



# Trends within the Powder Market and innovations in Drying and evaporation





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- Global process category manager, dry dairy
- Based in Copenhagen, Denmark
- Dairy engineering, MBA. Leading innovative organizations (2018)
- 15 years experience within evaporation and spray drying
- 4 years with Nestle/Amul, 11 years with engineering companies

- Introduction to SPX Flow Anhydro
- Global trends in the ingredients market
- New technologies – components & processes

Short but clear agenda!

## > Anhydro

### Søborg, Denmark

- Main Office
- Innovation Centre



### Core Markets

- Dairy
- Food
- Chemical
- Pharmaceutical



## Brief History

- Founded in 1948
- Acquired by SPX Flow in 2010
- Leading supplier of evaporator and dryer



## Brand Overview



Comprehensive customer R&D centers enable us to innovate with our customers

Following analysis contains extracts from three of the more recent market studies.

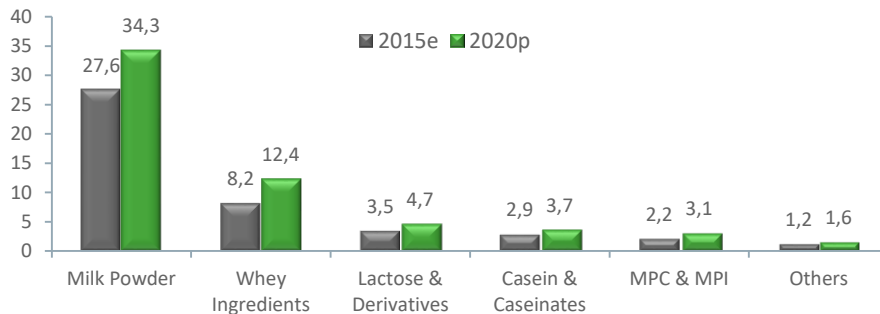
- Despite volatility in pricing overall consumption is **expected to continue growth** at a steady pace
- Growth is driven by increased **consumer awareness** around health and nutrition
  - Rising populations and increased **disposable incomes** in emerging markets
  - **Aging populations** and rising level of health disorders due to **sedentary lifestyles** in mature markets

- Increased demand for foods that deliver **higher nutritional value**
  - Strong demand growth for **functional and fortified product** with high demand for products with high protein content
  - Previously considered niche **sports and clinical nutritional** products moving more towards mainstream consumption
  - Busy lifestyles demanding more convenient “**on the go**” foods that fulfil nutritional requirements

# Global Dairy Ingredients Market - by Category

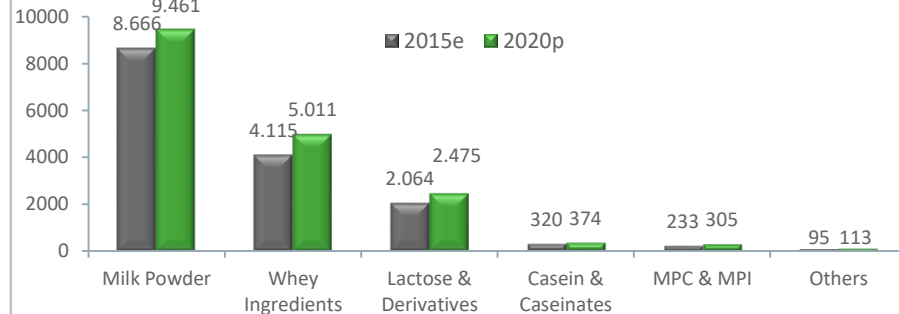
SPXFLOW

Dairy Ingredients Market by Value (US\$ billions)



Category	2013	2014	2015	2020p	CAGR 2015-20
Milk Powder	26.414	26.486	27.593	34.292	4.4%
Whey Ingredients	7.326	7.598	8.214	12.413	8.6%
Lactose & Derivatives	1.515	2.006	2.154	3.063	7.3%
Casein & Caseinates	3.278	3.310	3.519	4.741	6.1%
MPC & MPI	2.651	2.764	2.878	3.714	5.2%
Others	1.053	1.123	1.194	1.565	5.6%
<b>TOTAL</b>	<b>42.238</b>	<b>43.289</b>	<b>45.553</b>	<b>59.791</b>	<b>5.6%</b>

Dairy Ingredients Market by Volume (KT)



Category	2013	2014	2015	2020p	CAGR 2015-20
Milk Powder	8,367.4	8,515.4	8,666.1	9,460.5	1.8%
Whey Ingredients	3,806.8	3,957.5	4,114.7	5,010.7	4.0%
Lactose & Derivatives	1,919.1	1,990.1	2,063.8	2,474.9	3.7%
Casein & Caseinates	208.9	220.5	232.7	304.7	5.5%
MPC & MPI	300.3	309.9	319.8	374.4	3.2%
Others	88.2	91.4	94.6	112.8	3.6%
<b>TOTAL</b>	<b>14,690.7</b>	<b>15,084.8</b>	<b>15,491.7</b>	<b>17,738.0</b>	<b>2.7%</b>

Supported by increasing consumer awareness around health and awareness

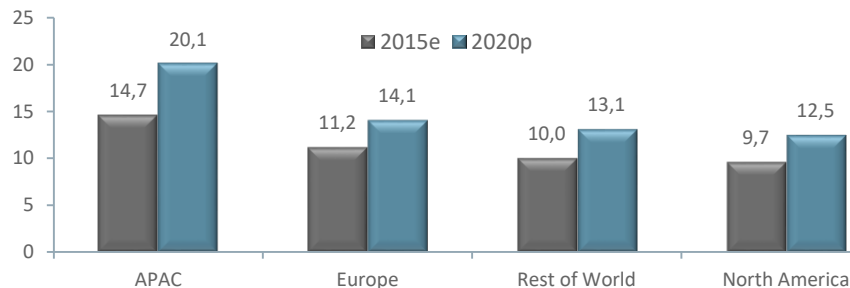
Dairy Ingredients market driven by rising popularity of protein enriched foods and beverages

Sources: MarketsandMarkets Analysis  
Published October 2015  
Base Year: 2014



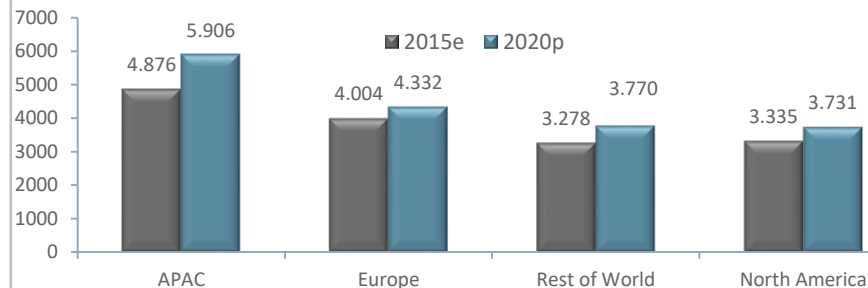
# Global Dairy Ingredients Market - by Region

Dairy Ingredients Market by Value (US\$ billions)



Category	2013	2014	2015	2020p	CAGR 2015-20
North America	8.918	9.197	9.652	12.506	5.3%
Europe	10.543	10.742	11.202	14.065	4.7%
APAC	13.412	13.811	14.651	20.123	6.6%
China	7.007	7.250	7.728	10.866	7.1%
Rest of World	9.364	9.538	10.047	13.132	5.5%
Brazil	3.652	3.743	3.968	5.351	6.2%
Middle East	1.264	1.282	1.346	1.727	5.1%
<b>TOTAL</b>	<b>42.238</b>	<b>43.289</b>	<b>45.553</b>	<b>59.791</b>	<b>5.6%</b>

Dairy Ingredients Market by Volume (KT)



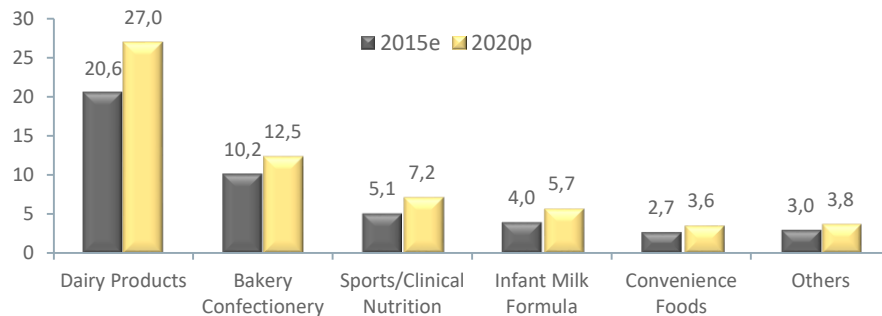
Category	2013	2014	2015	2020p	CAGR 2015-20
North America	3,190.4	3,261.5	3,334.6	3,730.7	2.3%
Europe	3,880.8	3,941.5	4,003.5	4,331.6	1.6%
APAC	4,531.6	4,699.6	4,876.1	5,905.9	3.9%
China	2,184.2	2,268.8	2,356.6	2,849.3	3.9%
Rest of World	3,087.9	3,182.1	3,277.5	3,769.7	2.8%
Brazil	1,003.6	1,029.2	1,055.4	1,197.1	2.6%
Middle East	367.5	378.6	390.1	452.9	3.0%
<b>TOTAL</b>	<b>14,690.7</b>	<b>15,084.8</b>	<b>15,491.7</b>	<b>17,738.0</b>	<b>2.7%</b>

APAC region dominates Global dairy Ingredient demand

Driven by China's large populations rising adoption of Dairy products and increased expenditure on healthy foods

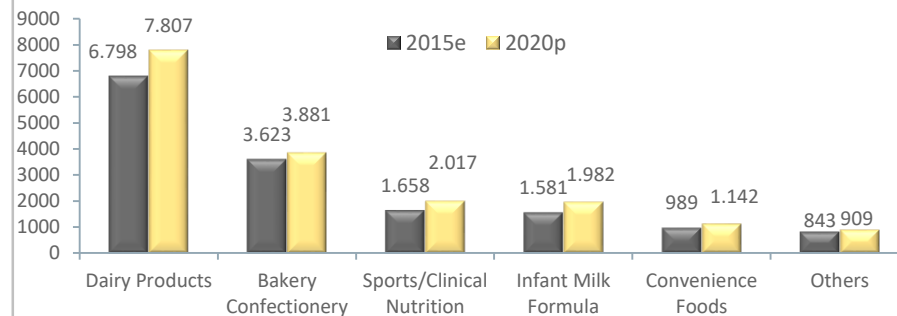
# Global Dairy Ingredients Market - by Application

Dairy Ingredients Market by Value (US\$ billions)



Category	2013	2014	2015	2020p	CAGR 2015-20
Dairy Products	19.085	19.552	20.586	27.044	5.6%
Bakery & Confectionery	9.782	9.784	10.156	12.459	4.2%
Sports & Clinical Nutrition	4.524	4.785	5.107	7.214	7.2%
Infant Milk Formula	3.570	3.743	4.007	5.740	7.5%
Convenience Foods	2.499	2.559	2.696	3.561	5.7%
Others	2.777	2.864	3.000	3.781	4.7%
<b>TOTAL</b>	<b>42.238</b>	<b>43.289</b>	<b>45.553</b>	<b>59.791</b>	<b>5.6%</b>

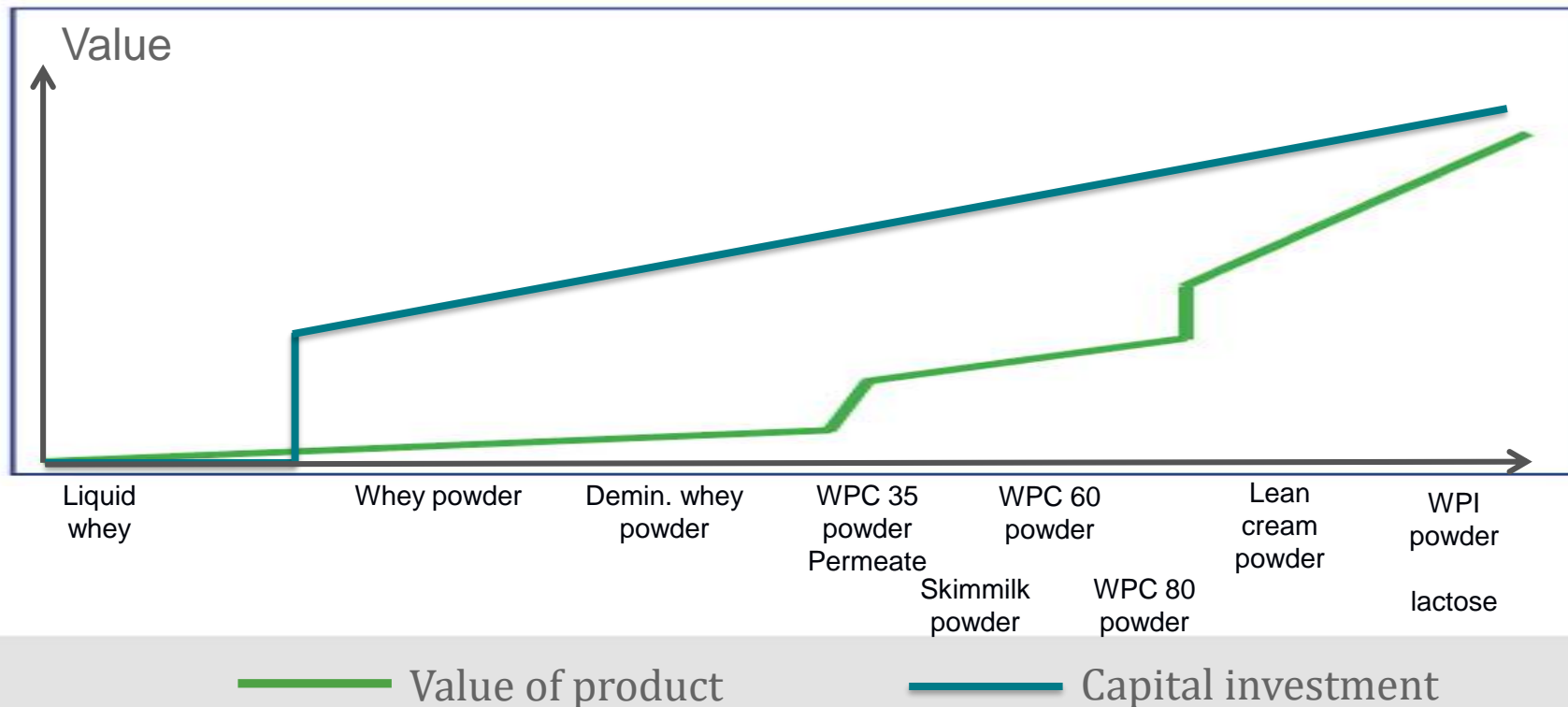
Dairy Ingredients Market by Volume (KT)

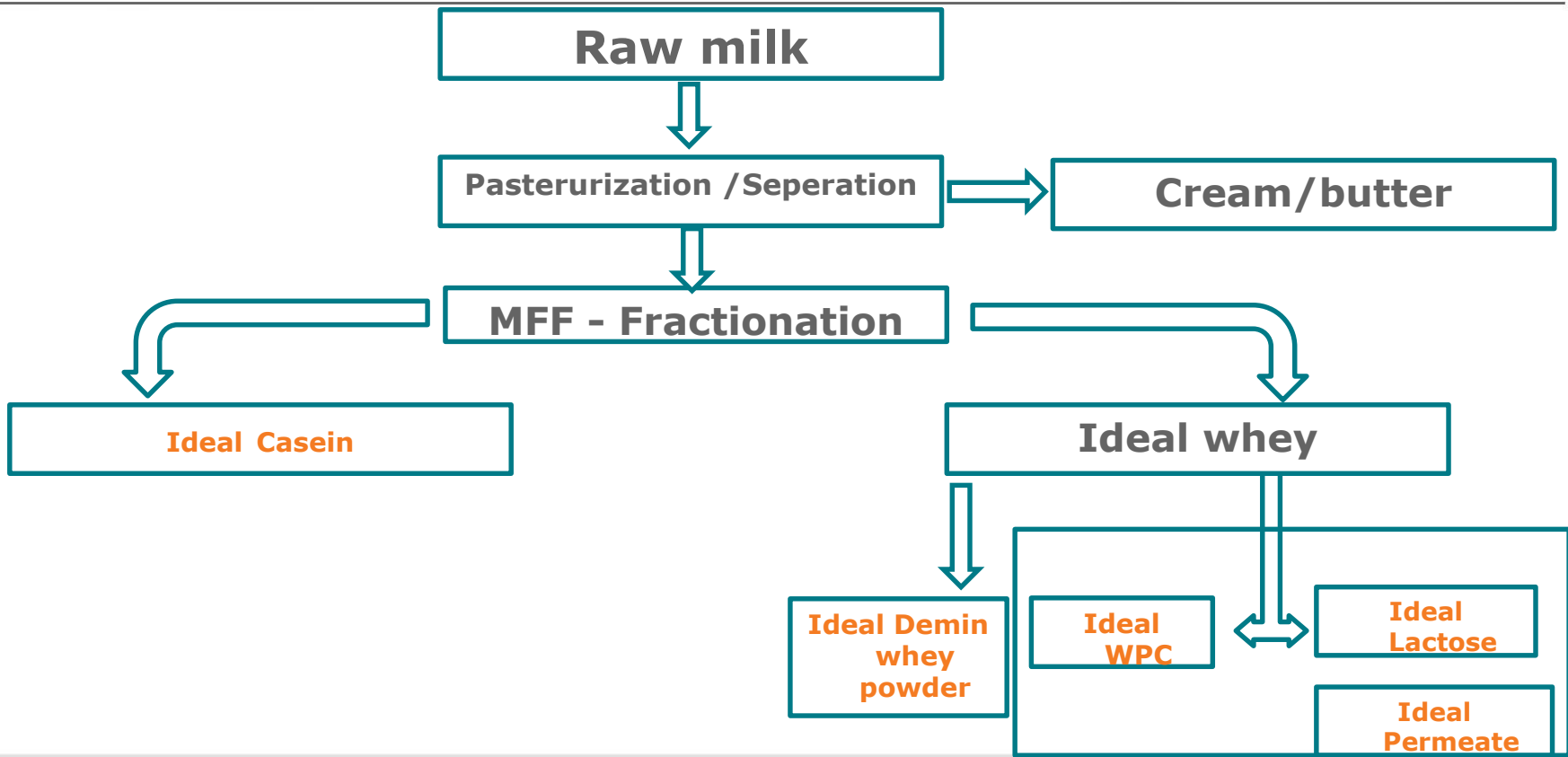


Category	2013	2014	2015	2020p	CAGR 2015-20
Dairy Products	6,440.3	6,616.2	6,798.2	7,807.1	2.8%
Bakery & Confectionery	3,529.5	3,575.4	3,622.6	3,881.3	1.4%
Sports & Clinical Nutrition	1,536.1	1,595.4	1,657.7	2,016.8	4.0%
Infant Milk Formula	1,450.2	1,513.9	1,581.4	1,982.0	4.6%
Convenience Foods	935.9	962.1	989.3	1,141.8	2.9%
Others	798.9	821.7	842.5	909.0	1.5%
<b>TOTAL</b>	<b>14,690.7</b>	<b>15,084.8</b>	<b>15,491.7</b>	<b>17,738.0</b>	<b>2.7%</b>

Increased consumer awareness of the need for nutrient rich diets driving demand for Dairy ingredients

## Product value Vs Capital investment







Cultures



Colours



Salt



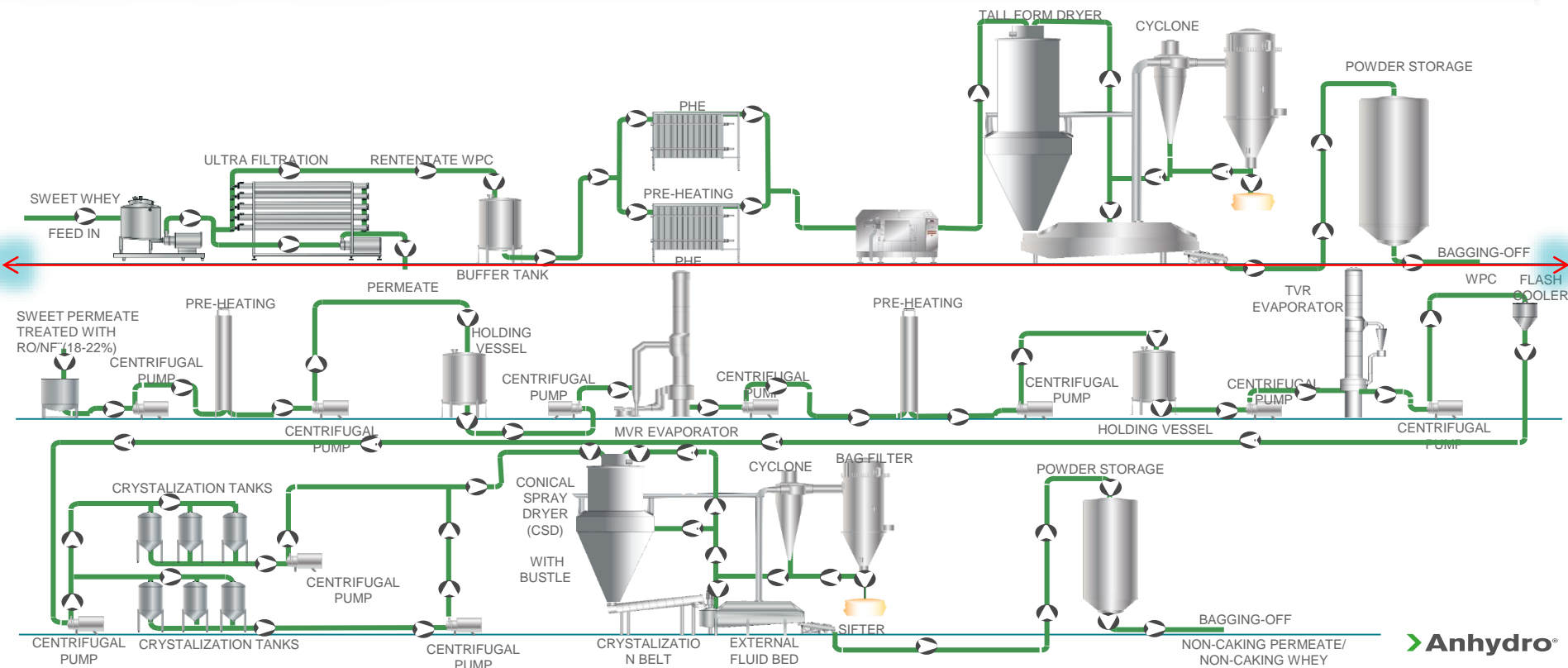
Cheese additives



Rennet and coagulants (acids)

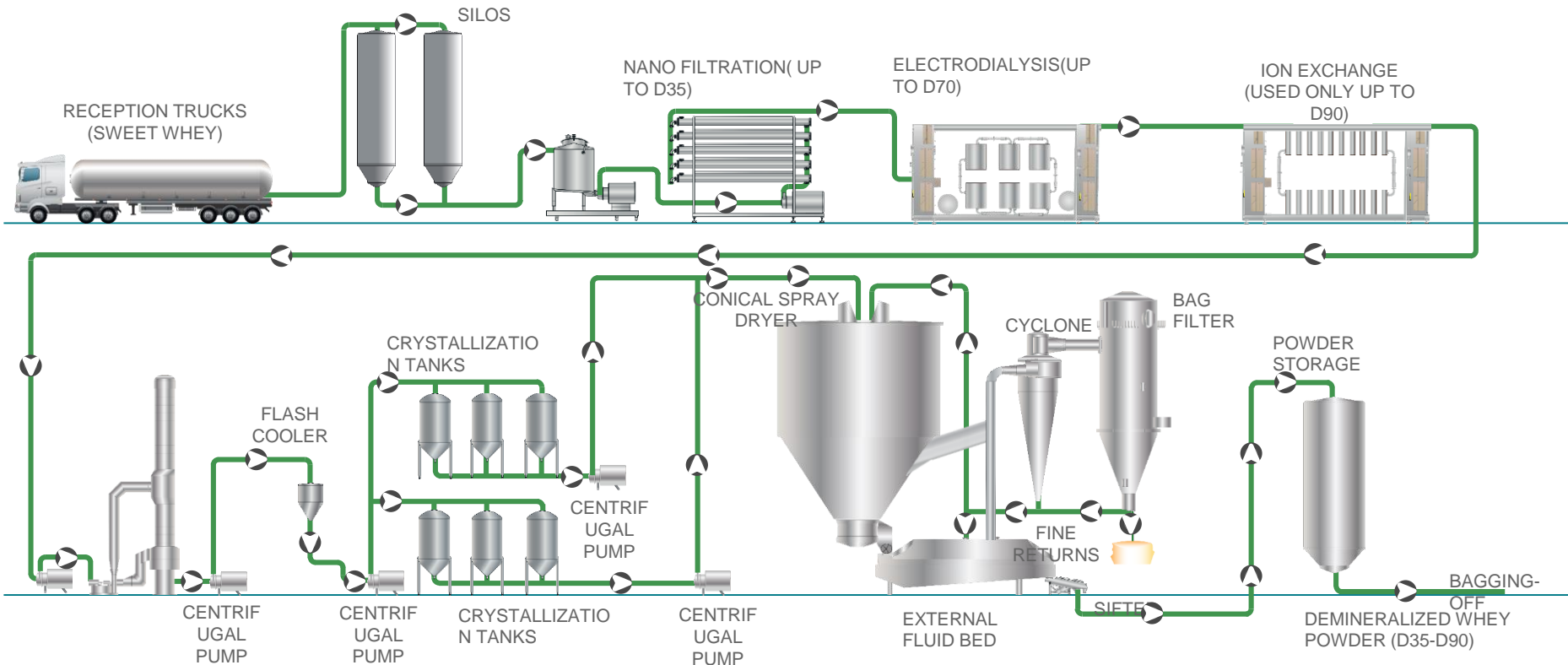
# WPC and Non caking permeate process

# SPXFLOW



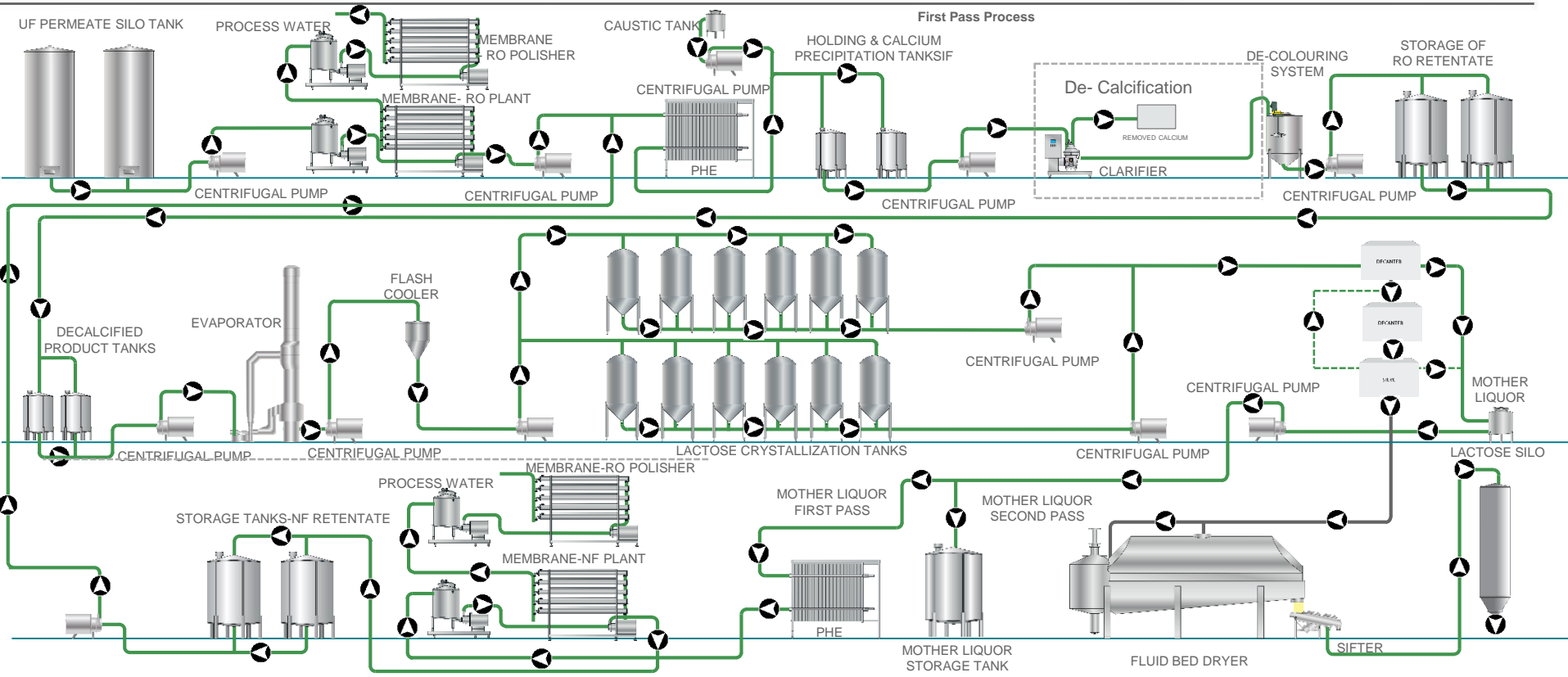
# Demin whey powder

# SPXFLOW



# High Yield Lactose process

# SPXFLOW

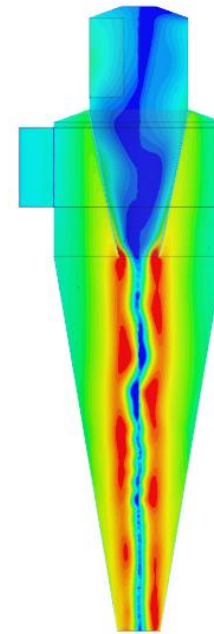
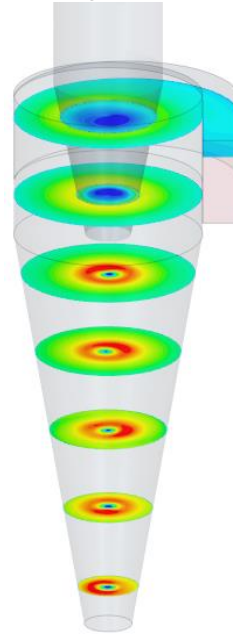
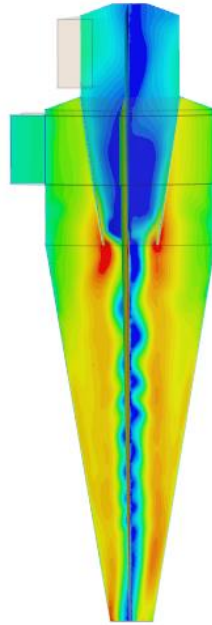
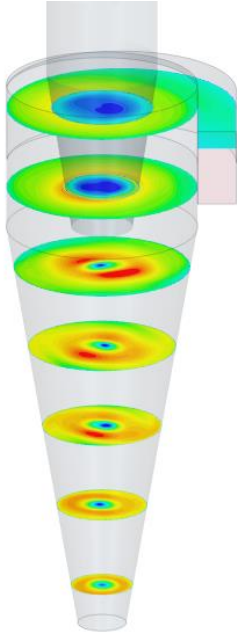


## High yield lactose process



## Some Innovations on components and processes

## Tangential velocity in cyclones



Cyclone for low fat powder

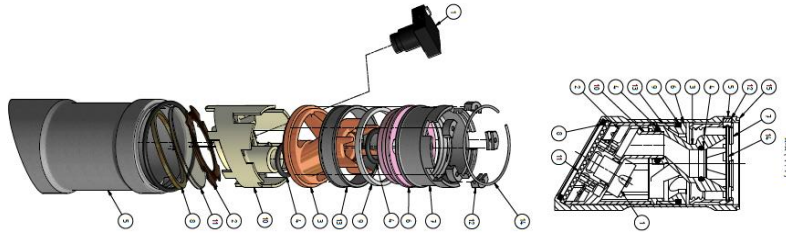
Cyclone for high fat powder

## Velocity field in cyclones



- Reduced tangential velocity at the top entrance
- Expanded cylinder diameter minorly
- Less tearing of bags
- Possibility of addition of rupture discs below the bags
- Longer running hours

## Nozzle and Air distributor camera

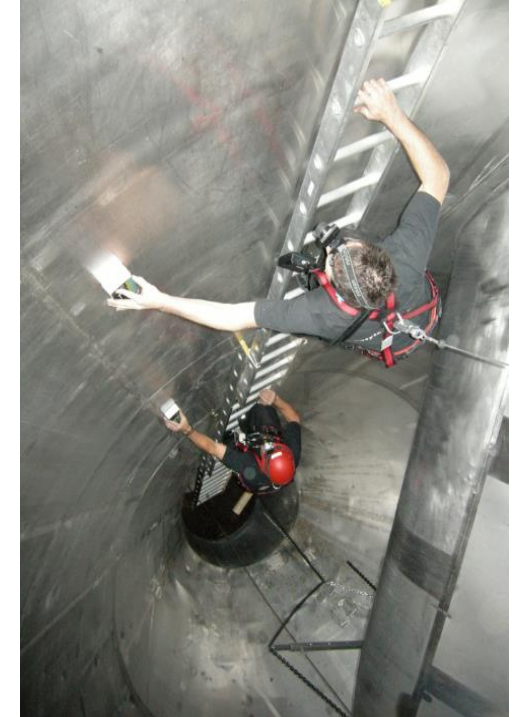


Camera as nozzle

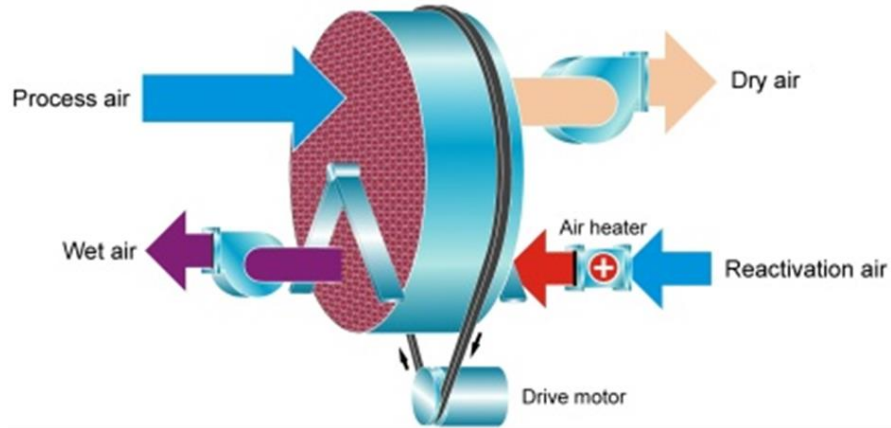


Installed at commercial sites

- No chemical products for the control
- Performed in very short time compared to other methods  
( 2 days vs. Dye penetrants = 1 week).
- Better Accuracy for detection
- Specific Scaffolding designed for dryers.



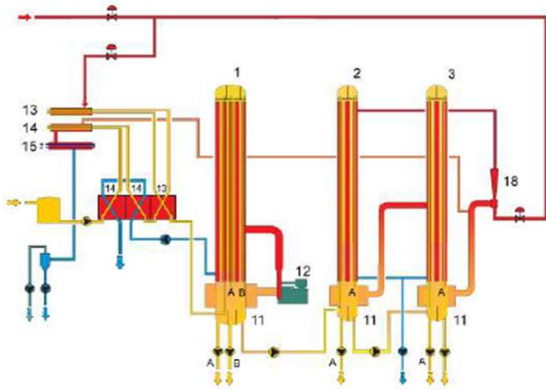
Unique Dryer Inspection Technology



8-10 % increase  
in capacity



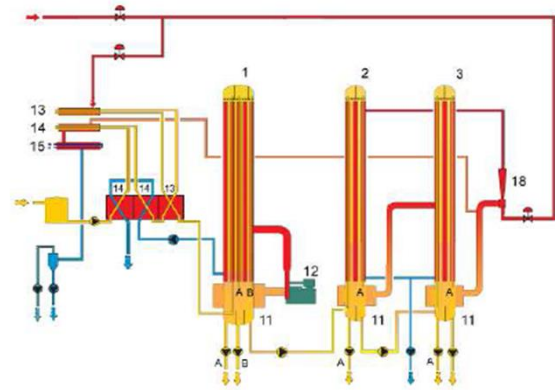
Dehumidification + cavitator additional



Existing evaporator



New feed system



New evaporator

20% increase  
in capacity

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**SPXFLOW**

**FOOD+BEVERAGE**