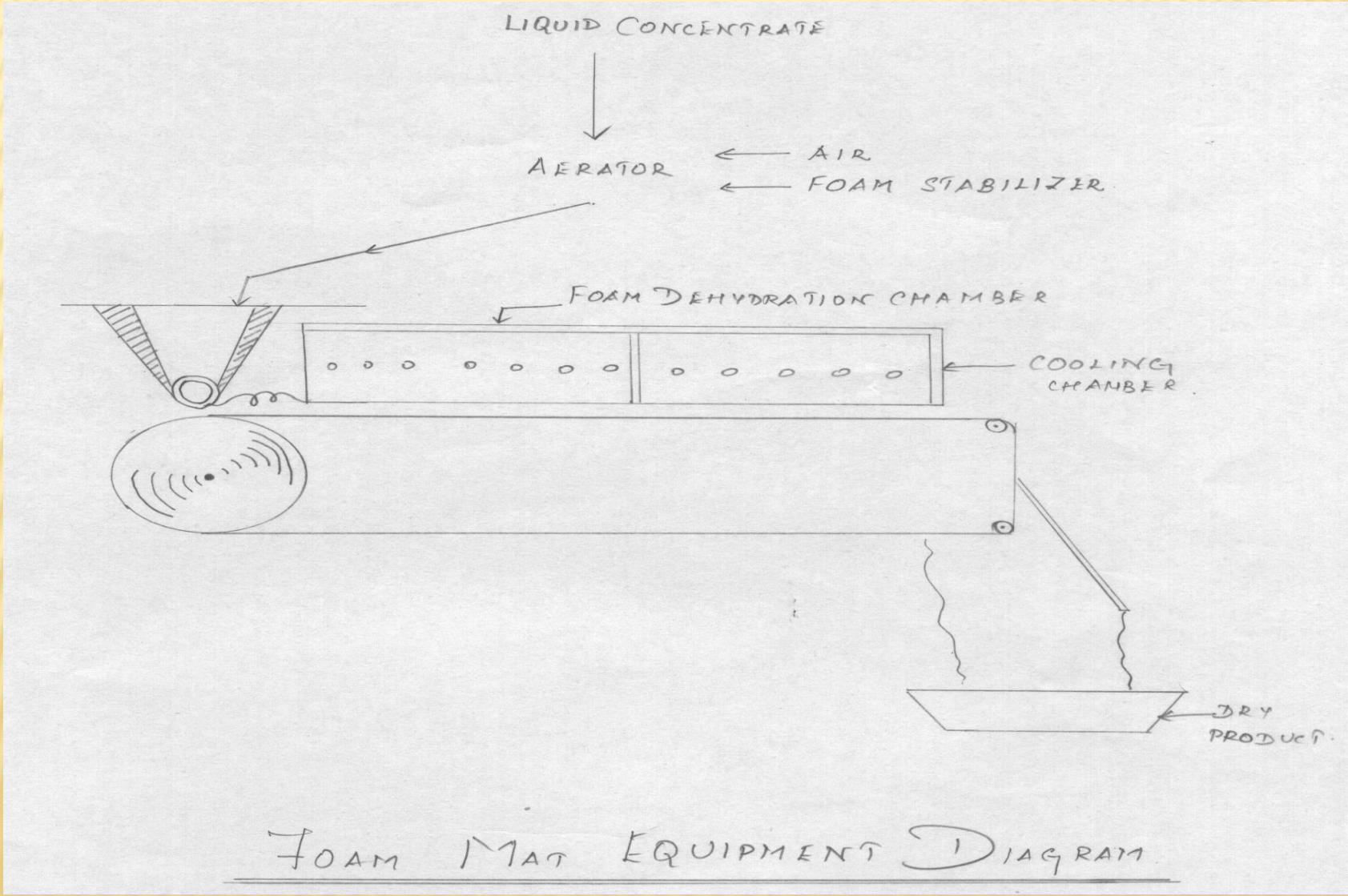
- ✓air heater
- ✓ disperser
- ✓drying chamber
- ✓feed pump
- ✓centrifugal atomizer
- ✓pneumatic conveying system
- ✓powder separator
- ✓Sifter
- ✓main cyclone
- ✓Fan
- ✓bag filter

2. FREEZE-DRYING

- Freeze drying is a dehydration method, which can produce high quality of dried products.
- This method takes advantage of triple point of water.
- Triple point is a state in which substances coexist in different states such as solid, liquid, and vapour and remain in thermodynamic equilibrium.
- Water has triple point at 0.01C and 611.73 Pa.
- Below triple point of water the ice can be directly sublimated into water vapour. This method of moisture removal gives many advantages over conventional methods

- The frozen egg white sample was dried in a Unitop 400 L (Virtis, Gardiner, NY) freeze dryer.
- The temperature of the heating plate was reduced to -40C before placing the sample inside.
- The frozen samples were then placed inside the drying chamber of the freeze dryer
- The thermocouples were connected to a digital data logger for automated temperature measurement during drying

FOAM MAT DRYER



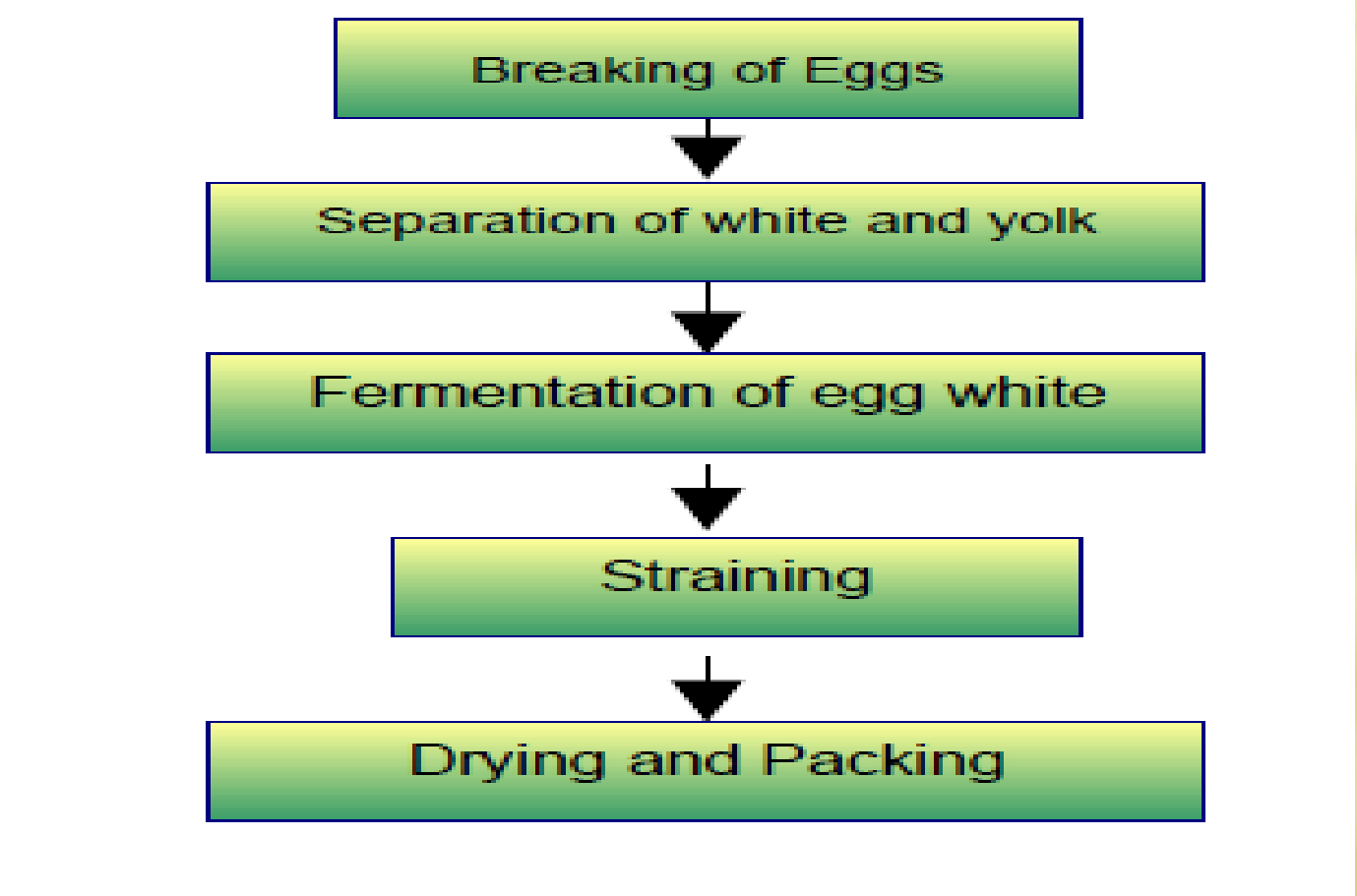
FOAM PREPARATION

- Egg white was kept under refrigeration (5^0C)
- A graduated glass beaker was used as a container to make the egg white foam.
- 100 ml of egg white was added to the glass beaker. Xanthan gum (XG; MP Biomedicals, Inc., Illkirch, France) at 0.125% concentration was used as a stabilizer.
- A 250-W kitchen blender with various speed adjustments was used for making foam.
- The XG of 0.125% concentration was added gradually during the whipping for the stability of egg white foam.
- The total whipping time was 5 min

MAJOR ADVANTAGES OF POWDERED EGGS OVER FRESH EGGS

- The price.
- Reduced weight per volume of whole egg equivalent.
- The shelf life.
- Smaller usage of storage space.
- Lack of need for refrigeration.

EGG ALBUMEN FLAKES



EGG ALBUMEN FLAKES

- Drying the egg white makes egg albumen flakes.
- This dried product has a crystalline appearance with golden yellow colour.
- Technical grade flakes are used in tanning of leather, in offset printing and as adhesive in crown cork cap manufacturing.
- The food grade product is mainly used in bakery and confectionery production.
- Egg yolk can be pasteurized and frozen for edible usage

LIQUID WHOLE EGGS

- **Ingredients:** Whole eggs broken from fresh shell eggs (noadditives) and then pasteurized in accordance with USDA standards.

Solids	24.2% min.
Fat	10.2% min.
Protein (N x 6.25)	12.0% min.
pH	7.3 +/0.3
Standard Plate Count	5,000/g max.

LIQUID EGG WHITES

- **Ingredients**: Egg albumen (whites) separated from fresh shell eggs and then pasteurized in accordance with USDA standards

Solids	11.0% min.
Fat	less than 0.01%
Protein (N x 6.25)	9.0% min.
pH	8.9 +/0.3
Standard Plate Count	5,000/g max.

LIQUID EGG YOLKS

- **Ingredients**: Egg yolks separated from fresh shell eggs and then pasteurized in accordance with USDA standards.

Solids	43.0% min.
Fat	25.6% min.
Protein (N x 6.25)	15.5% min.
pH	6.3 +/0.3
Standard Plate Count	5,000/g max.

DRIED EGG YOLKS

- **Ingredients:** Spray dried, pasteurized egg yolks.

Moisture.	5.0% max
Fat	56.0% min.
Protein (N x 6.25)	30.0% min.
pH	6.5 +/0.5
Standard Plate Count	10,000/g max.

DRIED WHOLE EGGS

- **Ingredients**: Spray dried, pasteurized whole eggs.

Moisture	5.0% max.
Fat	40.0% min.
Protein (N x 6.25)	45.0% min.
pH	8.5 +/0.5
Standard Plate Count	10,000/g max

DRIED EGG WHITES

- **Ingredients:** Spray dried, pasteurized egg whites.

Moisture	8.0% max.
Protein (N x 6.25)	80.0% min.
Reducing Sugar	0.1% max.
pH	7.0 +/0.3
Standard Plate Count	5,000/g max.

QUALITY

- Egg products must be homogeneous
- Fit for human consumption
- Practically free from shell fragments, and foreign matter.
- The taste, colour and odor of egg products shall be natural and characteristic of each product.
- In the case of dried egg products these shall be easily reconstituted.

THANKS