SAP Dairy Management by msg for SAP S/4HANA
Milk Processing From Farm to Consumer
SAP
July, 2020
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Agenda

Importance of the Dairy Industry and business models
- Market, Size, Business models, Supply chain

Challenges of Dairy Industry companies
- Common customer situations

Dairy Management capabilities
- End to End coverage, Solution areas, process example

Value and references
- Global, regional
Importance of the **Dairy Industry** and business models
Importance of Dairy Production

Sectors of the Food & Beverage Industry

- Dairy: 13.2%
- Meat: 24.3%
- Other: 5.9%
- Baked goods: 9.8%
- Confectionery: 8.3%
- Alcoholic beverages: 7.6%
- Processed fruits & vegetables: 6.1%
- Edible oils & fats: 3.6%
- Non-alcoholic beverages: 4.6%
- Convenience foods & others: 5.5%
- Mill products and starch: 3.4%
- Sugar: 1.5%
- Fish: 1.2%
- Coffee & tea: 2.5%
- Seasonings & sauces: 2.5%

Revenue based; Source: BE, 2016

Dairy is the second important sector in the food & beverage industry following meat.

World: cow’s milk production per region

- Asia: 30.0%
- Americas: 27.0%
- Europe: 33.0%
- Africa: 5.0%
- Oceania: 5.0%
- Africa: 5.0%
- Oceania: 5.0%

Global milk production increased in the last 20 years by 58% from 1996 till 2016 (3% yoy)

Bulletin of International Dairy Federation page 3, Link
The Dairy Industry
Business Models

Full Supply Chain Operation
> Own cow operations for raw milk production
> Purchase raw milk from farmers
> Own fields and feed mills
> Milk, butter, yoghurt, cheese production
> Retail operations
> Multiple Plants

Traditional Company
> Purchase raw milk from contract farmers
> Production of milk and all milk products like butter, yoghurt, cheese, etc.
> Selling to retailers, etc.
> Multiple Plants

Combined Company
> Execute at least two following steps of the value chain
> Cheese and whey
> Butter and cream
> Cheese and yoghurt
> Milk and butter
> …more combinations

Specialized Company
> Only milk production
> Only cheese production
> Only yoghurt production
> Only butter production
> Only whey production
Challenges of Dairy Industry companies
Top 10 Challenges in the Dairy Industry

1. Milk is an inhomogeneous product
2. Seasonal and regional supply variances
3. High volatile milk prices
4. Low margin business
5. Raw material is the biggest cost factor
6. Raw material efficiency is key
7. Subcomponents based planning
8. Analyze raw material loss
9. Accurate actual costing
10. Decoupled Business Processes
Improving Operational Efficiency – Financial impact

Revenue 77,70
- VAT 5,10
- Fees 1,80
- Margin 13,00
- Distribution 2,50
- Overhead 0,60
- Packaging 8,50
- Manufacturing 8,30
- Freight 1,40
- Milk 36,50

"78 Cent for drinking milk: This is how the price is composed" source, Jan. 2018: https://www.agrarheute.com/tier/rind/78-cent-fuer-trinkmilch-so-setzt-preis-zusammen-440859

Dairy Management supports to find and analyse the pain points within the whole dairy process.

The three modules
- Planning
- Operations and
- Costing
will help to improve the overall efficiency and the cost factor.
Dairy Management capabilities
End-to-End Process Flow along the milk supply chain
SAP Dairy Management by msg for SAP S/4HANA

Supply

External Farmers

Production Planning
Raw Milk Balancing

Milk Collection

Raw Milk Planning

Integrated Processes

Demand

Sales Orders

Planning/Prediction

Integrated Production Control

Integrated Production Control

Goods Receipt

Invoice Verification

Outgoing Payments

Warehouse

Picking

Shipping and Loading

Transport

Proof of Delivery

Billing

Incoming Payments

Integrated Processes

Standard S/4HANA Processes

SAP Dairy Management by msg

Other solution

- Cattle Breeding
- Calf Breeding
- Cow Keeping

- Raw Materials Purchasing

- Goods Receipt

- Invoice Verification

- Outgoing Payments

- Warehouse

- Picking

- Shipping and Loading

- Transport

- Proof of Delivery

- Billing

- Incoming Payments
How to detect small figures with high value effects?

**Raw Milk Transport**
- Inventory
- Tank and pipe cleaning

**Milk Receipt/Issue**
- Start-up
- Standardization
- Shut-down
- Intermediate cleaning
- Daily cleaning

**Raw Material Inventory**
- Prepare
- Produce
- Change product
- Start-up
- Shut-down
- Clean

**Milk Processing**
- Start
- Fill
- Change package
- Change product
- Shut-down
- Stop

**Milk Product Processing**
- B-Material
- Returns
- Destruction
- Damage

**Filling**
- B-Material
- Returns
- Destruction
- Damage

**Distribution**

**Overall Companies Loss**

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Ingredients / Components determine the value of the raw milk
How to balance the raw materials?

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw material 1kg = 1,000g</td>
<td>Raw material value ct/kg</td>
</tr>
<tr>
<td>Protein 3.4%</td>
<td>Protein-value</td>
</tr>
<tr>
<td>Fat 4.0%</td>
<td>Fat-value</td>
</tr>
</tbody>
</table>

Supply

Balancing

Demand

Supply

Balancing

Demand

Cream 35%

Butter > 82%

Drink Milk
Fat 3.5%

Supply

Balancing

Demand
SAP Dairy Management by msg for SAP S/4HANA – Overview

SAP Dairy Management provides an end-to-end solution for Dairy & Cheese Planning and Operation & Costing that offers comprehensive functionality along the production processes.
Raw Material Planning in SAP Dairy Management

**Challenges**

**Challenge**
- Balancing both raw material flows
- Optimal utilization of raw materials

**PUSH**
- Supply of raw material is independent of demand (in a short-term view)

**PULL**
- Demand of raw material is driven by consumer and thus independent of supply

[Diagram showing the flow from supplier to dairy plant to distribution center to store to consumer, with 'PUSH' and 'PULL' labels indicating supply and demand sides.]
Overview of Raw Material Planning in SAP Dairy Management

SAP Dairy Management by msg for SAP S/4HANA

- Raw material quantity planning
- Optional planning levels (supplier, hauler, vehicle)
- Consideration of delivery times
- Redirection between production plants
- Plan balances for raw material and components
- Balance PUSH and PULL flows with redirections, stock transfers, sales and purchases
- Optimized raw material planning processes

Integration with IBP or any other SAP planning tool

- Using S/4 standard processes
- Raw material requirements
Concept of Yield, Gain & Loss in SAP Dairy Management

- Raw material balancing
- Analysis Cockpit
- Post Processing
- Period close – component posting

- Mass Balancing per valuation category
- Confirmation of daily balance per inventory and batch characteristics
- Optimized raw material usage
Yield, Gain & Loss
Raw Material Balance – Basis Concept

**Idea**

- Split the material flow into an non-evaluated (milk) and a valuated part (components)
- Post the unevaluated movements in ECC immediately
- The documents are automatically classified for Dairy according to Customizing
- The batch values for balance type materials are carried in Dairy (basis for posting)
- Control incomplete or missing data and correct them
- Post the milk components to update value flow in ECC
- Obtain a raw material balance for the balance type materials and their components
Activity-Based Costing with SAP Dairy Management

Example

<table>
<thead>
<tr>
<th>Raw Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Special Features:</strong></td>
</tr>
<tr>
<td>- See milk utilization</td>
</tr>
<tr>
<td>- See component cost share</td>
</tr>
<tr>
<td>- Identify cost structure</td>
</tr>
</tbody>
</table>

| Raw Material Costs |

### Cost Object Report - Cost-Breakdown

**Plant:** 0011  
**Company Name:** Milchkontor Passau  
**Model Desc.:** Plant A - Plan A

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
<th>Price</th>
<th>Var. Cost (prop. to day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FERT - F016 - Butter 250g 10kg Box Production Quantity</td>
<td>15,000.000 ST</td>
<td>3,700.000 KG</td>
<td>Total Cost</td>
</tr>
</tbody>
</table>

**EUR**

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
<th>Price</th>
<th>Var. Cost (prop. to day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTR - 11 Milk Fat KG</td>
<td>3,202.163</td>
<td>4,500</td>
<td>14,409.732</td>
</tr>
<tr>
<td>INTR - 12 Milk Protein KG</td>
<td>28.865</td>
<td>3,350</td>
<td>95,705</td>
</tr>
<tr>
<td>INTR - 13 DM Milk KG</td>
<td>3,561.173</td>
<td>0,110</td>
<td>385,120</td>
</tr>
<tr>
<td>ROH - R02 Cream 40 % KG</td>
<td>8,015.885</td>
<td>0,100</td>
<td>385,120</td>
</tr>
<tr>
<td>ROH - R004 Butter Milk 50 % KG</td>
<td>4,016.100</td>
<td>20,000</td>
<td>81,200</td>
</tr>
<tr>
<td>KX01 - MILK RAW MATERIALS</td>
<td></td>
<td></td>
<td>14,891,626</td>
</tr>
<tr>
<td>HALB - R001 Butter Fat Flakes KG</td>
<td>7,390.000</td>
<td>7,500</td>
<td>14,881,626</td>
</tr>
<tr>
<td>HALB - R04 Cream for Butter 40% KG</td>
<td>7,767.233</td>
<td>38,838</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
<th>Price</th>
<th>Var. Cost (prop. to day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZUSA - 220990 Concentrate Soybean</td>
<td>69,976</td>
<td>0,000</td>
<td>69,976</td>
</tr>
<tr>
<td>KX03 - OTHER RAW MATERIALS</td>
<td></td>
<td></td>
<td>69,976</td>
</tr>
<tr>
<td>VERP - V12211 Karton Box Butter 25 ST</td>
<td>15,000</td>
<td>0,100</td>
<td>1,523,700</td>
</tr>
<tr>
<td>VERP - V12315 Intermediate Package ST</td>
<td>12,500</td>
<td>0,150</td>
<td>1,879,000</td>
</tr>
<tr>
<td>VERP - V12321 Butter Foil Square Cut LFM</td>
<td>3,525.000</td>
<td>7,050</td>
<td>36,100</td>
</tr>
<tr>
<td>KX04 - DIRECT PACKAGING MATERIAL</td>
<td></td>
<td></td>
<td>136,734</td>
</tr>
<tr>
<td>100020 Standardisation KG</td>
<td>7,500</td>
<td>67,163</td>
<td>74,938</td>
</tr>
<tr>
<td>KX12 - MILK STANDARDIZATION</td>
<td></td>
<td></td>
<td>74,938</td>
</tr>
<tr>
<td>1141102441 setup butter machine QUA</td>
<td>375.750</td>
<td>1,524</td>
<td>1,524,000</td>
</tr>
<tr>
<td>1141206101 Cleaning Mixing Pipe QUA</td>
<td>375.750</td>
<td>0,876</td>
<td>317,202</td>
</tr>
<tr>
<td>1141206101 Cleaning Raw Cream H QUA</td>
<td>375.750</td>
<td>0,242</td>
<td>92,241</td>
</tr>
<tr>
<td>1141303011 Cream Treatment KG</td>
<td>375.750</td>
<td>0,030</td>
<td>11,120</td>
</tr>
<tr>
<td>1141400011 Butter Production KG</td>
<td>375.750</td>
<td>1,104</td>
<td>35,061</td>
</tr>
<tr>
<td>KX13 - PRODUCTION/PROCESSING</td>
<td></td>
<td></td>
<td>54,486</td>
</tr>
<tr>
<td>114150022 Butter Packaging 10 ST</td>
<td>15,000</td>
<td>0,050</td>
<td>748,500</td>
</tr>
<tr>
<td>KX14 - LAYERING PACKAGING</td>
<td></td>
<td></td>
<td>748,500</td>
</tr>
<tr>
<td>8000 Quality Lab QUA</td>
<td>375.750</td>
<td>0,355</td>
<td>38,702</td>
</tr>
<tr>
<td>KX15 - QUALITY CONTROL</td>
<td></td>
<td></td>
<td>38,702</td>
</tr>
<tr>
<td>FERT - F016 - Butter 250g 10kg Box</td>
<td></td>
<td></td>
<td>17,180,886</td>
</tr>
</tbody>
</table>

---

*Handle with care: demonstration example, abstract data*
Activity-Based Costing with SAP Dairy Management

Activity-Based Costing - Plan

- Activity Rates
- Material Calculation

- ABC Simulation Engine
  - Overhead
  - Machine Data
    - Power Efficiency
    - Fresh/Waste Water
    - Plant Maintenance
  - Fat
  - Protein
  - Labor & Machine Times
  - Seasonal BOM

Activity-Based Costing - Actual

- Process Order Revaluation
- ABC Revaluation Engine
  - Overhead
  - Machine Data
    - Power Efficiency
    - Fresh/Waste Water
    - Plant Maintenance
  - Fat
  - Protein
  - Activity Rates
  - S-Price

CO-PA Integration

- Process Order Revaluation
- Analysis of Variance of Process Order
- WIP Calculation of Process Order
- Settlement of Process Order

SAP Dairy Management for SAP S/4 HANA

- Consider Seasonal BOMs
- Cost Share of Components (e.g. Fat)
- Transparency of Actual Components
- Improved Contribution Margin Analysis
- Utilize Machine Data
- Identify Cause-Relation of Costs
- Increase Accuracy of Man. Costs
- Perform Full Overhead Absorption (if required)

Integration with S/4 Core Processes

- via S/4 Core Processes
- S-Price Updates
- Process Order Valuation
- CO-PA Settlement
SAP Dairy Management by msg for SAP S/4HANA
Activity-Based Costing Processes

Employee 1
Employee 2
Electricity
Steam

6:00 8:00 10:45 – 11:15 13:00 14:00

Preparation
Filling Yoghurt
Format Switch
Filling Yoghurt
Cleaning

Processes

Preparation
Filling Yoghurt
Format Switch
Filling Yoghurt
Cleaning

Activity
unit/ process

Staff
hours
Electricity
kWh
Steam
m³
Water
m³

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Affinage with SAP Dairy Management

Challenges

- Having the most accurate weight in the system during the entire aging period, even though there is no physical measurement.
- Having the most realistic material value available during the entire aging period (gain of value due to aging and process costs).
- Automatically having a clean system at the end of the aging period (even if target and actual weights are not 100% the same).
Cost Allocation
Increase the Value of Aging Materials based on Process Costs

**Feature:**
- Consideration of additional process costs, which accrue during the aging process e.g. lubrication, maintenance processes
- All adjustments are based on product-specific master data

**Benefits:**
- Most accurate material price during the entire aging process
- Automated valuation process

---

**First day**
- 50.0 KG

**After 5 weeks**
- 47.0 KG

**After 15 weeks**
- 41.1 KG

**After 25 weeks**
- 32.54 KG

1.5% loss per week | 1.3% loss per week | 1 KG loss per week

0 weeks | 5 weeks | 10 weeks | 15 weeks | 20 weeks | 25 weeks
Cheese Planning
Push/Pull Principle of Planning Aging Material

Features:
- Consideration of aging times and losses
- Automatic planning of green cheese production
- Forecast of future stocks per age

Features:
- Consideration of aging times and losses
- Automatic planning of green cheese production
- Forecast of future stocks per age

Plan balance
Cheese in stock
Income
Consumption
+/- Excess/Shortage

PUSH
Cheese: Buying/Production

Pull
Requirement/Sales

Finished products

Features:
- Consideration of aging times and losses
- Automatic planning of green cheese production
- Forecast of future stocks per age

Features:
- Consideration of aging times and losses
- Automatic planning of green cheese production
- Forecast of future stocks per age

Excess/Shortage
Jan Feb Mar Apr May Jun

Requirement Receipt

Income Production

Own production / purchasing

Affinage / maturing

Sales
SAP Dairy Management by msg for SAP S/4HANA

Unified User Experience

Real-time insight and monitoring on aggregated and detailed levels

Integrated Dairy business processes and value chain

Manage Dairy specific production methods and recipes for milk & cheese products

Assign production resources to departments

Track production on yield, gains and losses

Manage milk collection routes

Manage & plan milk based on the relevant components

Availability of an integrated material master in S/4

Integration to standard SAP tools such as IBP and PP/DS

Real Time Dairy Scenarios - Powered by SAP HANA
SAP Analytics Cloud

Availability of additional Reporting Content on SAC

- Use advantages of the central cloud analytics solution combined with dairy-specific key figures and processes
- Provided content on SAP Analytics Cloud by msg systems ag
  - Raw Material Plan Balance
  - Activity-Based Costing Analysis
- Get a first impression of the new reporting possibilities
  Visit us: SAP App Center

Note: SAC content is not included in the SAP Dairy Management by msg for SAP S/4 HANA license.
Value and references
Challenges covered with SAP Dairy Management

<table>
<thead>
<tr>
<th>Challenges</th>
<th>SAP Dairy Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> Milk is an inhomogeneous product</td>
<td>Inbound Processing</td>
</tr>
<tr>
<td>As a natural product the sub-components (fat, protein, etc.) vary throughout the year and need to be planned and tracked accurately for an optimal utilization of the milk.</td>
<td>Production</td>
</tr>
<tr>
<td><strong>2</strong> Seasonal and regional supply variances</td>
<td>Activity Based Costing</td>
</tr>
<tr>
<td>Different milk volumes and varieties of milk types (conventional, bio, hay, sheep, goat, etc.) are pushed to the dairy plants (compulsory acceptance) and need to be processed in the most profitable way.</td>
<td></td>
</tr>
<tr>
<td><strong>3</strong> High volatile milk prices</td>
<td></td>
</tr>
<tr>
<td>Milk price differs over the year and needs to be reflected throughout the operational processes and accurately considered in actual product costing.</td>
<td></td>
</tr>
<tr>
<td><strong>4</strong> Low margin business</td>
<td></td>
</tr>
<tr>
<td>The entire Dairy process needs to be cost optimized to increase the margin.</td>
<td></td>
</tr>
<tr>
<td><strong>5</strong> Raw material is the biggest cost factor</td>
<td></td>
</tr>
<tr>
<td>The raw materials and underlaying sub-components have to be tracked and processed optimal from milk intake to filling and packaging line.</td>
<td></td>
</tr>
</tbody>
</table>

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# Challenges in the Dairy Industry

## Challenges

<table>
<thead>
<tr>
<th>Challenge</th>
<th>SAP Dairy Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Raw material efficiency is key</strong></td>
<td></td>
</tr>
<tr>
<td>Milk price differs over the year and needs to be reflected throughout the process.</td>
<td></td>
</tr>
<tr>
<td><strong>Subcomponents based planning</strong></td>
<td></td>
</tr>
<tr>
<td>Planning of components increases planning accuracy, milk utilization and cost transparency along the complete dairy process.</td>
<td></td>
</tr>
<tr>
<td><strong>Analyze raw material loss</strong></td>
<td></td>
</tr>
<tr>
<td>Dairy operations identify losses along the processing and derives milk loss factors to enable process improvements for raw material loss reduction.</td>
<td></td>
</tr>
<tr>
<td><strong>Accurate actual costing</strong></td>
<td></td>
</tr>
<tr>
<td>The real utilization of sub-components by final products on process order level increases accurate actual costing.</td>
<td></td>
</tr>
<tr>
<td><strong>Decoupled Business Processes</strong></td>
<td></td>
</tr>
<tr>
<td>Tailor-made Dairy processes are fully integrated in the overall process model and enables seamless work in SAP S/4 without system change and interfaces.</td>
<td></td>
</tr>
</tbody>
</table>
SAP Dairy Management by msg for SAP S/4HANA

Overall Value

- Raw Material Planning
- Yield, Gain & Loss
- Labor and Activity Efficiency
- Activity-Based Costing

- Quantity planning of deliveries
- Raw material balancing
- Daily department-controlling of raw materials, ingredients, materials and Services
- Dairy process costs
- Contribution margins
- Raw material utilization

Increase efficiency and prevent losses by more accurate planning
Losses and downtimes are immediately transparent to implement measures
Transparent costs, potentials and targets

* SAP performance benchmarking
### Dairy Management Customers

<table>
<thead>
<tr>
<th>Company</th>
<th>Revenue (US$)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>dmk</td>
<td>6.5bn</td>
<td>Largest dairy company in Germany</td>
</tr>
<tr>
<td>Emmi</td>
<td>3.7bn</td>
<td>Largest dairy company in Switzerland</td>
</tr>
<tr>
<td>Saputo</td>
<td>9.9bn</td>
<td>Largest dairy company in Canada</td>
</tr>
<tr>
<td>Hood</td>
<td>2.2bn</td>
<td>One of the largest branded dairy operators in the US</td>
</tr>
<tr>
<td>Käserel Champignon</td>
<td>0.6bn</td>
<td>Exports to 55 countries all over the world</td>
</tr>
<tr>
<td>TNUVA</td>
<td>1.8bn</td>
<td>Largest food manufacturer in Israel</td>
</tr>
</tbody>
</table>

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*We are pleased that SAP has added this innovative solution to its solution portfolio. SAP Dairy Management by msg is a key part of our SAP strategy. This ground-breaking industry application sets the cornerstone for ensuring solid performance, innovation, growth and lasting success.*

*Heinz Hodel, former CIO, Emmi about SAP Dairy Management by msg*
Customer References
Links to published reference stories

Emmi – Benefits of SAP Dairy Management

Article in Molkerei Industry (German)

Geographical Coverage

Food Conference Munich – Downloads of Customer Presentations
Speakers were DMK, Emmi, Dr. Öttl, F.Bodfeld, H.Buschendorf
Username: foodcom
Passwort: fcm2017
Further Information on SAP Homepage

Product

Documentation

References

"SAP Dairy Management by msg."

Heinz Hodel, Emmi AG, about
Thank you.