



Membrane Cleaning

Membrane filtration

TYPE OF INDUSTRY	FEED	MEMBRANES TYPE	AUDIT CONCLUSION	ENZYMATIC PRODUCT IMPLEMENTED
DAIRY	Whey	Ultrafiltration (Whey Protein Concentrate)	Proteic/Lipidic ++ fouling Biofilm fouling Inorganic fouling	Daily enzymatic cleaning (Filzym 131) Monthly anti-biofilm treatment Monthly inorganic cleaning
DAIRY	UF permeate	Nanofiltration (Lactose concentrate)	Proteic/Lactose fouling Biofilm fouling	Daily enzymatic cleaning (Filzym 111) Monthly anti-biofilm treatment
WINE	UF	Hollow fiber	Proteic/Fiber/Tannin fouling Inorganic fouling (silica)	Weekly enzymatic cleaning (Enzywine L)) Monthly inorganic cleaning
PROTEIN CONCENTRATION	Gelatin	UF	Proteic fouling	Daily enzymatic cleaning (Filzym 150)
JUICE	Apple, Orange, Strawberry ...	Ultrafiltration	Proteic/Fiber fouling Inorganic fouling	Daily enzymatic cleaning (Filzym 161) Weekly inorganic cleaning
COFFEE	Coffee	Ultrafiltration	Organic fouling	Daily enzymatic cleaning (Filzym 35)
PLASMA	Blood	Ultrafiltration	Proteic fouling	Daily enzymatic cleaning (Filzym 150)



Fouling Analysis Kit:

Purpose and principle of the audit

The Fouling Analysis Kit is a non-destructive methodology to identify any fouling that can be present in a membrane filtration equipment.

The principle of the audit is to circulate a number of specific solutions and assess their impact on the solubility of the residues on the one hand and on the flux recovery rates on the other.

Phase 1: organic fouling audit based on different enzymatic activities

Phase 2: inorganic fouling audit based on specific cleaning solutions

Phase 3: biofilm fouling audit based on a specific enzymatic solution



Fouling Analysis Kit: Purpose and principle of the audit

STEP	PRODUCT	DURATION
1. Organic fouling audit	Fouling Test 01	20 min
	Fouling Test 02	20 min
	Fouling Test 03	20 min
	Fouling Test 04	20 min
	Fouling Test 05	20 min
<i>Rinsing</i>	Water	
2. Inorganic fouling audit	Fouling Test 07	25 min
<i>Rinsing</i>	Water	
3. Biofilm audit	Fouling Test 08	45 min
<i>Rinsing</i>	Water	

Industrial cases

A. Goat milk industry

Industrial application

WPC & MPC of goat cheese. 110 millions of litter per year

Customer request

- Avoid downtime during peak season
- Increase productivity to avoid further investments
- Increase membrane lifetime

Equipments

- UF skimmed goat milk (12°C) – VCF 1,8-2,5
- UF whey from cheese factory – VFC 15
- RO permeate from UF
- Polisher

Industrial cases

A. Goat milk industry

Solution
provided on UF
MPC

- mix protease-lipase on daily basis
- chlorine free cleaning procedure
- no downtime during lactation period
- re-injection valve open longer
- membrane lifetime extension 24 → 36-42 months

Customer
benefit

Solution
provided on UF
WPC

- mix protease-lipase-lactase on daily basis
- strong reduction of chlorine use ($\div 4$)
- reinjection valve open longer – longer runs with high FR
- baseline FR increased
- membrane lifetime extension 18 → 36-42 months

Customer
benefit

Industrial cases

A. Goat milk industry

**Solution
provided on RO**

- mix protease-lipase-lactase on daily basis
- Biofilm treatment 2x/year
- longer runs
- membrane life-time extension 18 → 24-30 months
- no contamination issues

**Customer
benefit**

**Solution
provided on
Polisher**

- only acid and alkaline based products
- Biofilm treatment 2x/year (including pipes & tanks)

**Customer
benefit**

- excellent process water quality

Industrial cases

B. Whey concentration industry

Industrial application

WPC of cheese. 860 million of litter per year

Equipments

- UF1 + UF2 + UF3 → 30 loops all together
- NF to concentrate UF retentate
- RO/ROP
- RO to concentrate whey

Customer request

- reduce the use of chlorine while maintaining microbiological quality
- increase productivity
- avoid further investments
- increase membrane lifetime

Industrial cases

B. Whey concentration industry

Solution provided

- membrane fouling audit
- enzymatic cleaning (protease) on all plants

Customer benefit on UF plant

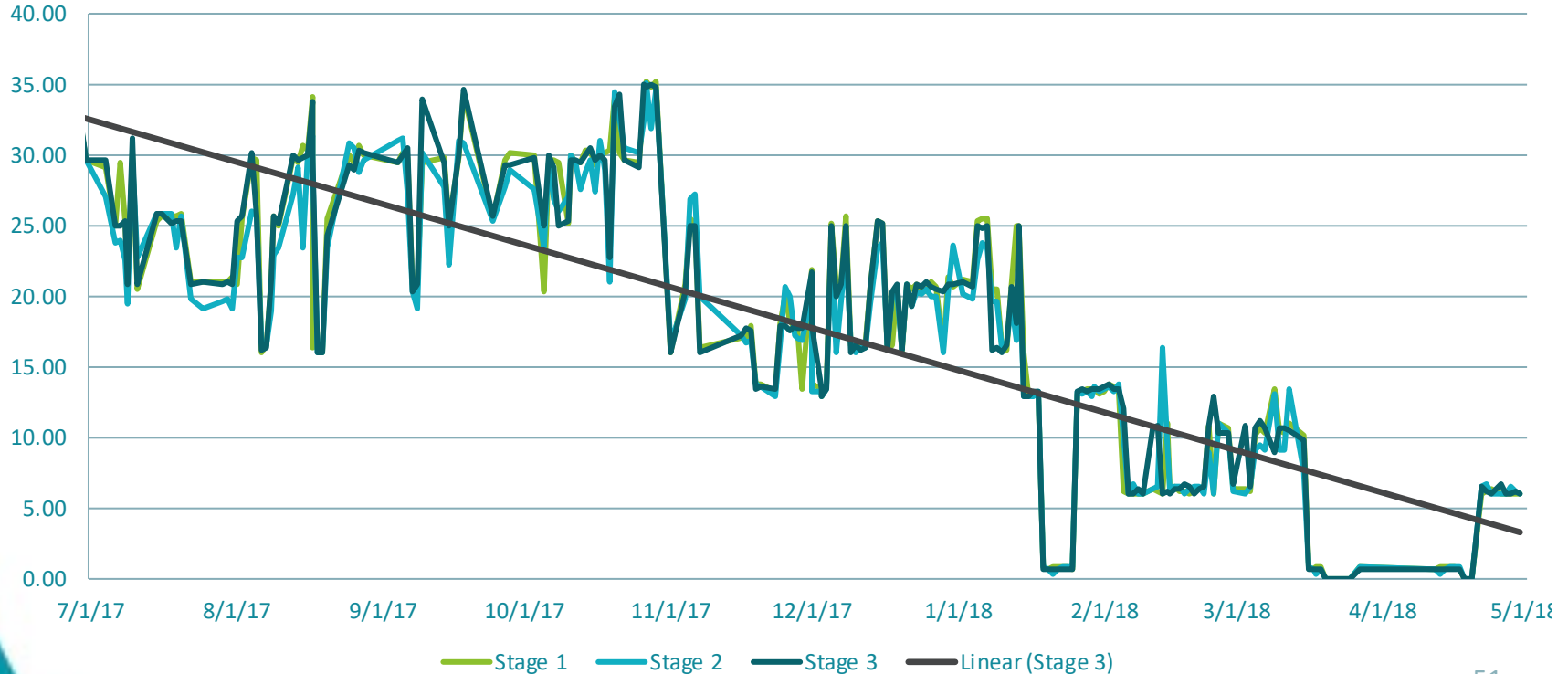
- increased productivity (daily flow rate increased up to 50%)
- strong chlorine reduction (30L → 20L → 6L → no chlorine) while maintaining microbiological quality
- remaining capacity at the end of production (100 % of area needed vs 79% today)

Industrial cases

B. Strong reduction of chlorine use

INDUSTRIAL CASE

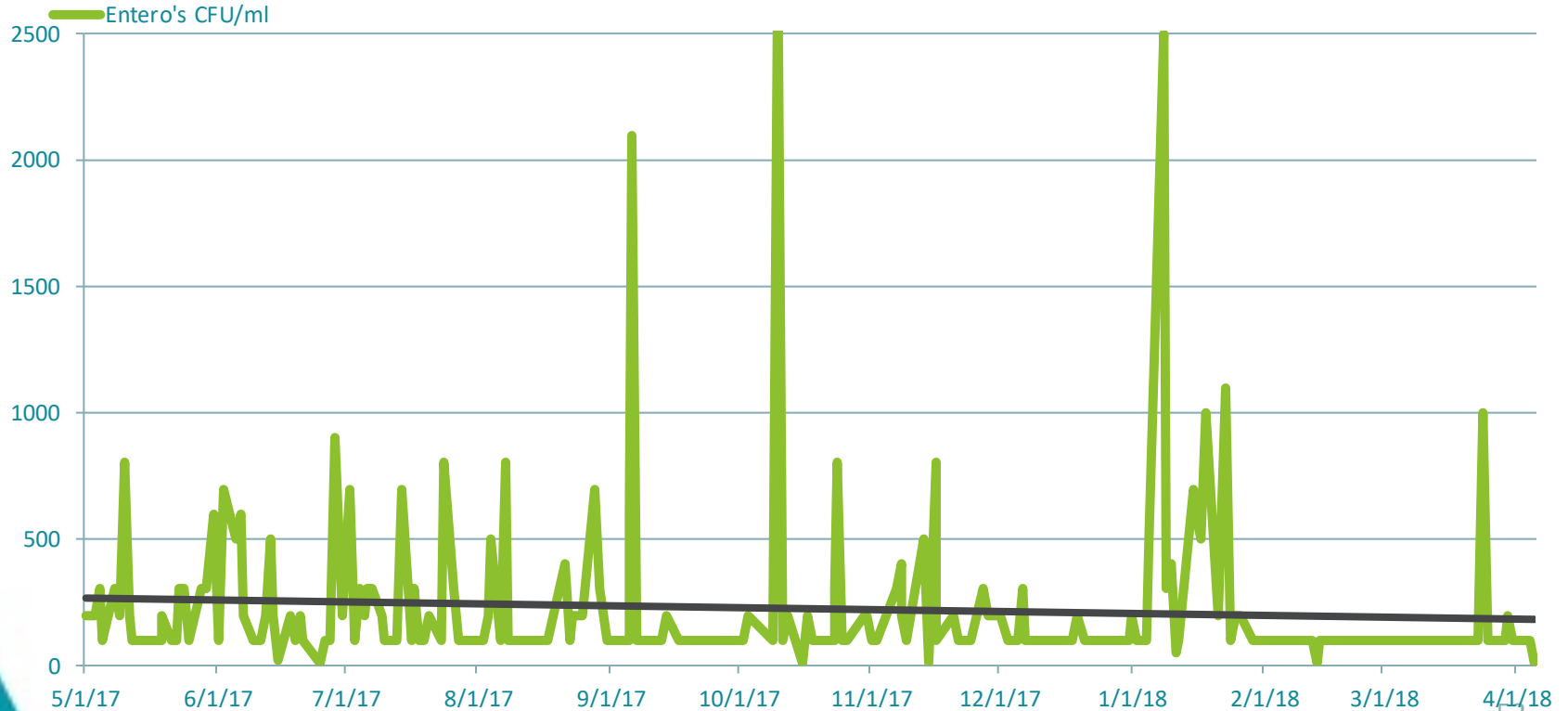
Hypochlorite dosed
(L)



Industrial cases

B. Maintaining microbiological quality

INDUSTRIAL CASE



Take away from the Fouling analysis tool

Thanks to its non-destructive **Fouling Analysis Kit** specifically designed for each industrial segment, Realco is able to clearly identify the nature of residues that may reduce equipment efficiency.

The full analysis of this audit will result in the recommendation of the most effective cleaning procedure that will remove all stubborn residues which may consist of organic, inorganic or biofilm compounds.

To optimize filtration process, guarantee productivity, prevent microbiological contamination and ensure equipment life time: **efficient cleaning is a key.**