Six Sigma in the food industry

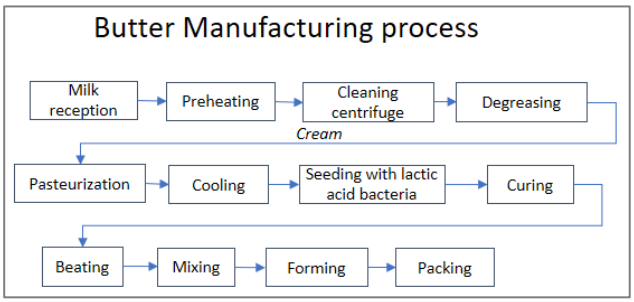
The food industry is extremely complex. This industry has some features linked by the nature of the raw materials processed and the finished products obtained. Raw materials are mostly biological products, perishable and degradable. Starting from here we can conclude the need for improvements that can be done with Six Sigma.

Six Sigma is a data-driven systematic approach. **DMAIC** methodology - **D**efine, **M**easure, **A**nalyze, **I**mprove & **C**ontrol is used to improve the existing process.

An example of a successful project using Six Sigma in the food industry is "Reducing complaints for butter manufacturing".

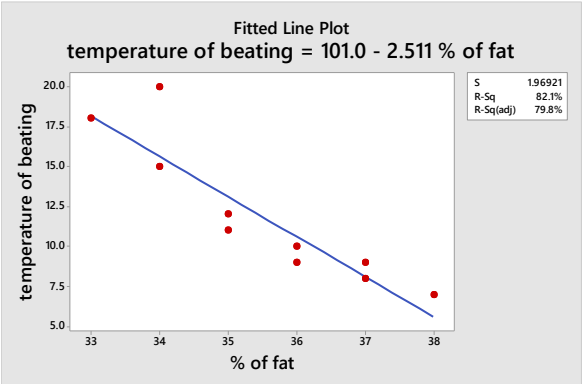
Butter is one of the most important milk products for human consumption, being the animal fat with the highest digestibility. Butter composition is mainly represented by fat (80-82%), water (15.6 to 17.6%), protein, calcium and phosphorus (about 1.2%).

In **D**efine were studied the complaints (using Pareto) and found that the clear majority (85%) were due to cheese aspect (crumbly). Manufacturing process was studied (see picture below).



In **M**easure phase data were collected from the process and have identified factors that may influence the cheese aspect (crumbly): the optimum ratio between solid and liquid phase, the size and shape of fat crystals, the percentage of fat from cream, the degree of maturation of cream, temperature of beating, degree of filling of the churn, Ph of cream.

The causes that led to the cheese aspect were temperature of beating and the fill volume of churn – **A**nalyze phase.



Temperature of beating depends on the fat content of the cream. So, the consistency that gives the buttery appearance depends on the temperature of beating. Regression was used to demonstrate this hypothesis (see picture below).

In **I**mprove the following solutions were found: The optimum temperature for beating to be between 8-14^{o}C, depending on the fat content of the cream (high content / low temperature) and depend on the season (lower summer than in winter). The degree of filling of churn to be 40% for cylindrical form.

In **C**ontrol phase, has changed manufacturing instruction "Beating of cream".

We invite you to Six Sigma courses organized by Effective Flux to reap the benefits of this methodology.