

# acrylamide: Where are we today?

concept of minimisation

prospect

success

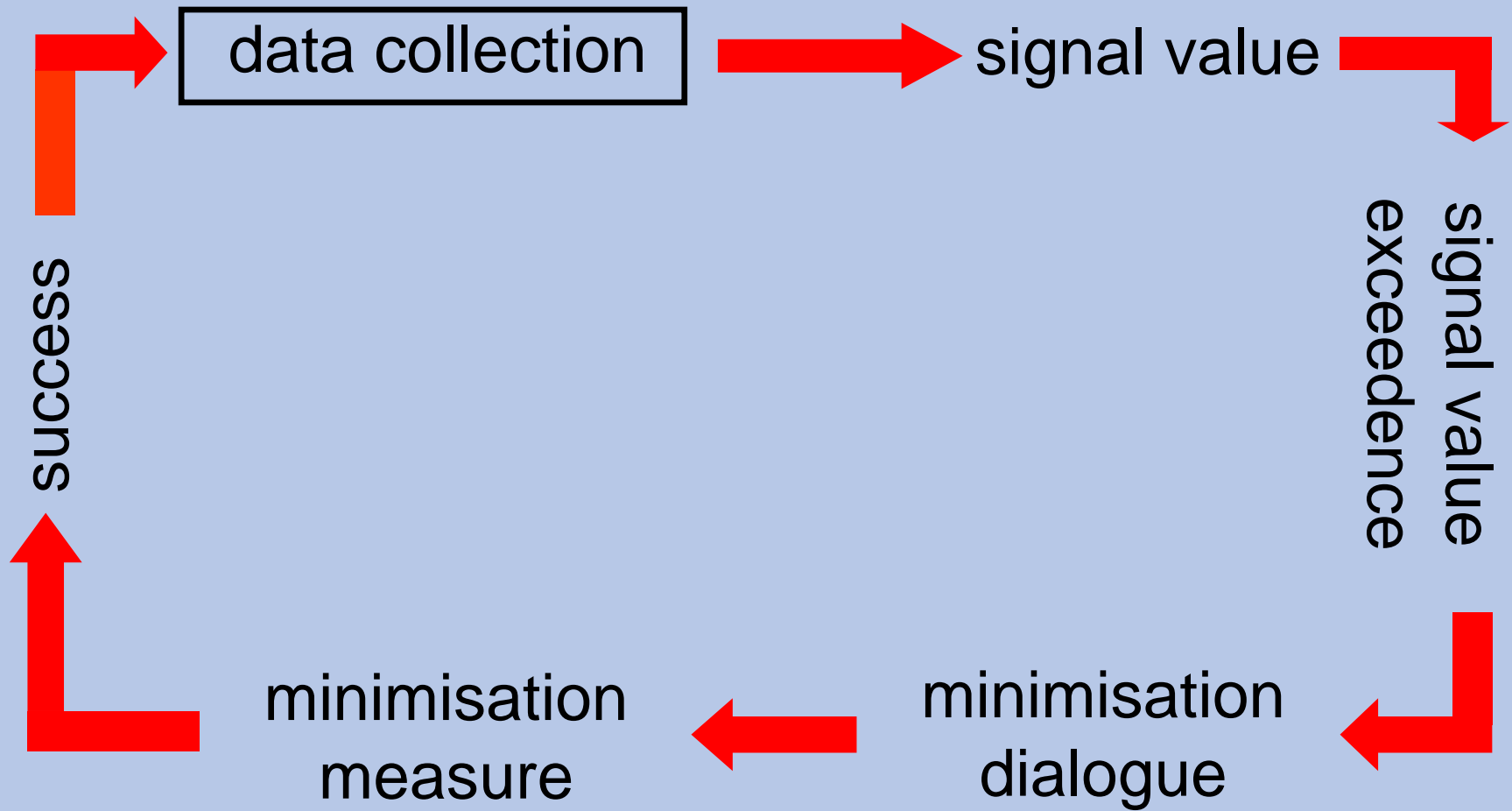
structure

# concept of minimisation: project kickoff

## coordination of the project: august 2002

- Federal Office of Consumer Protection and Food Safety
- Federal Ministry of Consumer Protection, Food and Agriculture
- Federal States authorities
- NGO's (producers)

# concept of minimisation: workflow



# data collection

- source
  - official food monitoring
- content of files
  - product labeling, producer, place of production, batch number, best before date, acrylamide content, laboratory test method, source of data
- number of files (score: week 1, 2004)
  - 5400

# data collection

allocation of results to different food groups

## ***Crispbread***

## ***Breakfast cereals***

## ***Fine bakery wares***

- shortcrust pastries
- children's biscuits
- thin almond biscuits
- gingerbread
- diabetics' cakes

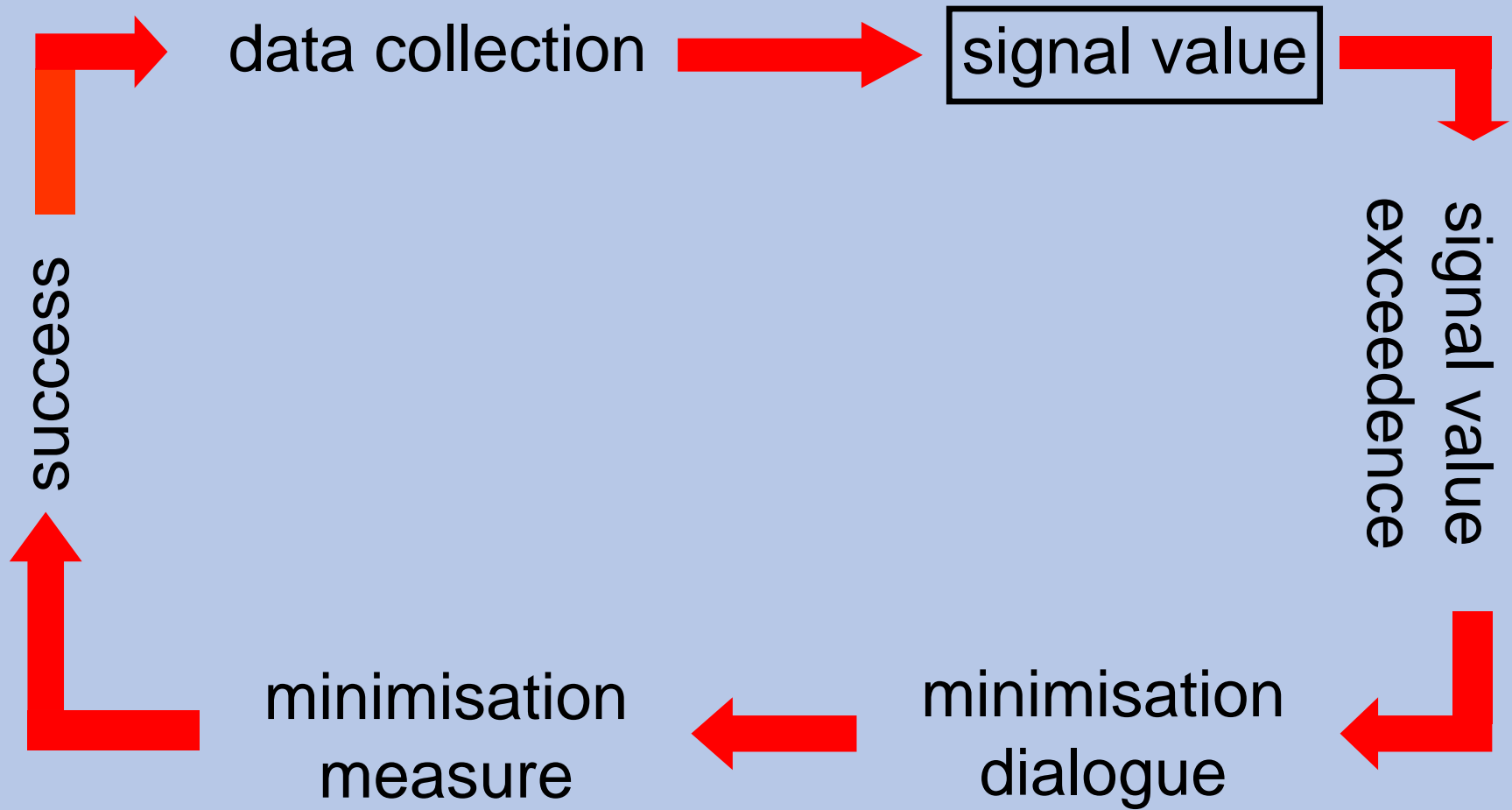
## ***Potato products***

- French fries, prepared
- potato crisps
- potato fritter, prepared

## ***Coffee***

- coffee, roasted
- coffee extract
- coffee substitute

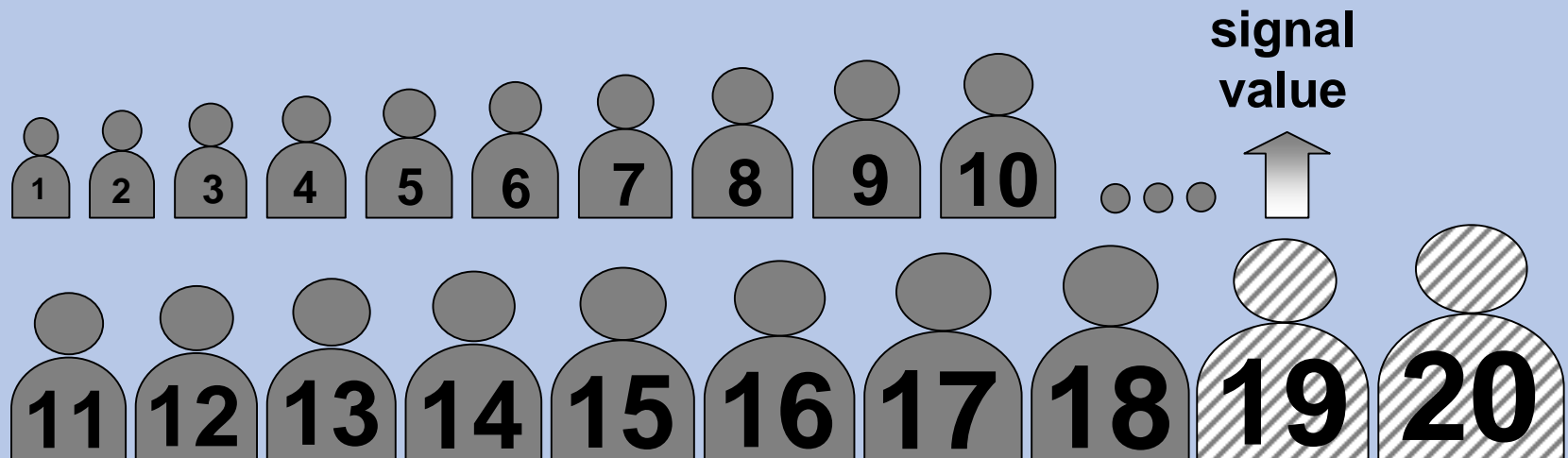
# concept of minimisation: workflow



# signal value

definition of the signal value:

- lowest level of the 10 % containing the highest level of acrylamide



# signal value

- demands:
  - max. 1000 µg/kg
  - no increase of a once established signal value
- rule for orientation
- indicator for success
- lowering only by wide implementation of minimisation measures

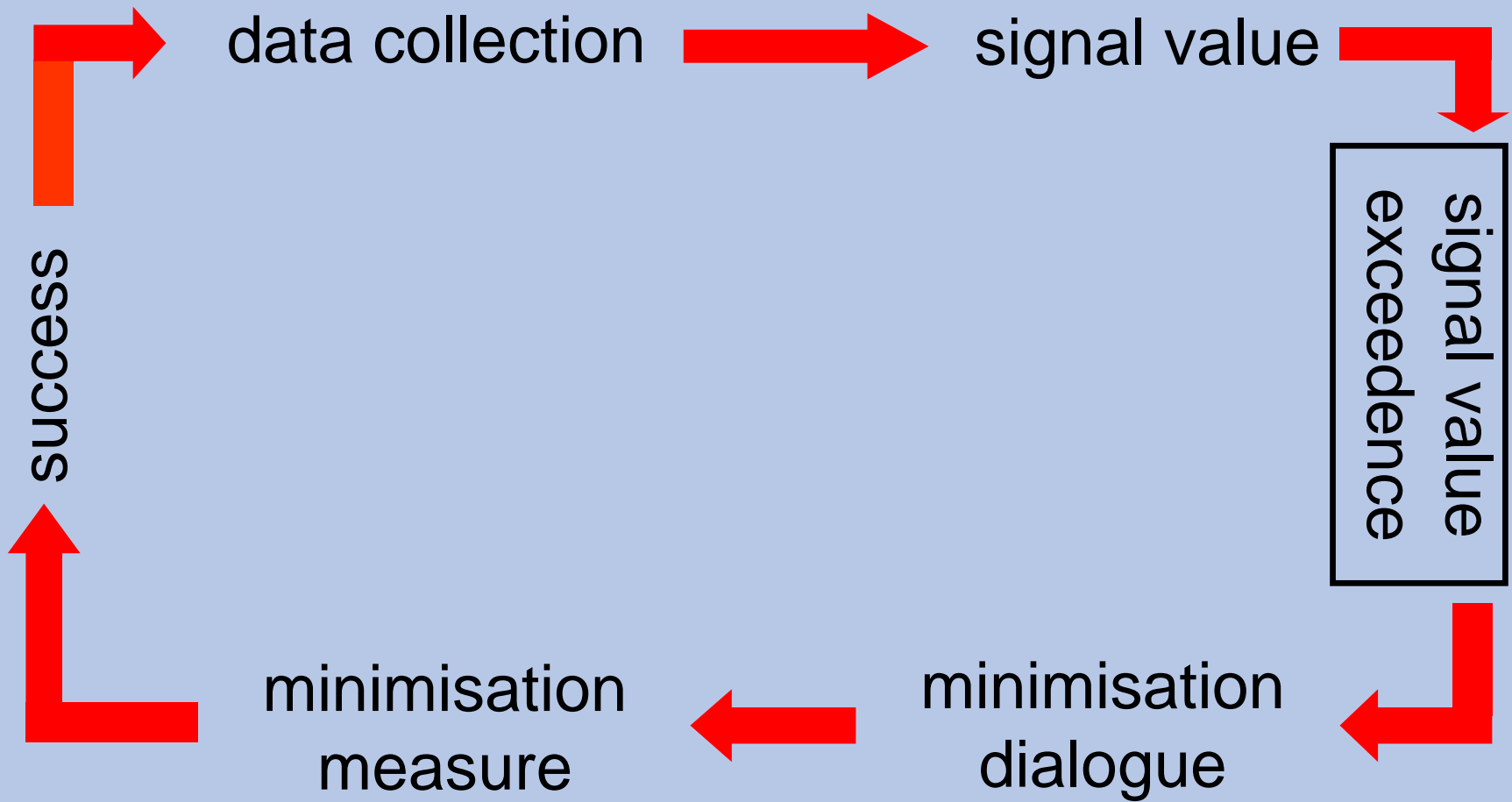


# signal values: overview

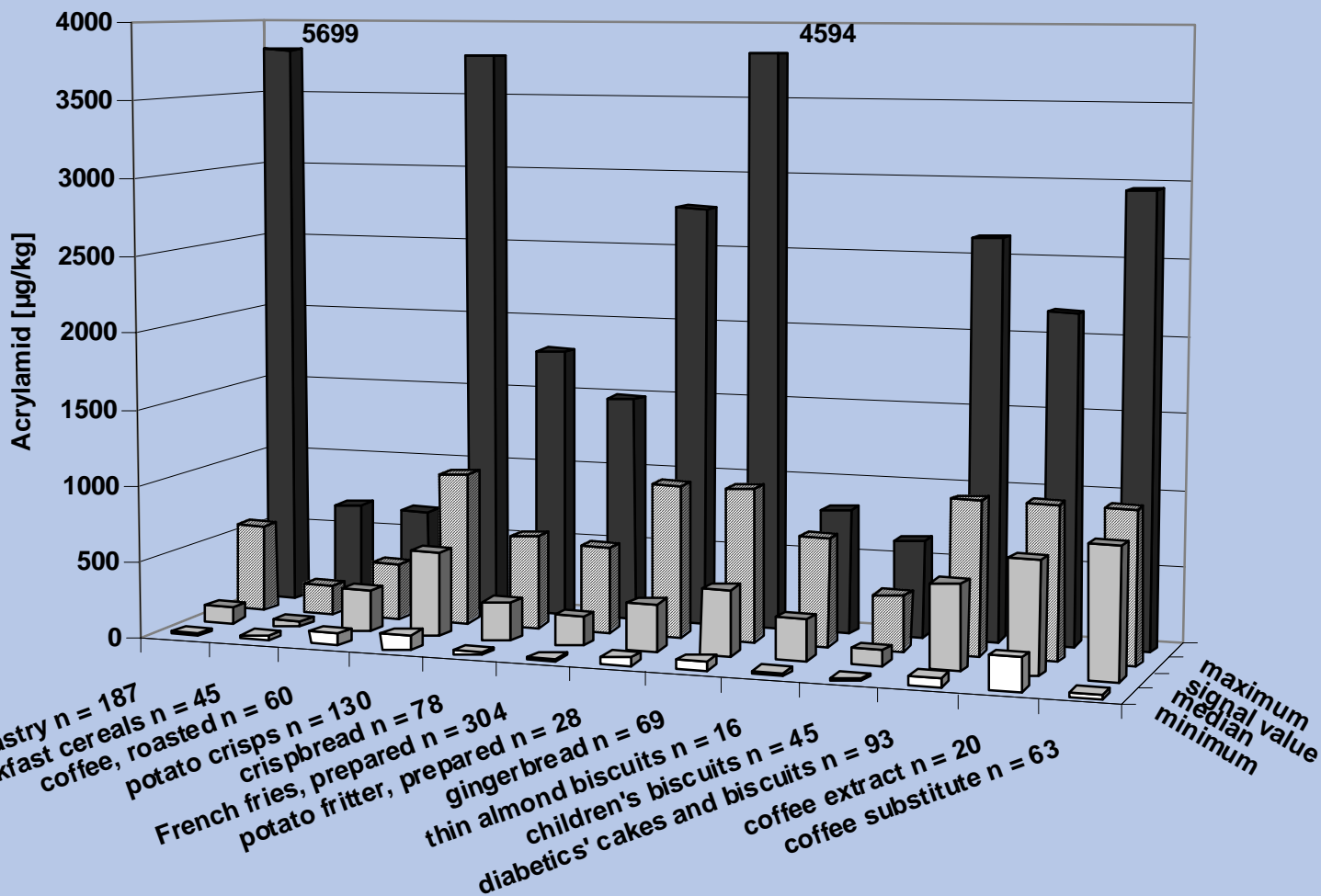
<b>food group</b>	<b>signal values, 17.09.2002</b> acrylamide (µg/kg)	<b>signal values, 31.01.2003</b> acrylamide (µg/kg)	<b>signal values, 26.11.2003</b> acrylamide (µg/kg)
fine bakery ware of short pastry	800	660	575
breakfast cereals	260	260	200
coffee, roasted	370	370	370
potato crisps	1000	1000	1000
crispbread	610	610	610
French fries, prepared	770	570	570
potato fritter, prepared	1000	1000	1000
gingerbread and bakery ware containing gingerbread	1000	1000	1000
thin almond biscuits	1000	710	710
children's biscuits	n. c.*	n. c.*	360
diabetics' cakes and biscuits	n. c.*	n. c.*	1000
coffee extract	n. c.*	n. c.*	1000
coffee substitute	n. c.*	n. c.*	1000

\* not calculated

# concept of minimisation: workflow

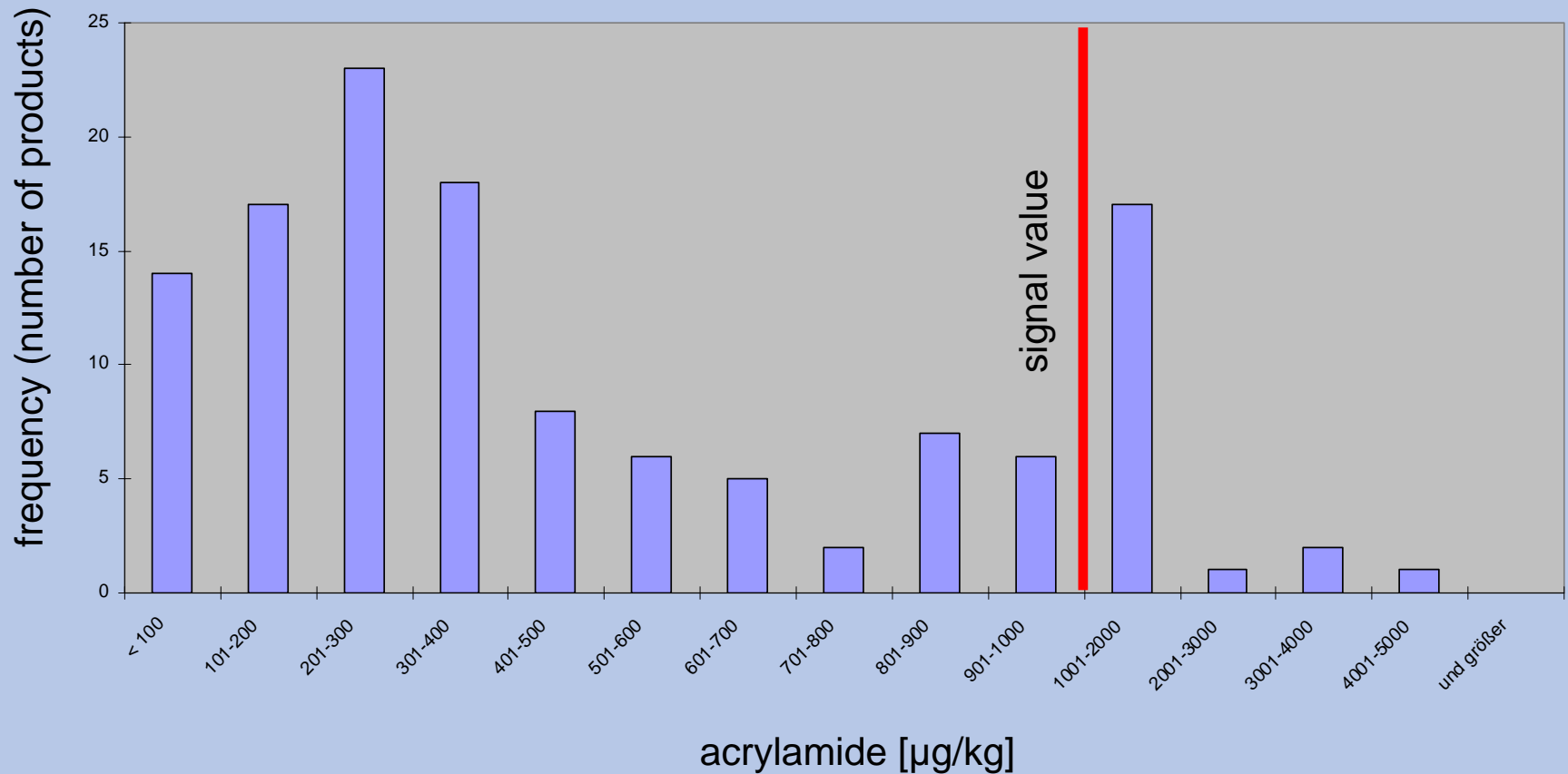


# signal value exceedence (26.11.2003)

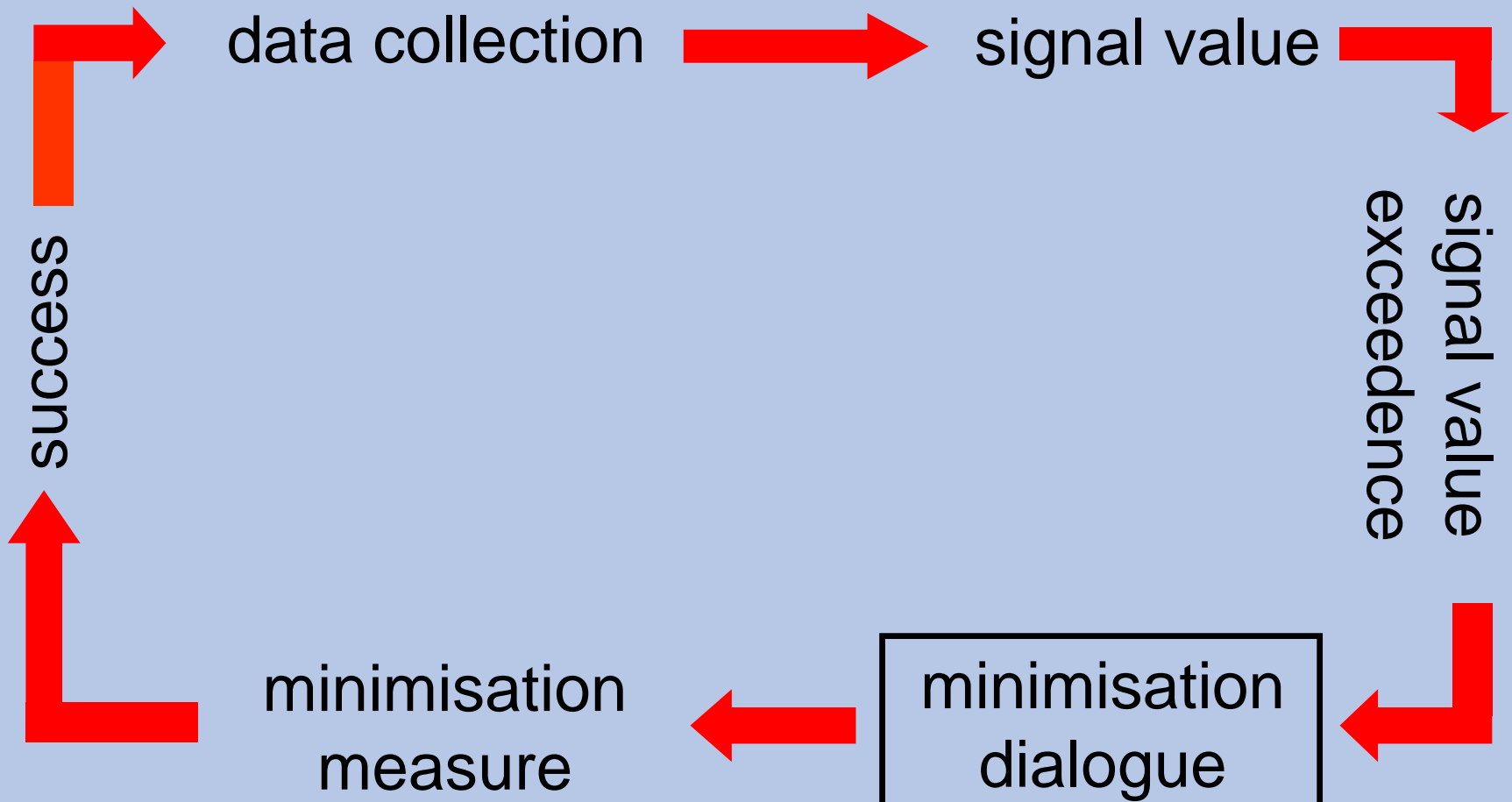


# signal value exceedence and frequency distribution (n = 127; 26.11.2003)

gingerbread and bakery ware containing gingerbread



# concept of minimisation: workflow



# minimisation dialogue

notification of exceedence of signal value  
by weekly overviews to the  
Federal states authorities

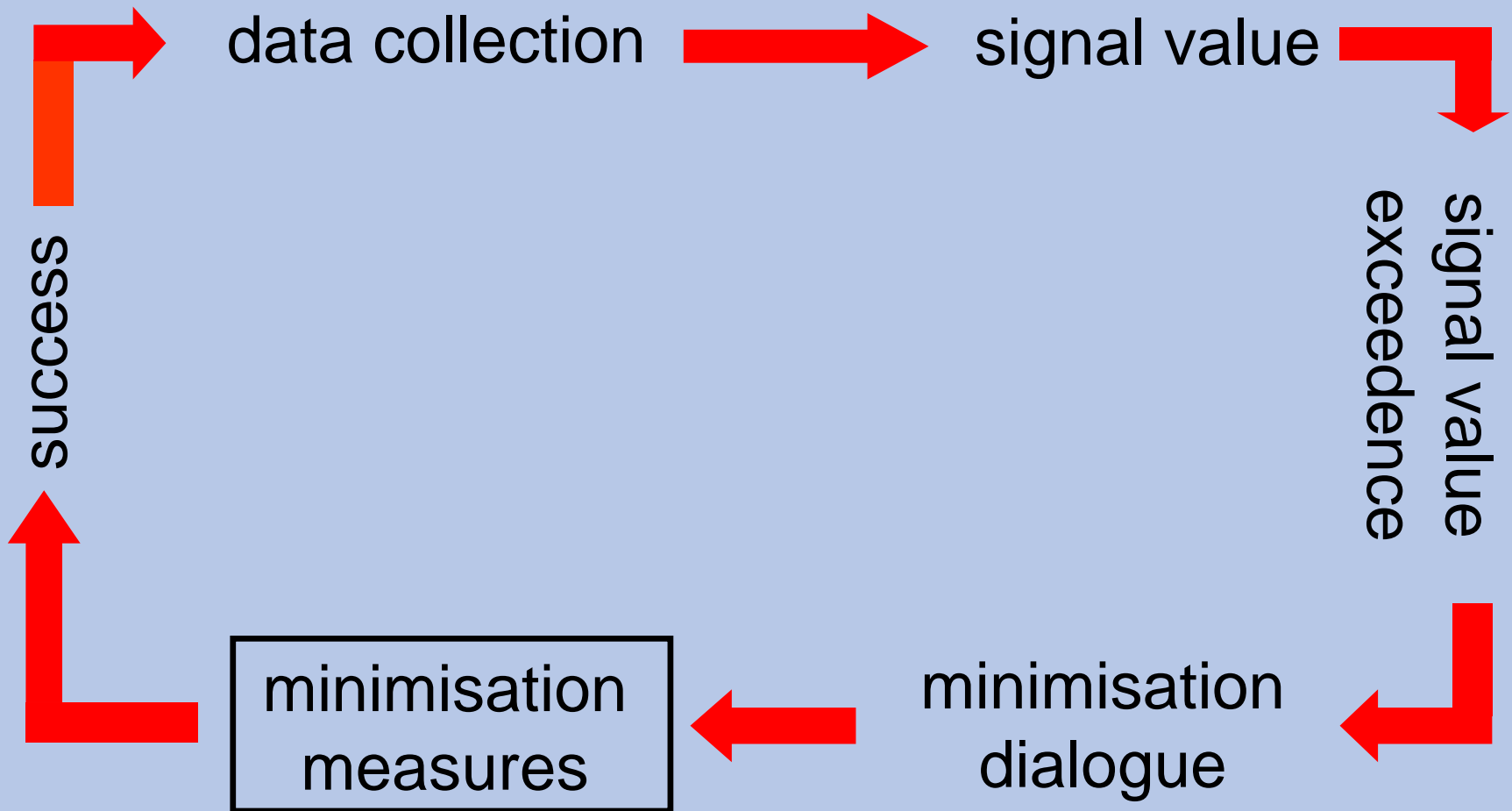


competent authorities start the minimisation  
dialogue with the companies



identification of the „adjusting screws“

# concept of minimisation: workflow



# minimisation measures

## potato crisps

- changes in the choice of raw material
  - type of potato, production area, crop type, storage with influence on the level of reducing sugars and asparagine
- reduction of Maillard-browning
  - temperature-time profile
- increase of residual moisture
- elimination of crisps with „hot spots“



# minimisation measures

## French fries

- precept: „golden yellow, not carbonised“
- maximum frying temperature: 175 °C
- soaking of raw potatoes before processing
- reduction of sugar added to chipped potatoes
- reduction of surface/volume ratio
- potential adjusting screw
  - choice of raw material


# minimisation measures

## crispbread

- adjustment of temperature-time profil
- increase of residual moisture
- no use of rework
- potential adjusting screws
  - reduction of use of higher extraction flours
  - „warm“ breadmaking process
    - yeast with asparaginase-activity

# minimisation measures

## shortcrust pastries, gingerbread

- reduction of Maillard-browning
- using of sugar alcohols instead of reducing sugars
  - fructose  maltitol
- reduction of use of higher extraction flours
- reduction/elimination of use of ammonium carbonate - sodium hydrogen carbonate as a replacement

# minimisation measures

## shortcrust pastries, gingerbread

- changes in the choice of certain ingredients
  - high acrylamide content:  
whole cane sugar, roasted almonds, toasted onions, industrial honey
  - high acrylamide forming potential:  
Jerusalem artichoke
- no use of rework

# minimisation measures

## breakfast cereals

- changes in the choice of certain ingredients
  - high acrylamide content: whole cane sugar

## coffee

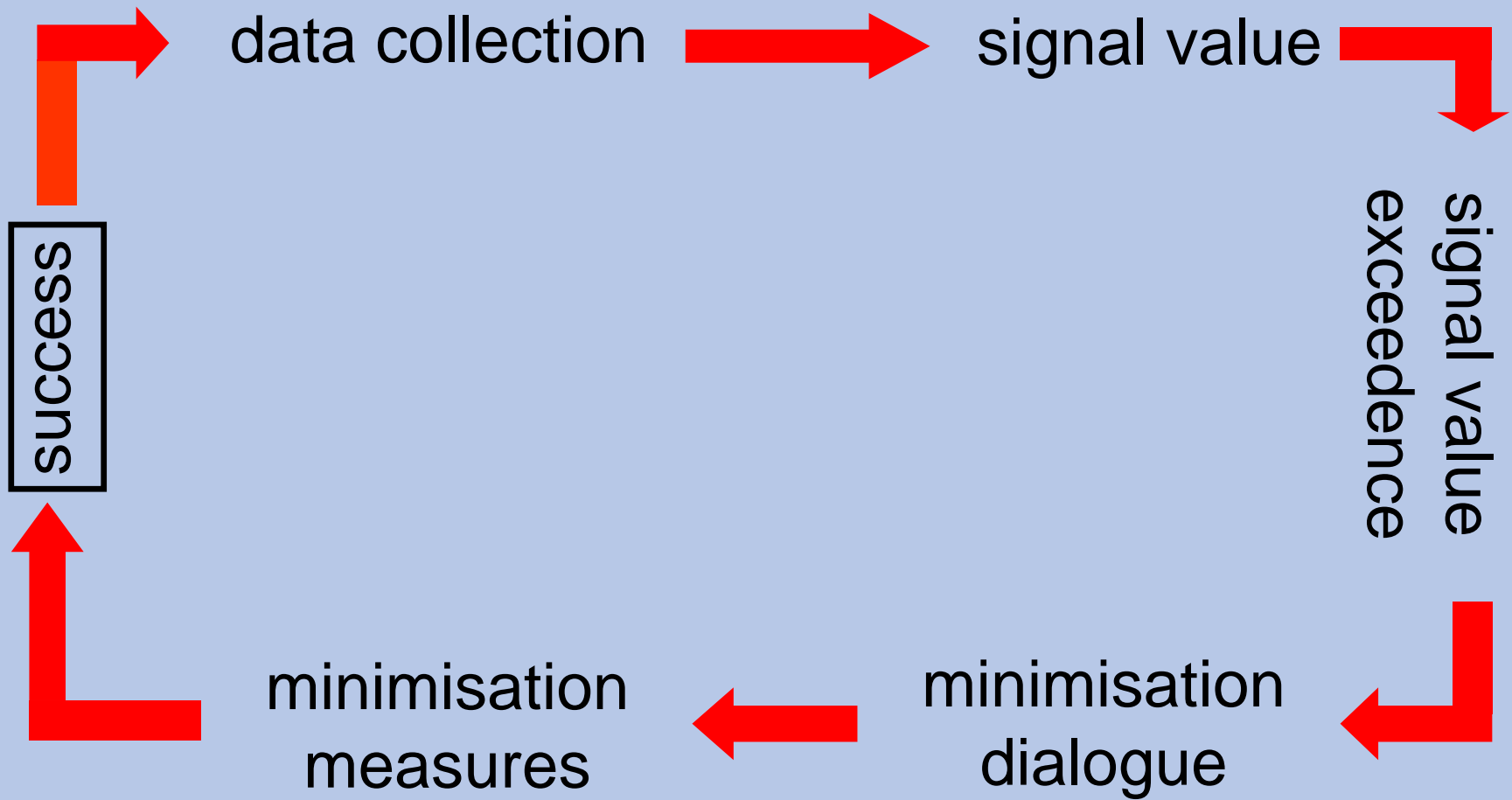
- check of the roasting time
  - determination of the end point of processing
- potential adjusting screw
  - convection roasting

# minimisation measures

## substitute coffee

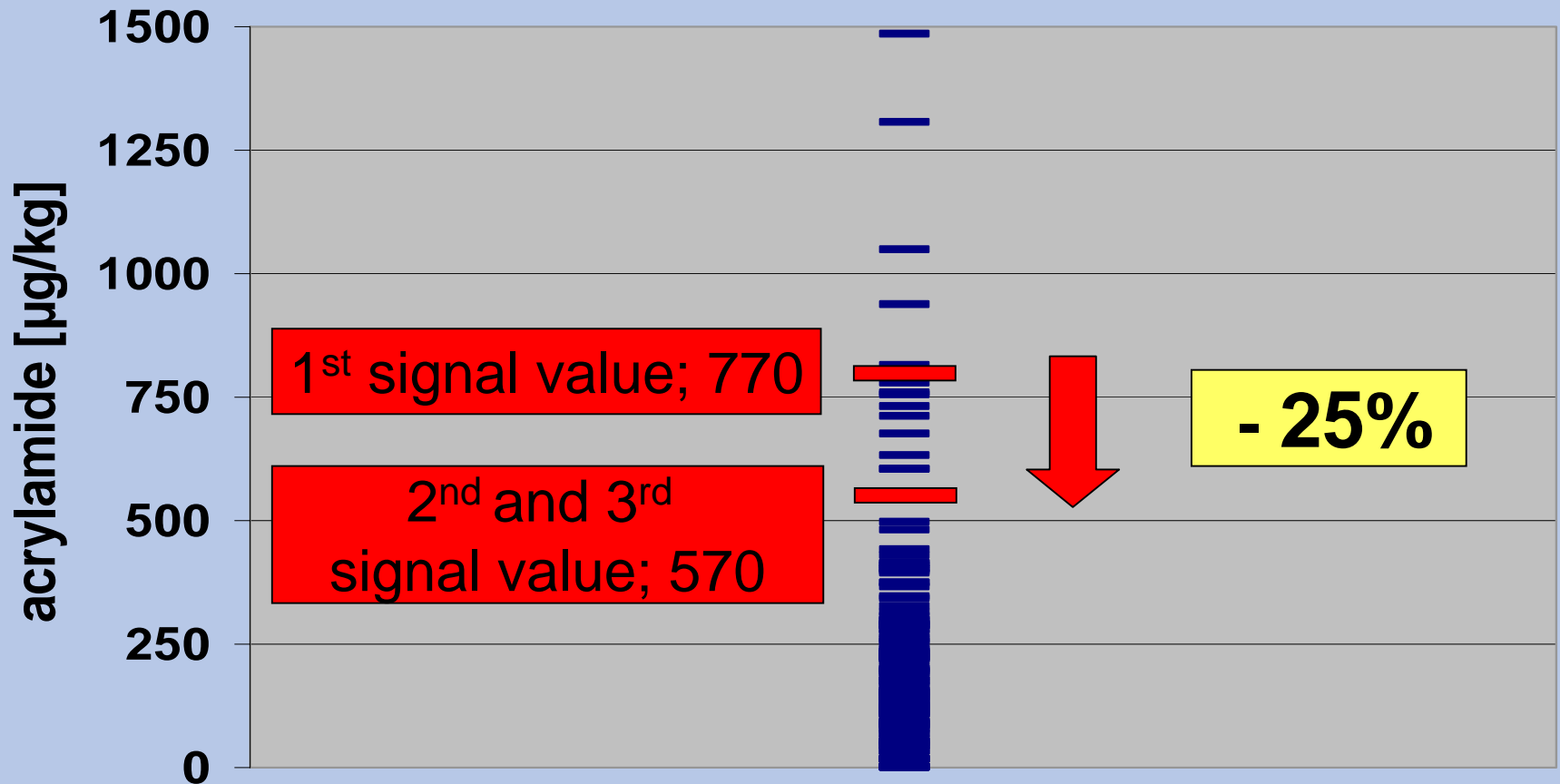
- changes in the choice of raw material
  - high acrylamide content:  
chicory, especially chicory undergoing torrefaction
- check of the roasting time
  - determination of the end point of processing

# concept of minimisation: workflow



# success: signal value lowering

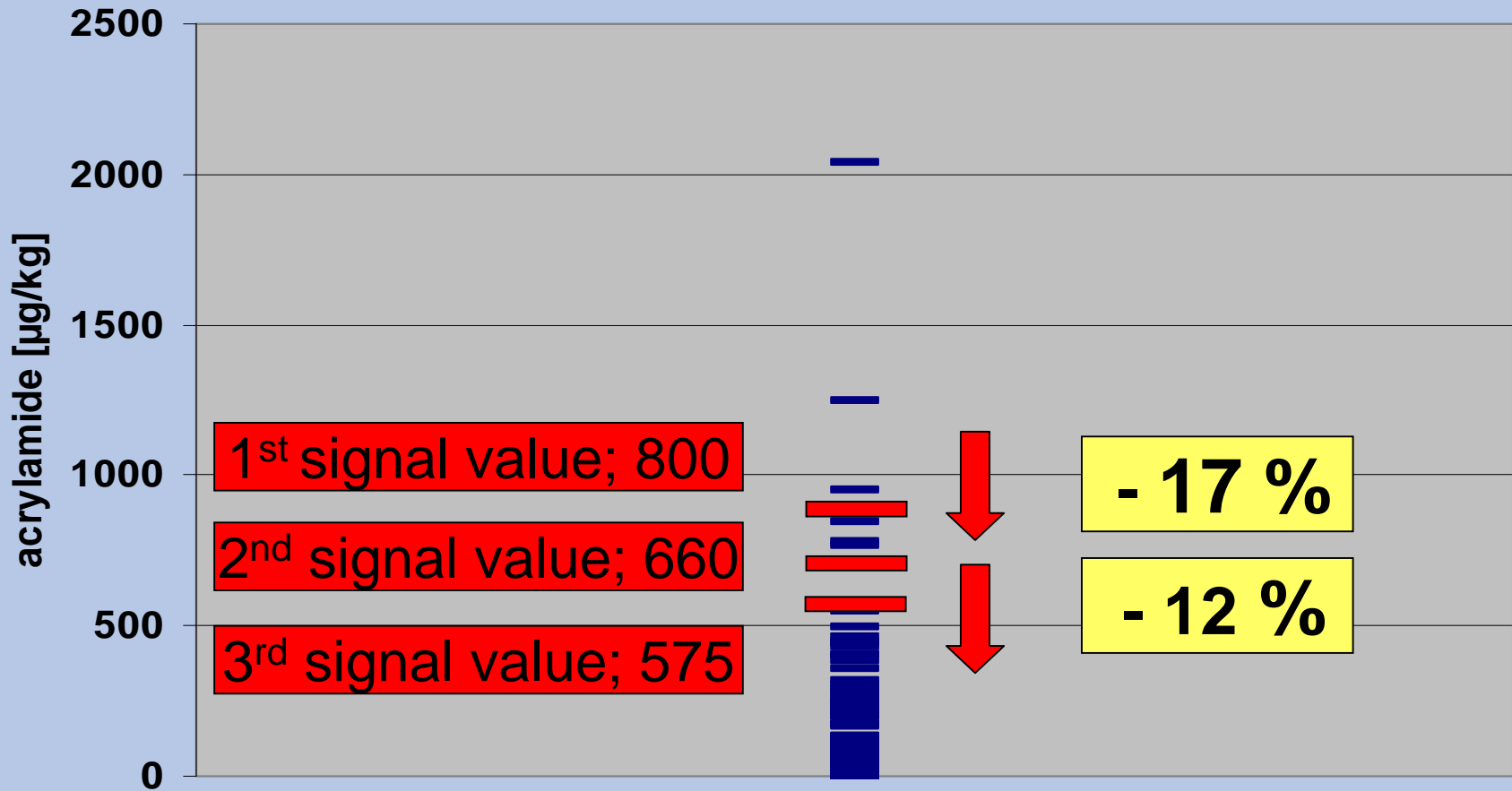
example: French fries, prepared





# success: signal value lowering

example: shortcrust pastries



# success: signal value lowering

example: gingerbread

- old production (2002/2003)
  - 43 % lower than 300 µg/kg acrylamide
  - signal value: 1000 µg/kg
- new production (2003/2004)
  - 63 % lower than 300 µg/kg acrylamide
  - signal value, if calculated: 800 µg/kg

# concept of minimisation: prospect

- continuation of the concept of minimisation with an adjustment of the coordination
  - direct tracing of the minimisation measure success
  - increasing number of products to be analyzed
- basic principle:  
a minimisation is possible!