



An ultimate solution for longer shelf life of milk powders, naturally

SyneROX 4 Dairy

Milk powders are often used as a substitute for fresh milk and as an ingredient for manufacturing of wide range of processed food products.

Three types of reactions are deteriorative and determine the shelf life of milk powder in practice:

- » lactose crystallisation,
- » lipid oxidation,
- » Maillard reaction (nonenzymatic browning).

Lipid oxidation involves oxidation of unsaturated fatty acids in phospholipids and triglycerides.

Crystallised lactose in reaction with proteins leads to formation of volatile oxidation products, which are responsible for cardboard off-flavor in oxidized milk powder.

Table 1: SyneROX 4 milk powder application areas

TYPE	PRODUCT	RECOMMENDED USAGE LEVEL	APPLICATION
Milk powder for production of ice cream, milk powder for vending machines	SyneROX 4 (302162)	1 g/kg	Add to liquid milk prior to spray drying



Test protocol

The antioxidant action of SyneROX 4 (302162) was tested in:

- » spray dried whole milk powder.

SyneROX 4 (302162) was dosed to the liquid milk. Dosage of antioxidant was calculated per dry matter of milk. Control contained no antioxidant.

Storage conditions:

- » samples were packed in 10 kg multiply paper bags with poly inner bag without modified atmosphere and stored 12 months at room temperature.

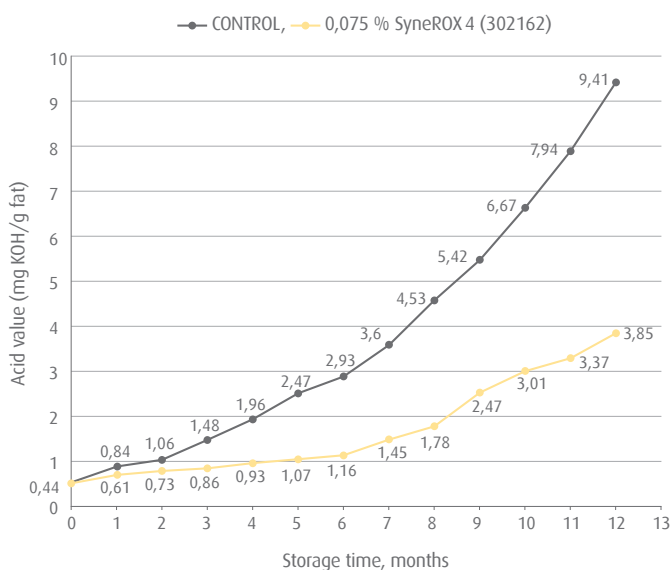
Oxidative changes were measured by TBA test and acid value after production and after each month during the 12 month storage period at room temperature.

After 5, 9 and 12 months of storage samples were sent to external laboratory for microbiological evaluation.



Results

Graph 1: Results of acid value of milk powder stored 12 months at room temperature



Graph 2: Results of microbiological evaluation of milk powder stored 12 months at room temperature.

PARAMETER	RESULTS	
	Control	0,075 % SyneROX 4 (302162)
<i>Salmonella</i> spp.	not found in 25 g	not found in 25 g
<i>Bacillus cereus</i>	20 CFU/g	<10 CFU/g
Coliform bacteria	<10 CFU/g	<10 CFU/g
<i>Enterobacteriaceae</i>	<10 CFU/g	<10 CFU/g
Yeasts	<10 CFU/g	<10 CFU/g
Moulds	<10 CFU/g	<10 CFU/g
Aerobic plate count	1000 CFU/g	200 CFU/g
<i>Escherichia coli</i>	not found in 1 g	not found in 1 g



Conclusion

By adding 0,075 % of SyneROX 4 (302162) to whole milk prior to spray drying (calculated per dry matter of liquid milk):

- » full antirancidity protection of whole milk powder is provided,
- » according to the acid value and TBA test results after 12 months of storage at room temperature, milk powder with addition of SyneROX 4 (302162) has 2 to 3 fold better stability than control material,
- » there is no negative taste and flavor contribution,
- » milk powder is microbiologically more stable:
 - *Bacillus cereus* growth is inhibited,
 - aerobic plate count is 5 fold lower in milk powder protected with SyneROX 4 (302162), compared to the control sample.

Benefits

Benefits of using SyneROX 4 (302162) in milk powder applications are:

- » shelf life extension naturally,
- » better oxidation management,
- » better microbial stability of the products,
- » fresher taste of the products ,
- » 100 % natural non-allergenic formulation.

Legislation status and labeling:

- » For legislation status and additional labelling advices, please contact us at foodprotection@frutarom.com.





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