Influence of a liquid application in the main mixer on mixture homogeneity of feeding stuffs

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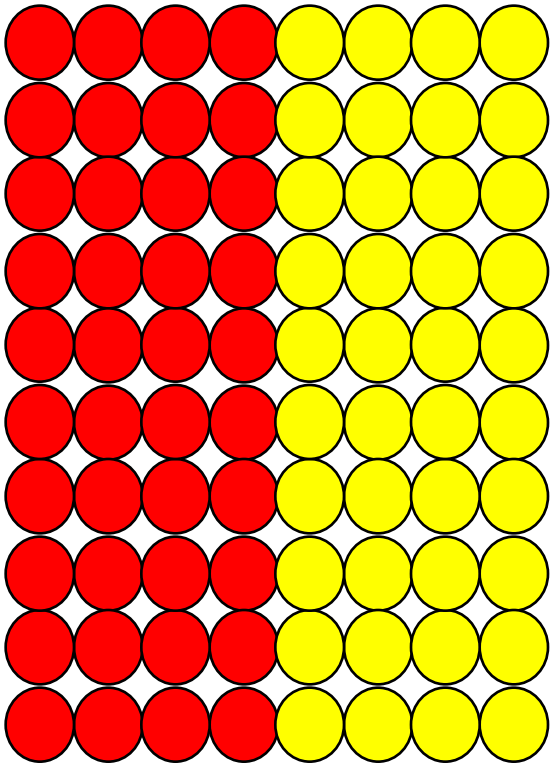
Liquid addition to feeding stuff powders as an aspect of feed quality and safety

Liquids are added to feeding stuffs to

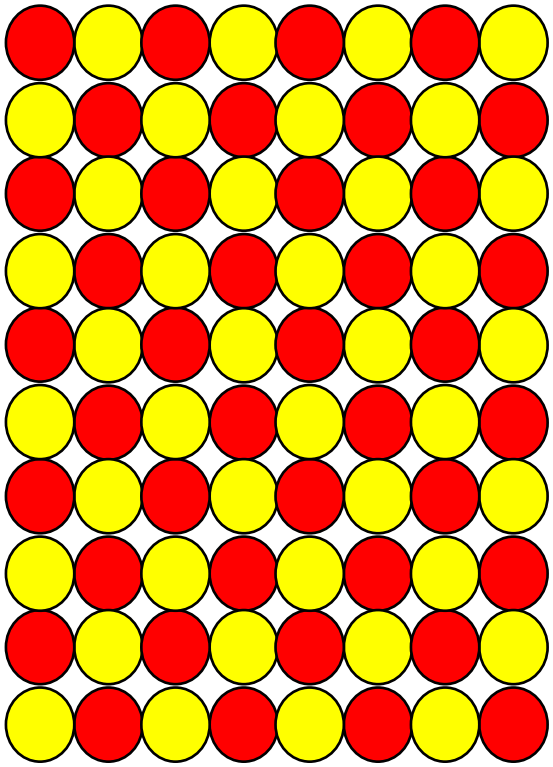
- decrease dusting behaviour
- increase taste and nutritional value
- avoid segregation

What is segregation?

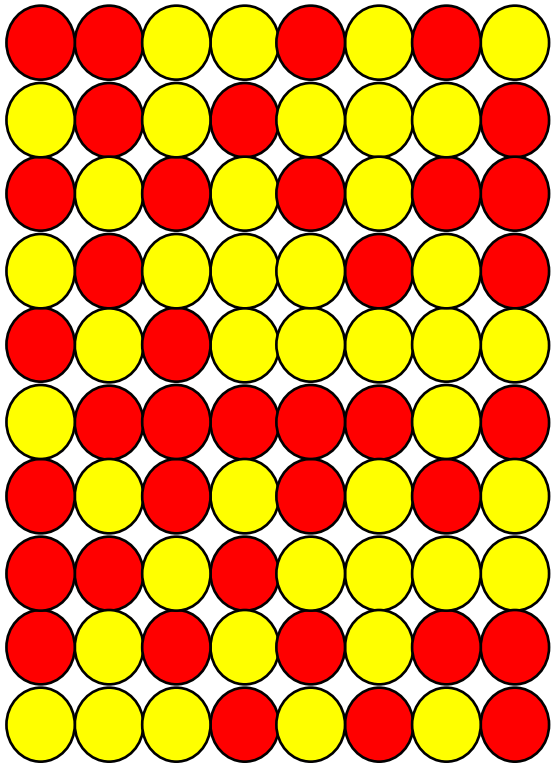
complete decomposition



ideal mixing-homogeneity

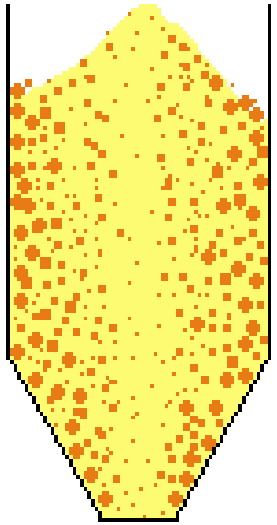


homogeneous coincidence mixture



What is segregation?

Segregation is caused and influenced by differences in

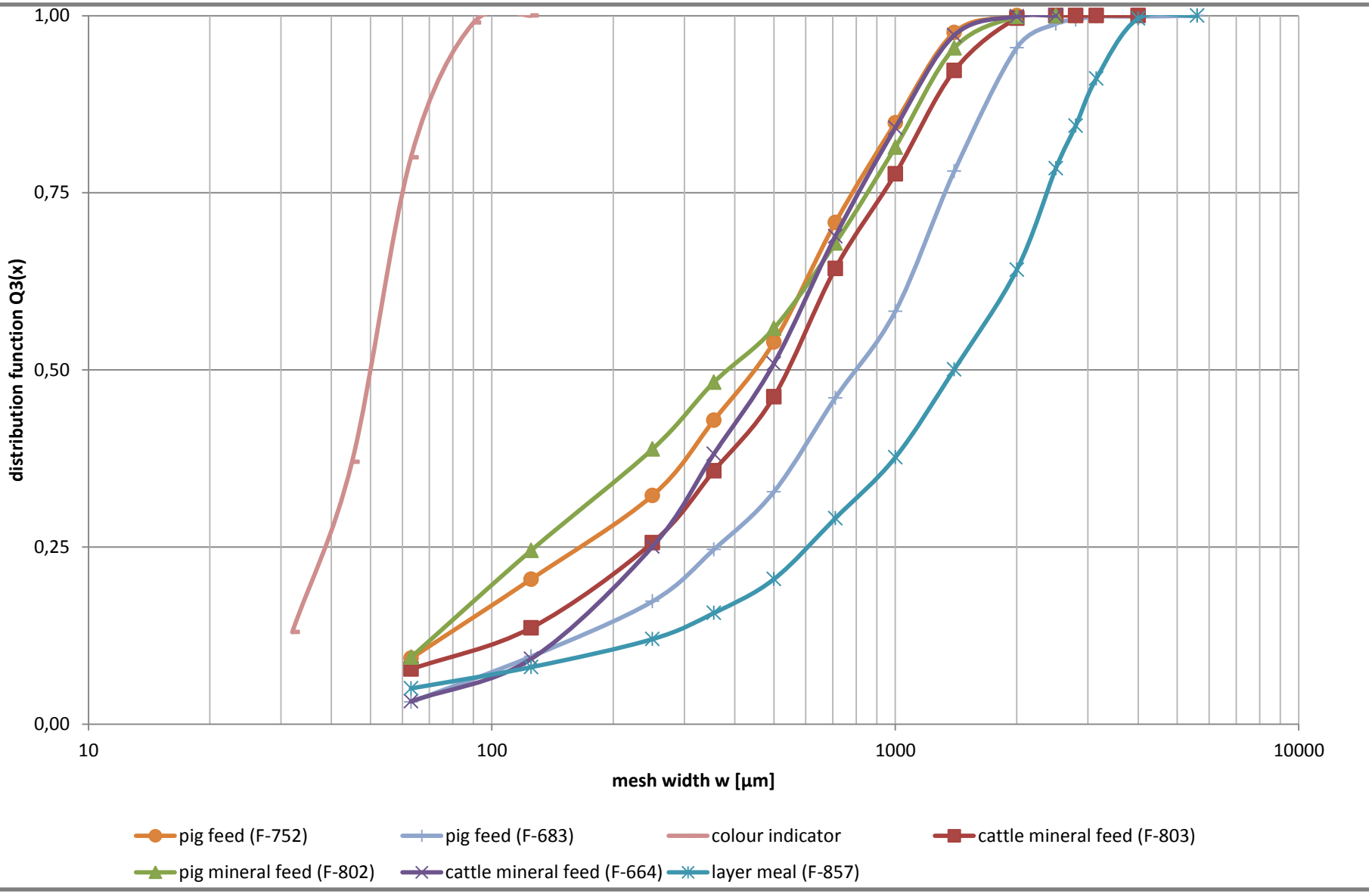


- particle size
- particle density
- particle shape
- surface roughness

Main actuating variable is the particle size distribution

Typical mechanisms are agglomeration, percolation or segregation in a fluid flow

Particle size distribution



Liquid application in tne main mixer- Problems

Experimental study

An experimental study was carried out to mark up

technological parameters and material properties for optimized discontinuous liquid application in the main mixer regarding feed quality

- mixture homogeneity
- avoidance of segregation and
- dusting behaviour

and to minimise cross-contamination – caused by unbound fines on the one and caking on the other hand

The project is funded by the German Ministry of Economics via AiF (AiF-Code 16016 N, 2009-2011)

Selected results linked to the avoindace of segregation as an aspect of feed quality and safety

EVALUATION OF MIXTURE STABILITY / SEGREGATION

Selected questions to be answered

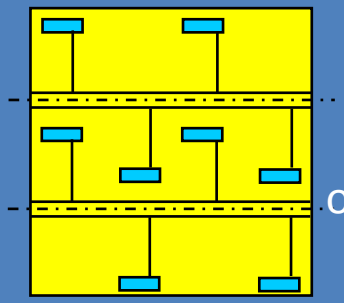
Is there a significant influence of liquid´s characteristics on the avoidance of segregation?

Which proportion of different liquids should be added to the feed mixture for avoidance of segregation?

How long will a stabilizing effect last?

Experiment

Mixing



double-shaft-paddle mixer

one-component nozzle

mineral concentrates

compound feed

part. colourant

molasses & vegetable oil

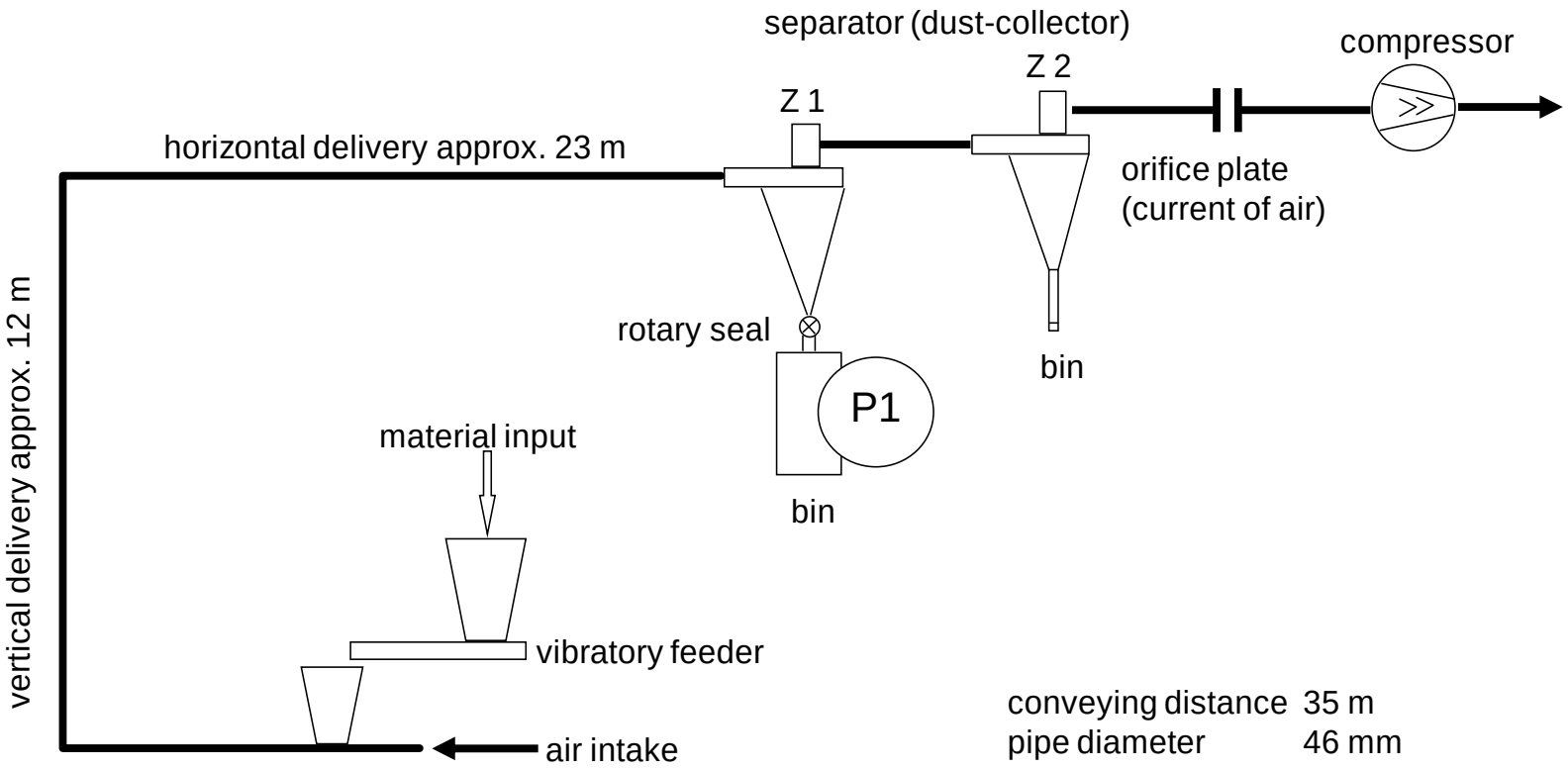
1-3 %

Storing

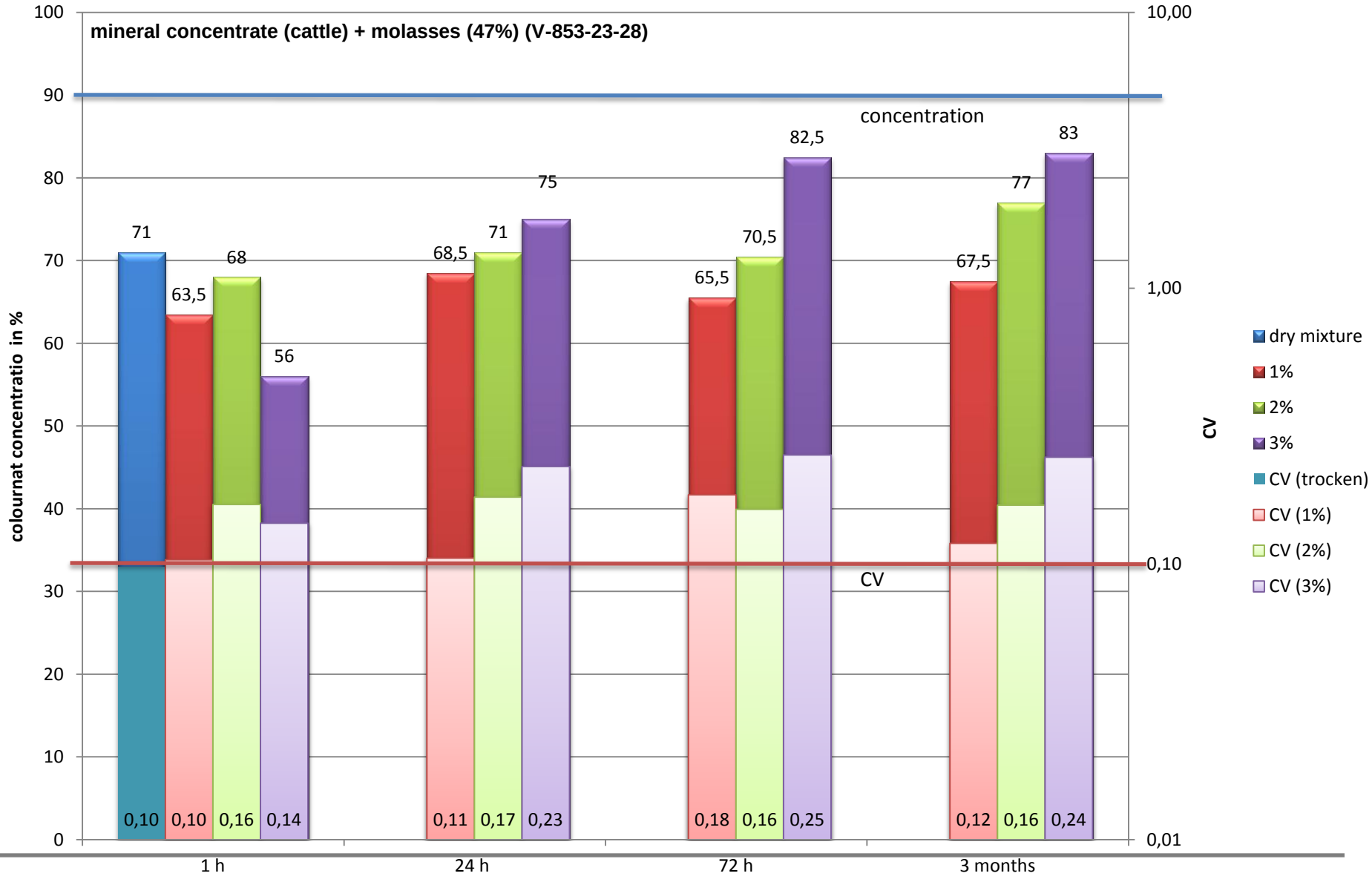
1 h – 24 h – 72 h – 3 months

Experiment (2)

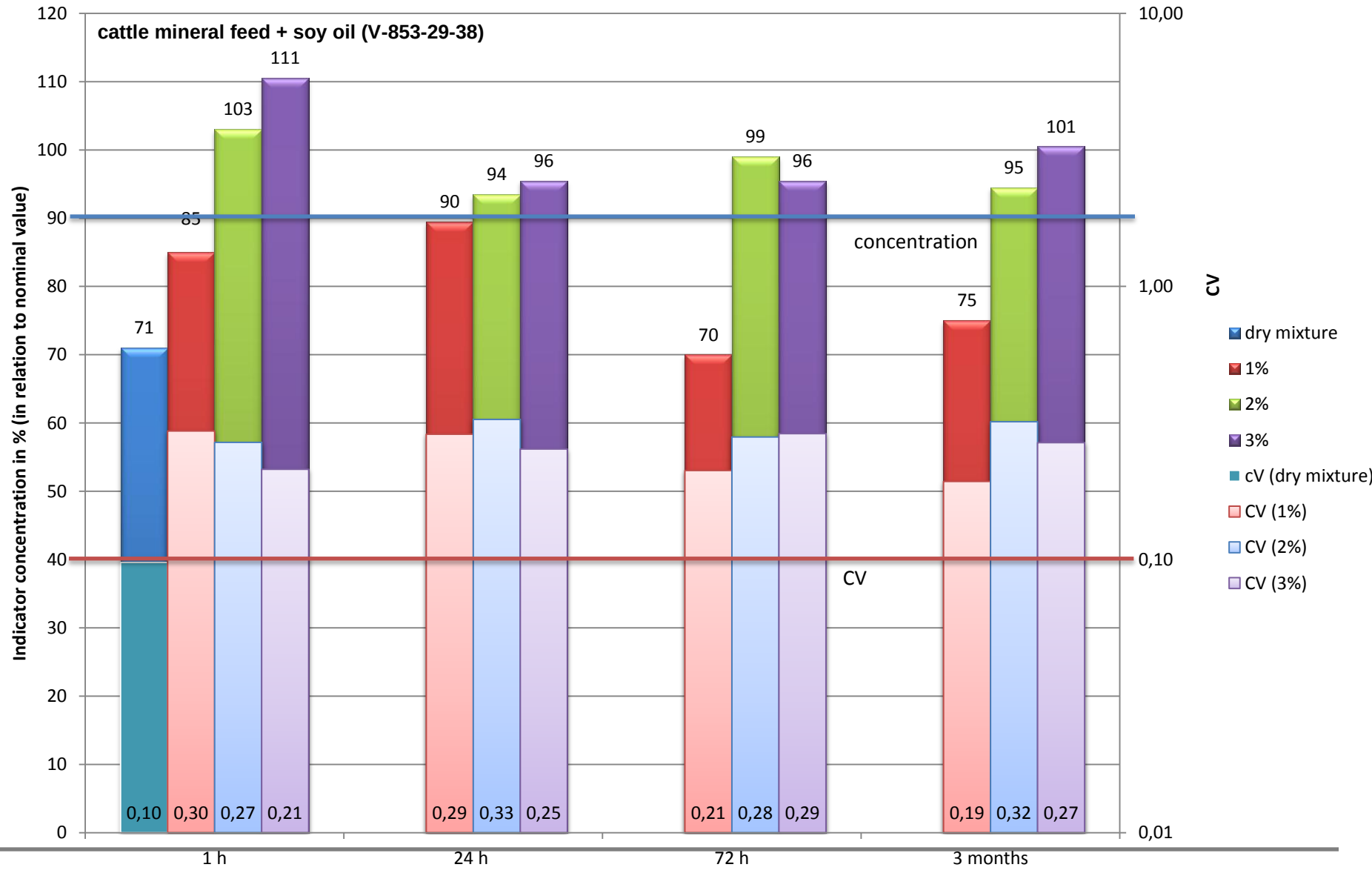
Stressing / segregation



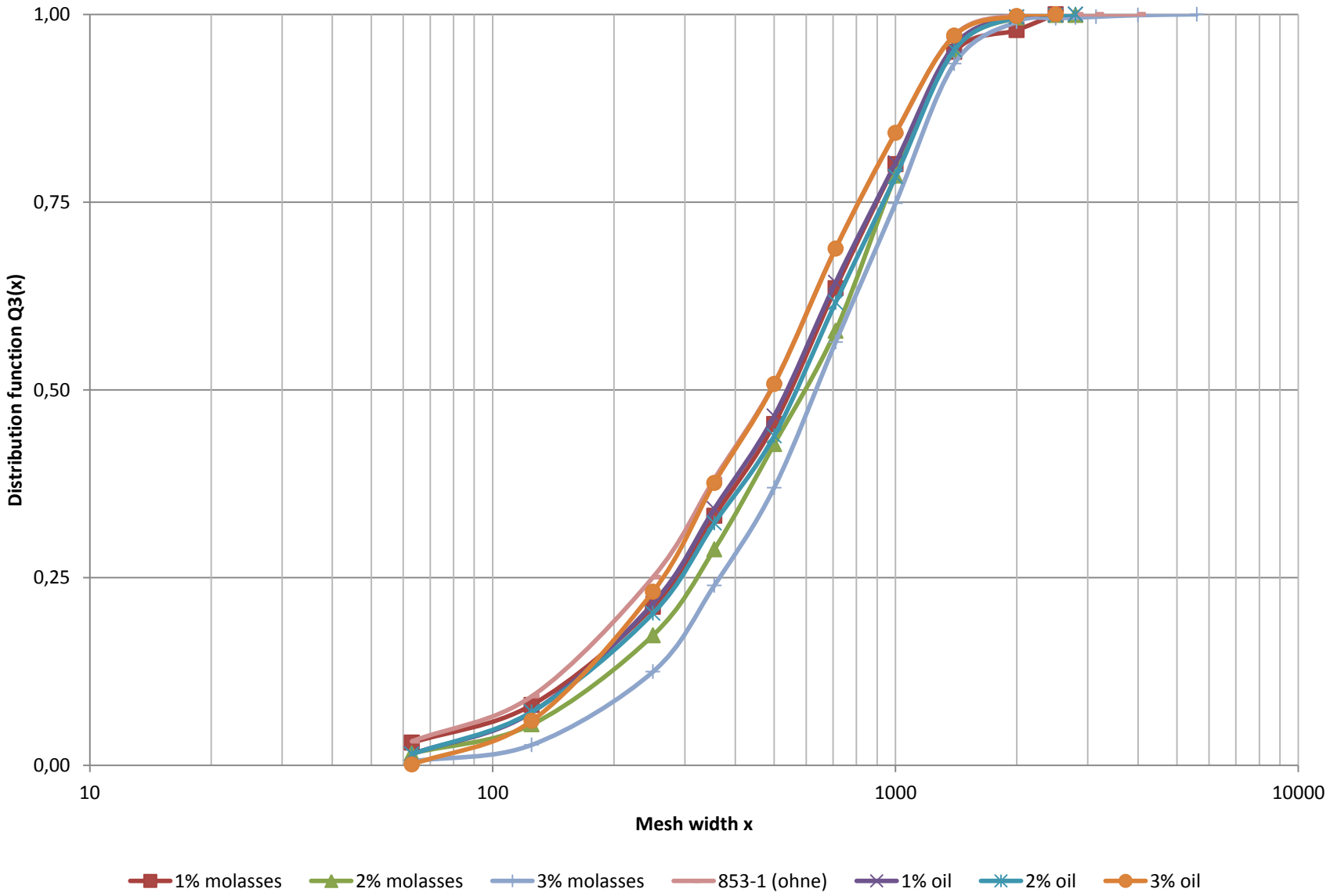
Selected results



Selected results



Particle size distribution



Conclusions

- Expected influences on segregation effects due to different liquid properties and different amounts of liquid could be marked,
- suggestions for improving the feed quality and safety could be made on base of these findings
- The evaluation of segregation effects is a very complex issue, not all interdependencies are sufficiently know at the moment,
- therefore a general conclusion is not possible due to several material properties of liquids and bulks and complex strains of the mixture
- Continuative investigations on the topic are eligible