

Meeting for ISPE Nordic PAT COP Members



# PAT tools in the Food Industry

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Arla Foods amba Global Ingredients R&D

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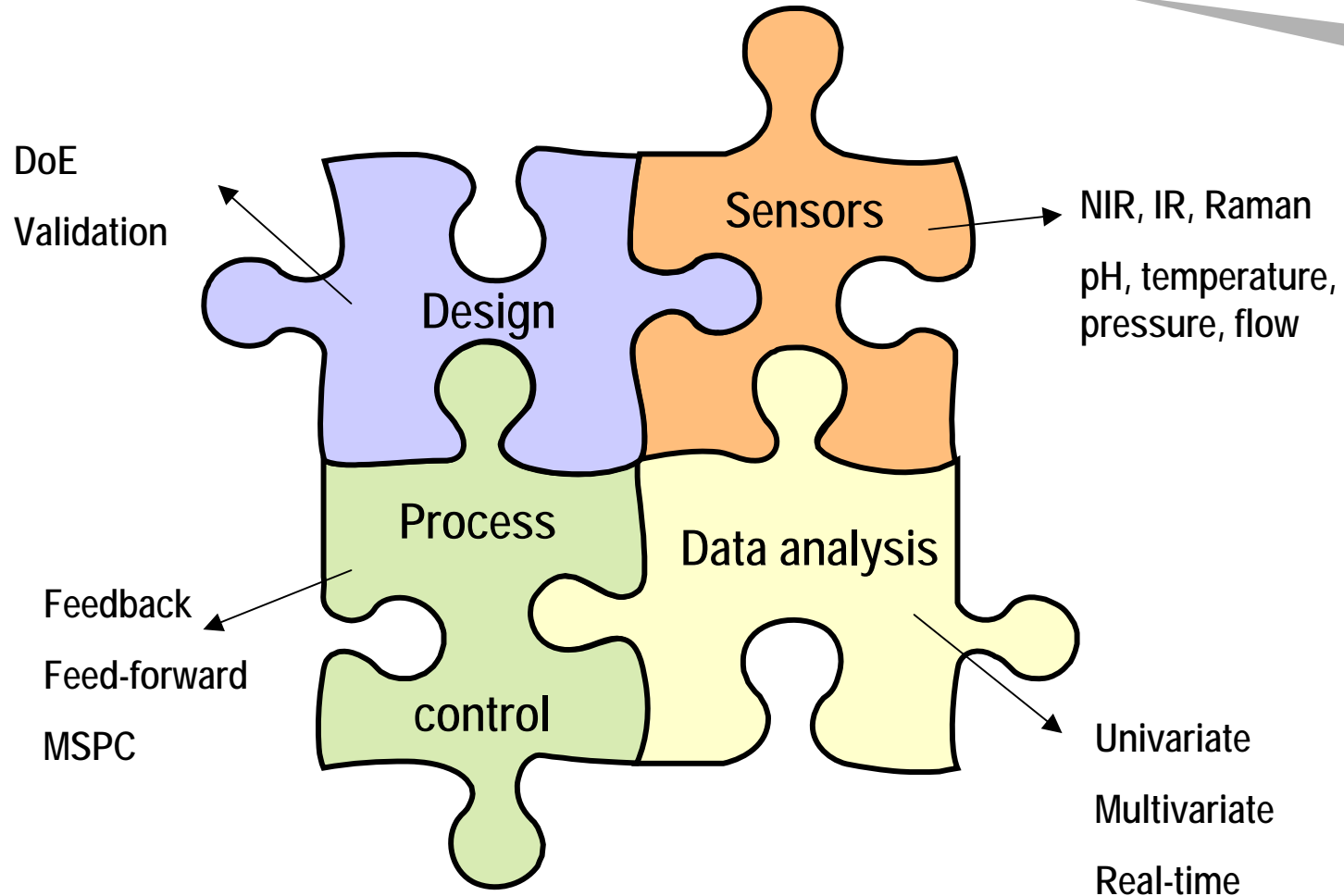
# Outline



1. What is PAT?
2. Arla Foods today
3. Case: An on-line solution
4. Instrument and process optimization
5. Process optimization and it's tools

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# What is Process Analytical Technologies ?



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## Arla Today



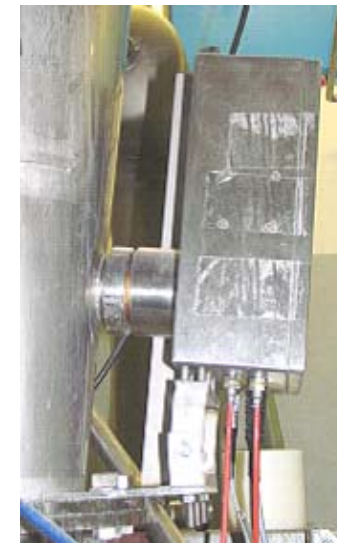
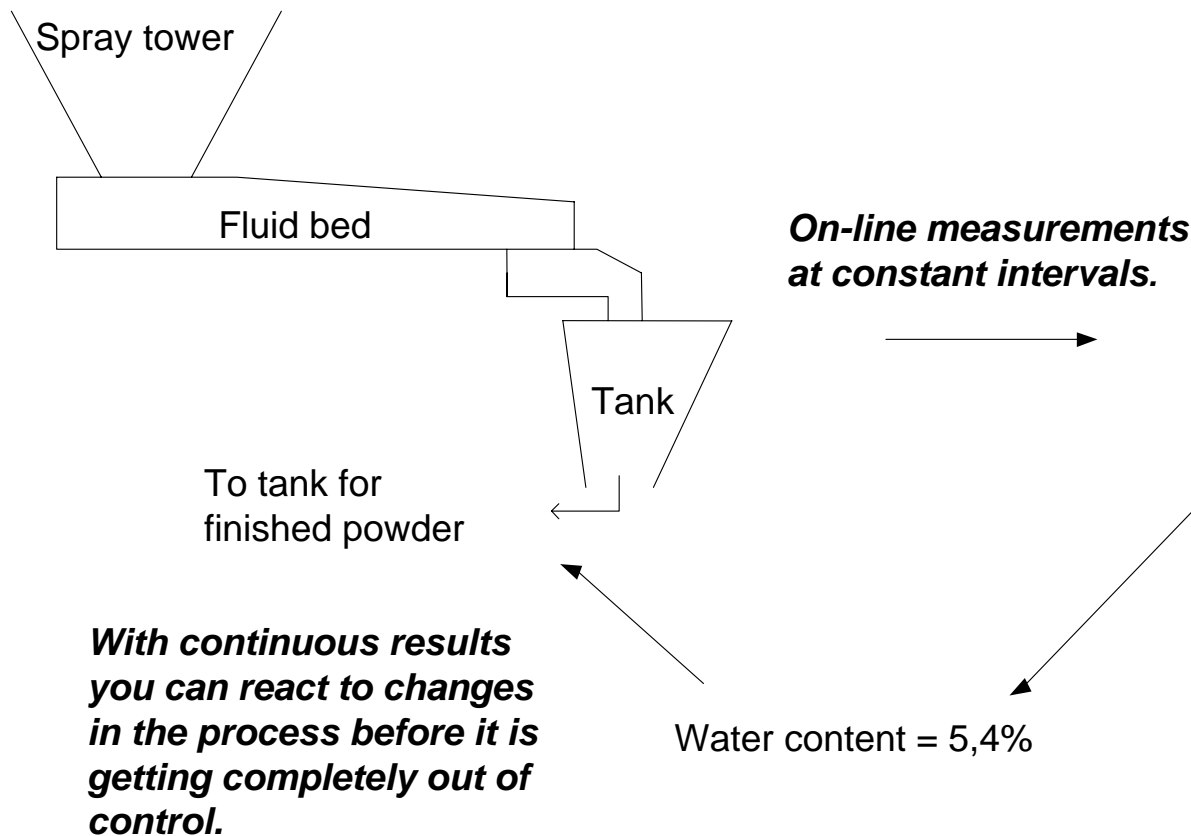
Arla Foods have:

- ▶ on-/at-line applications running
- ▶ a communicated strategy concerning how to implement and employ analytical equipment in the process
- ▶ Support system of NIR/IR
- ▶ SPC employed; especially within Division Production
- ▶ a focus on IT-support

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**Case: An on-line solution**



► Measurements of water content in powder



*Water content determined from a calibration for the given product.*

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**Process and instrument optimization**  
 – QI control chart

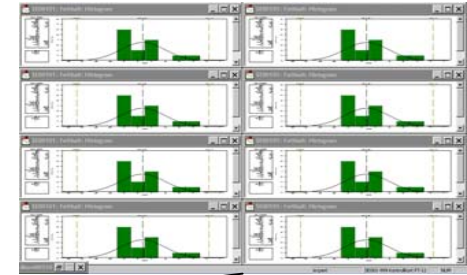
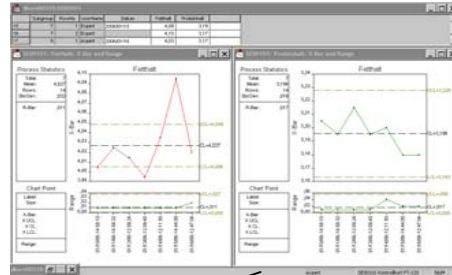


**People responsible for the instruments**

**Lab-Managers/Experts etc.**

**Experts**

**LIMS/SAP**



**Production server with QI database**



Process analysis on-line



Raw mat.analysis at/off-line



Process analysis at/off-line



Raw mat analysis at/off-line



Process analysis at/off-line



Process analysis in-line

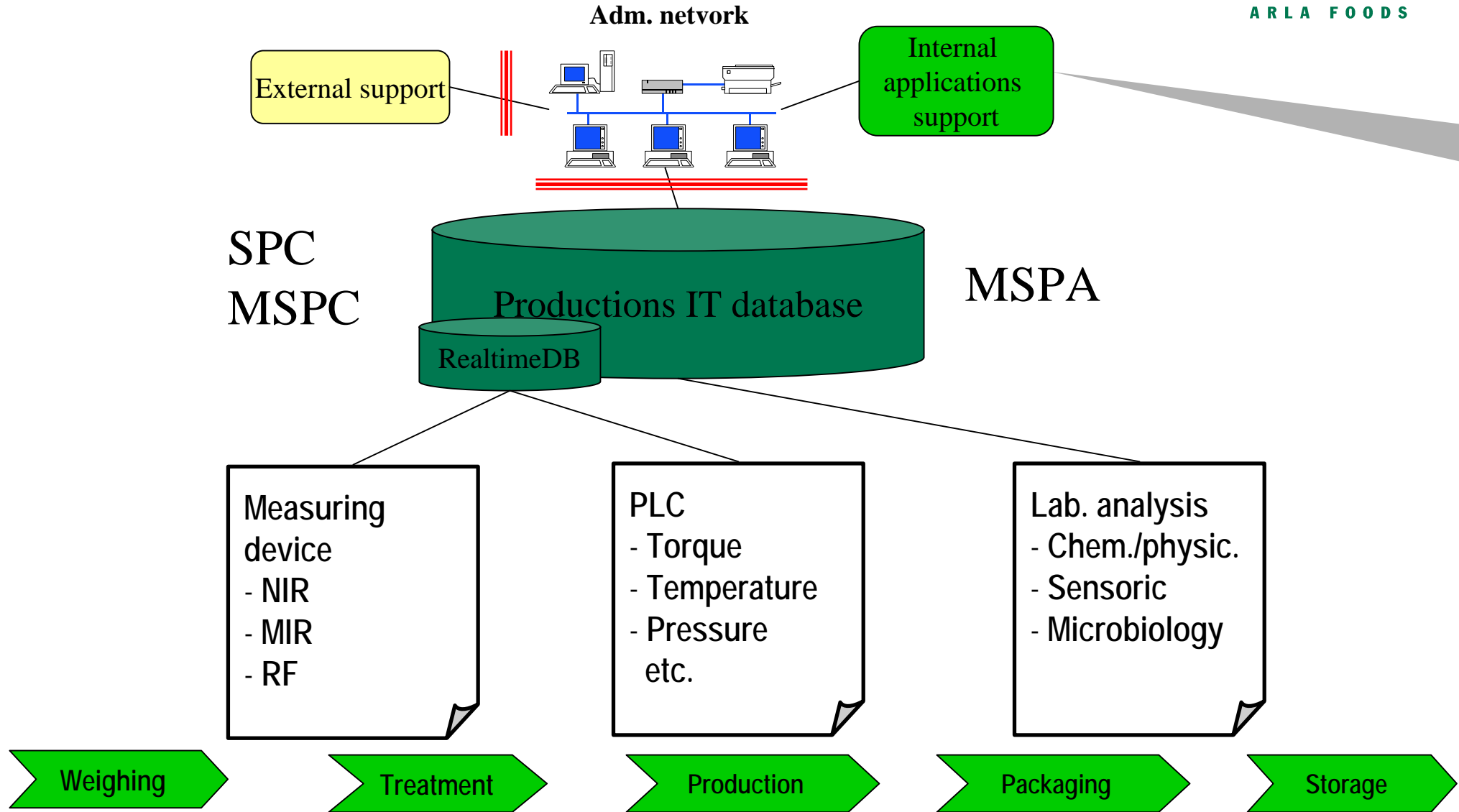
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## Process optimization



- ▶ **First step:**  
Gathering process data, controlling unit operation
- ▶ **Second step:**  
Correlate process data to response values
- ▶ **Third step:**  
Build predictive models
- ▶ **Fourth step:**  
Full process control

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**Automatic system to couple different types of data**





## Advantages of an automated system



- ▶ Both spectrale data and process data are gathered automatically.
- ▶ The solution gives us the possibility to extract specific data on a given product or batch.
- ▶ All data relevant for a given process are saved at one place.

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## Process optimization



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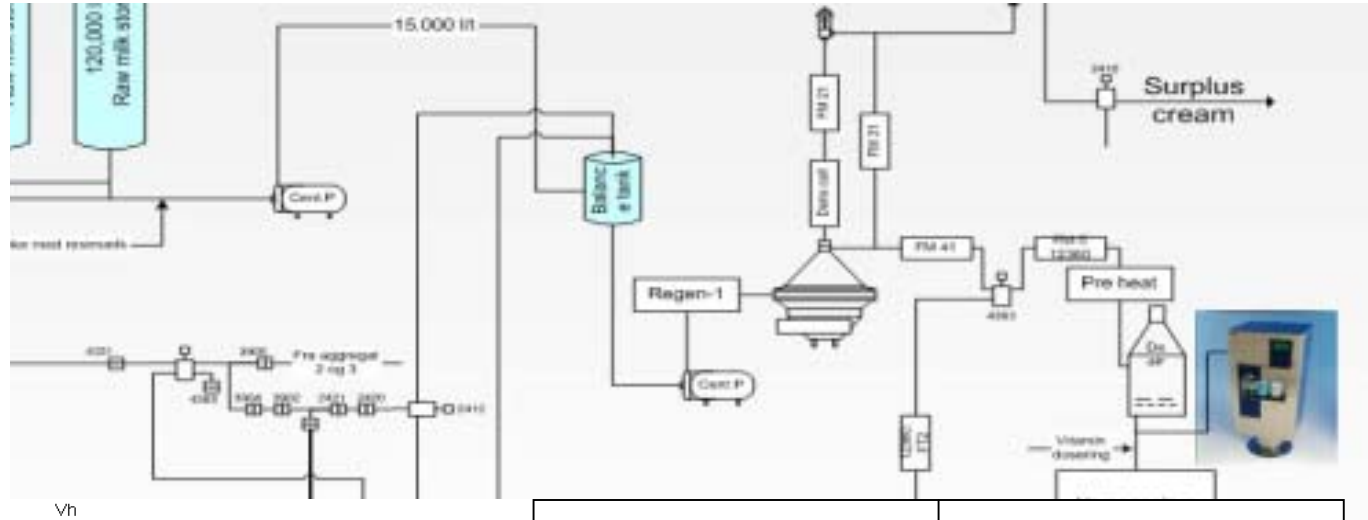
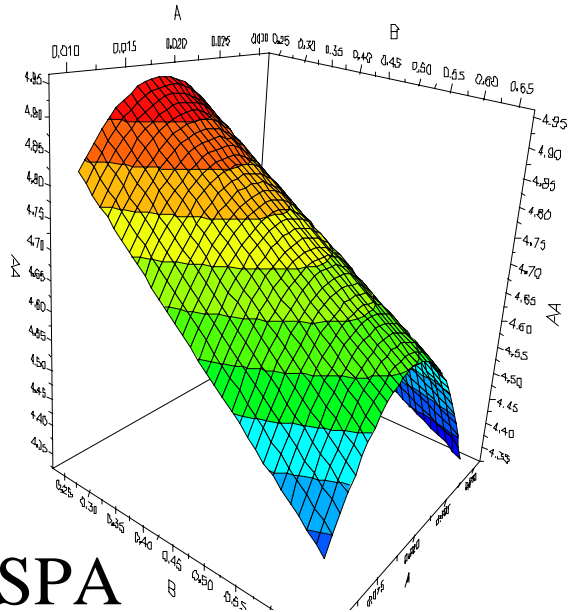
## Different strategies in Arla Foods



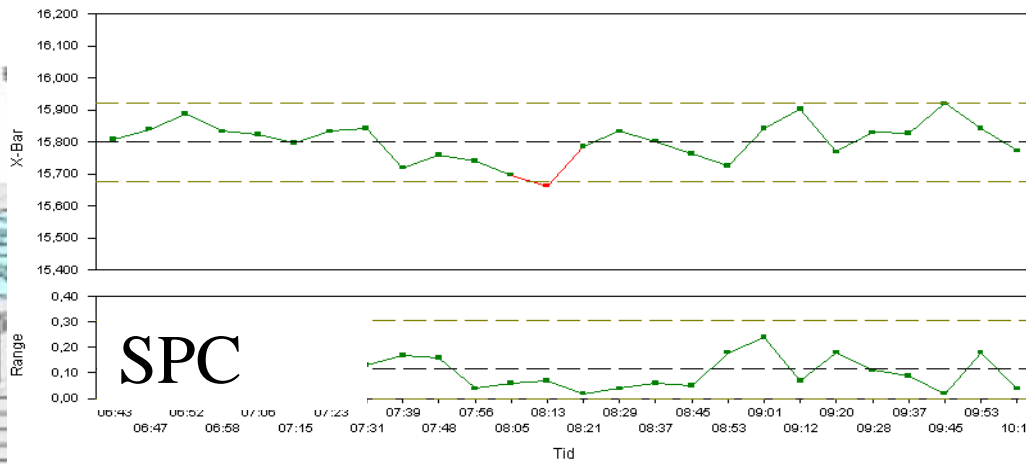
- ▶ Division Production, Butter and Cheese has let the modelling work be proceeded by a strategic analysis.
  - Modelling work is managed by internal people
- ▶ Division Global Ingredients has chosen to work in close cooperation with consultants with skills in modelling.
- ▶ Our FDP Division is by tradition concentrating more on hygienic issues than process optimization.

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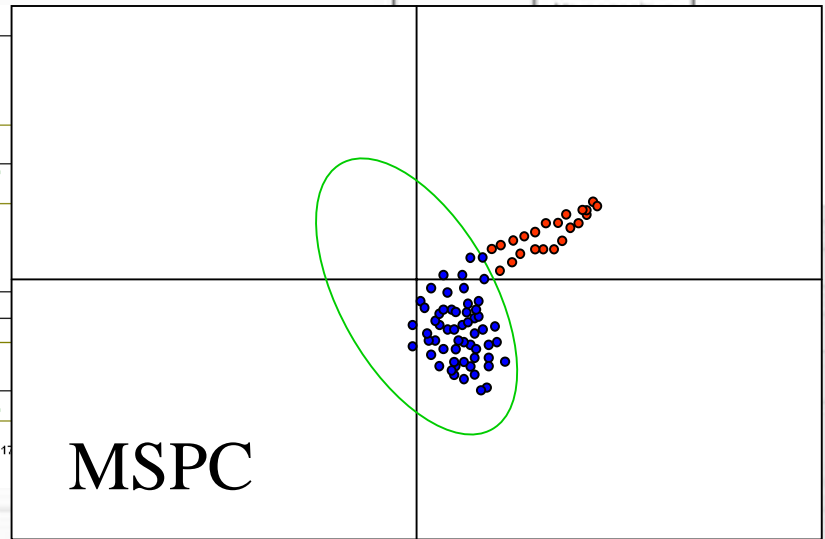
## Examples of employed Tools



MSPA



SPC



MSPC

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The End