Tailor-made
system products

Innovative water
technology

State-of-the-art
dosing technology

VTA®

we clean water

VTA Hydroprompt® FORTE

For the reliable elimination
of different germ loads in the
secondary clarification of wastewater.

VTA Hydroprompt® FORTE

The latest development for the reliable elimination of different germ loads in the secondary clarification of wastewater.

This multifunctional system product from VTA's in-house laboratories has been enhanced with additional properties that ensure highly effective precipitation and flocculation.

VTA Hydroprompt® FORTE is used for the treatment of wastewater in the inlet to the secondary clarifier.

Microbial impurities (for example, pathogens and multi-resistant germs) are effectively removed from the aqueous phase.

The specially developed formula ensures that there is neverthe-less no adverse impact on the microorganisms in the biological process.

Use VTA Hydroprompt® FORTE with care due to its disinfecting effect. Always read the label and product information before use.

The unique composition enables a wide range of applications and can be used individually according to requirements.

ADVANTAGES

→ Effective reduction of germ load even at low dosing quantities

→ Improved settleability/ sedimentation behaviour of suspended matter

→ Efficient flocculation – formation of stable macrofloc

→ Increased sedimentation rate and visibility depth

→ Reliable phosphate elimination

→ Reduction of precipitant consumption

WITHOUT VTA HYDROPROMPT® FORTE

WITH VTA HYDROPROMPT® FORTE

Colonies on plate count agar.
Untreated control sample (left), sample treated with VTA Hydroprompt® FORTE (right).

Once the fine floc has settled, complete elimination of germs can be observed in the supernatant (depending on dosage).

The following results are average values from a series of practical tests

TOTAL GERM LOAD

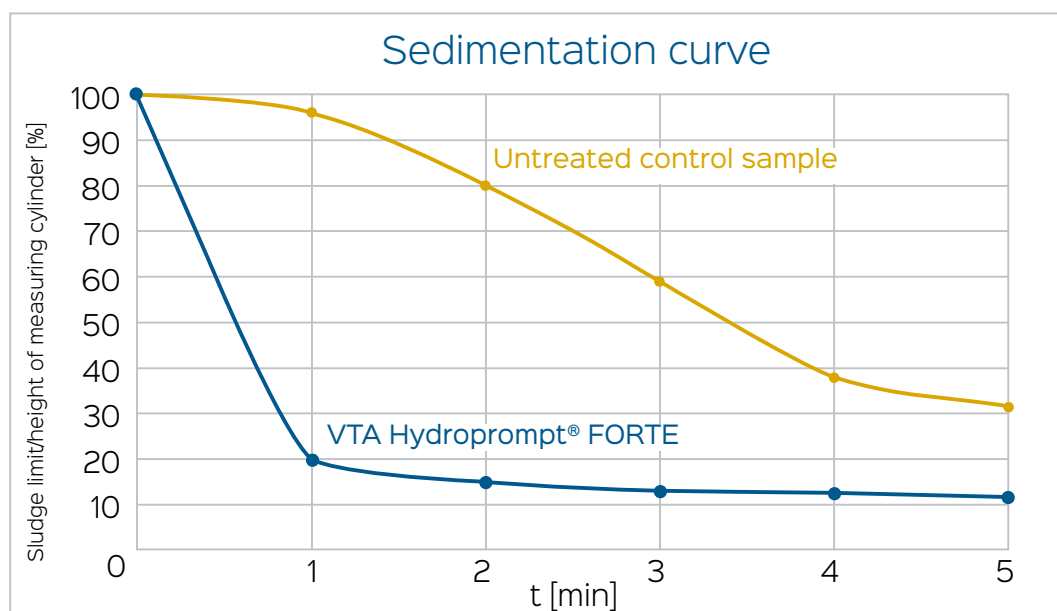**Significant reduction of germs at very low concentration.**

VTA Hydroprompt® FORTE is used for germ reduction in the final treatment stage at wastewater treatment plants. Even very low concentrations achieve a significant reduction of germs compared to the initial situation.

	Load		Reduction
	Control sample	VTA Hydroprompt® FORTE	
Total germ load	**100%**	**5.38%**	**› 94%**
E. coli	100%	4.17%	**› 95%**
Enterobacter aerogenes	100%	1.65%	**› 98%**
Acinetobacter baumanii	100%	2.74%	**› 97%**
Staphylococcus saprophyticus	100%	6.25%	**› 93%**

Analysis based on addition of 50 ppm of product.

SEDIMENTATION

Several series of tests confirm that VTA Hydroprompt® FORTE leads to a significant improvement in sedimentation behaviour and sedimentation rate. The formation of stable macrofloc guarantees a clean, turbidity-free clear water phase.

Sedimentation curve

Untreated control sample

VTA Hydroprompt® FORTE

Sludge limit/height of measuring cylinder [%]

t [min]

Average values from a series of practical tests

Field report
VTA Hydroprompt® FORTE

1. METHOD

The resounding effect of VTA Hydroprompt® FORTE becomes apparent in the course of a practical test. The treatment plant has a design capacity of 9,500 PE, a current load of approx. 6,500 PE and has two secondary clarifiers. During the test period, one of the two secondary clarifiers was treated with 30 or 50 ppm of VTA Hydroprompt® FORTE; the second served as a reference (control sample).

→ Test period: 13 to 17 July 2020

→ Daily inlet volume into secondary clarifier: ~1000 m³/day

→ Analysis: Mixed and random samples taken daily from the individual tanks, followed by analysis at VTA's Rottenbach laboratory.

→ Dosage: 30 or 50 ppm VTA Hydroprompt® FORTE in the area with good flow (optimum mixing) in the inlet to the secondary clarifier. This ensures optimum effectiveness of the system product.

GOAL

→ Improvement of physical parameters such as the sedimentation rate of solid particles (suspended solids) and depth of visibility in the secondary clarifier

→ Optimisation of chemical parameters such as COD, P_{tot}, orthophosphate, nitrate and turbidity in the discharge

→ Minimisation of the total germ load and load of pathogenic germs (resistant/multi-resistant) in the discharge from the treatment plant

To achieve this, firstly the relevant parameters and the germ and pathogen load in the untreated secondary clarifier and in the discharge from the treatment plant were determined, after which, both the improvement in the parameters and the reduction of germ load after treatment with VTA Hydroprompt® FORTE were analysed.

2. RESULTS
Chemical / physical parameters

DEPTH OF VISIBILITY IN SECONDARY CLARIFIER

The depth of visibility in the secondary clarifier improved from 1.5 to 2.5 metres within a few hours after addition of VTA Hydroprompt® FORTE. On the second day of testing, a further improvement in the visibility depth to no less than 3 metres was found.

As a result of the significant reduction of suspended matter (fine suspended solids) in the clear water phase in the secondary clarifier and the minimisation of floc outflow, there was a marked reduction of the discharge load.

Depth of visibility in secondary clarifier tank

Depth of visibility in metres

Reference tank	1.5
Day 1 with VTA Hydroprompt® FORTE	2.5
Day 2 with VTA Hydroprompt® FORTE	3.0
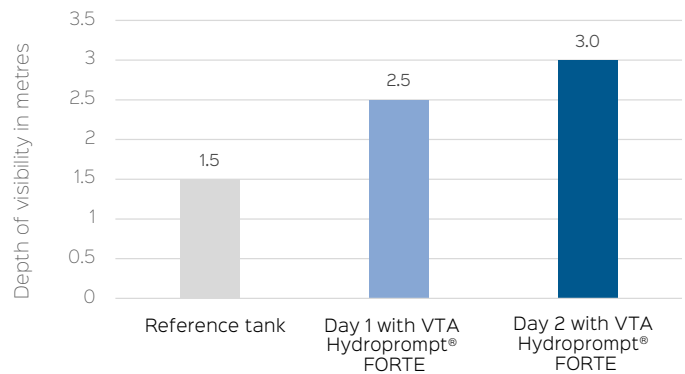
Depth of visibility and turbidity respectively in the secondary clarifier
Left: untreated; right: treated with VTA Hydroprompt® FORTE after 24 hours.

COD, PHOSPHATE, NITRATE AND TURBIDITY

The use of the system product VTA Hydroprompt® FORTE led to a significant improvement in the chemical parameters in the clear water phase.

➜ Reduction of phosphate. Total phosphate was reduced from 0.44 to 0.09 mg/l, orthophosphate fell from 0.26 mg/l to below the detection limit.

➜ Guaranteed adherence to the prescribed phosphate limit value (0.5 mg/l) during normal operation

➜ Precipitant savings in the biological stage

➜ Reduction of COD and nitrate values by around 42% (COD) and 36% (nitrate) respectively

➜ Reduction of turbidity by a total of 84% from 4.4 FNU to 0.7 FNU

Sample description / Clear water secondary clarifier tank	COD (mg/l)	Total phosphate (mg/l)	Orthophosphate (mg/l)	Turbidity (FNU)	Nitrate (mg/l)
Untreated reference sample	17.8	0.44	0.26	4.4	0.84
With 30 ppm VTA Hydroprompt® FORTE	-	0.11	‹ 0.05	1.2	-
With 50 ppm VTA Hydroprompt® FORTE	10.4	0.09	‹ 0.05	0.7	0.54

Comparison of the relevant chemical parameters in the samples
from the secondary clarifier and discharge from the treatment plant respectively.

EFFECTS ON THE BIOLOGICAL STAGE

In addition to the potential savings in precipitants for phosphate elimination, the formation of compact floc in the return sludge makes a significant contribution to the minimisation of scum in the biological stage as a result of improved settleability in the activated sludge tank.

Reduction of germ load

To detect the germ and pathogen load, 100 µl of each of the mixed and random samples taken (untreated and treated) were prepared on plate count agar plates (universal culture medium) and selective agar plates (specific detection of pathogenic germ groups) and incubated at 36°C for 24 hours.

In order to obtain exact results, repeat determination with two approaches was used at all times and the mean value calculated. The analysis was carried out by counting the number of germ colonies formed after 24 hours, whereby the actual germ reduction by means of VTA Hydroprompt® FORTE over the total number of CFUs (colony forming units) compared to the untreated reference sample was examined.

Total number of germ colonies (dark spots) in the untreated sample from the clear water phase in the secondary clarifier (left) and in the treated sample (right).

Pathogen comparison before and after treatment with VTA Hydroprompt® FORTE.
E. coli and *Enterobacter aerogenes* in the untreated sample (left) and in the treated sample (right).
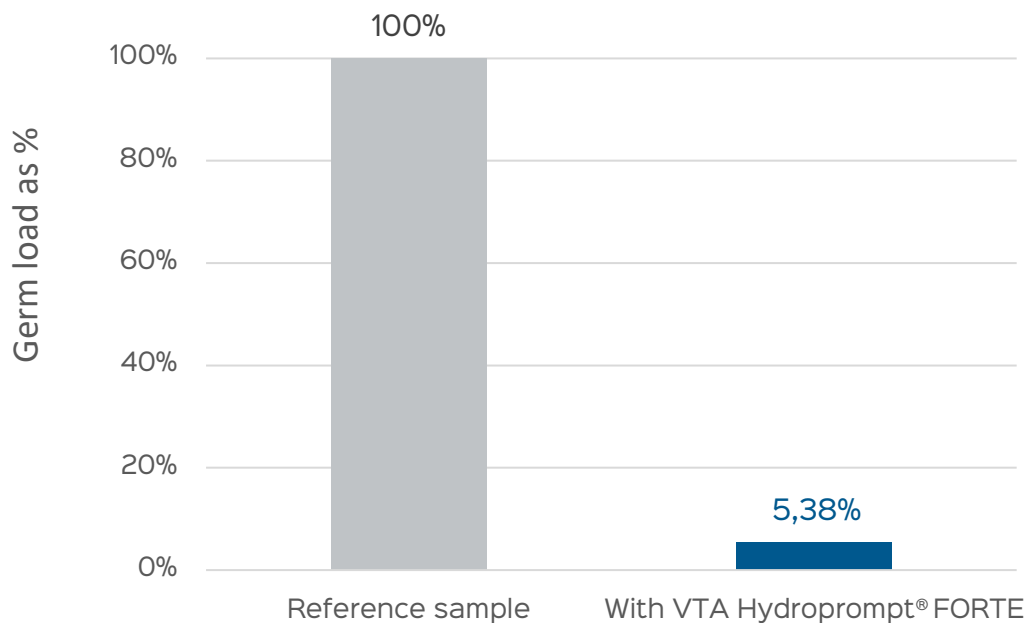

Pathogen comparison before and after treatment with VTA Hydroprompt® FORTE.
Acinetobacter baumannii and *Klebsiella pneumoniae* in the untreated sample (left) and in the treated sample (right).

TOTAL GERM LOAD IN THE CLEAR WATER PHASE

The analyses showed a reduction of the total germ load in the secondary clarifier of up to 95% through VTA Hydroprompt® FORTE.

In addition, pathogenic germs such as *Escherichia coli, Enterobacter aerogenes, Acinetobacter baumanii, Klebsiella pneumoniae* and *Staphylococcus saprophyticus* were detected through selective culture media. These pathogens that are relevant in terms of health were also almost completely eliminated from the clear water phase during the test period (> 93%).

Comparison of the total germ load in the samples from the secondary clarifier before and after treatment with VTA Hydroprompt® FORTE.

OVERVIEW: MULTI-RESISTANT GERMS

Pathogenic germ	Selective agar	Morphology	Occurrence	Diseases
Escherichia coli	Eosin methylene blue agar	Gram-neg. and rod-shaped	Human intestine	Infections of the digestive tract and urinary tract
Enterobacter aerogenes	Eosin methylene blue agar	Gram-neg. and rod-shaped	Human intestine	Urinary and respiratory tract infections, meningitis
Acinetobacter baumannii	Brilliance CRE agar	Gram-neg. and rod-shaped	Soil and water	Lung, wound, urinary tract and brain infections
Staphylococcus saprophyticus	Brilliance Staph 24 agar	Gram-pos. and spherical	Intestinal flora (human and animal)	Urinary tract infections
Staphylococcus aureus	Brilliance Staph 24 agar	Gram-pos. and spherical	Skin, nose and genitals	Nosocomial diseases (gastrointestinal infections)
Enterococcus faecium	Brilliance VRE agar	Gram-pos. and spherical	Intestinal flora (human and animal)	Nosocomial diseases (urinary tract infections)
Enterococcus faecalis	Brilliance VRE agar	Gram-pos. and spherical	Intestinal flora (human and animal)	Nosocomial diseases (urinary tract infections)
Pseudomonas aeroginosa	Cetrimide agar	Gram-neg. and rod-shaped	Humid and dry environment	Nosocomial diseases (pneumonia, urinary tract and skin infections)
Klebsiella pneumoniae	Brilliance ESBL	Gram-neg. and rod-shaped	Intestinal flora	Nosocomial diseases (pneumonia and urinary tract infections)

We set standards!
Highly effective, efficient and sustainable.
Following the example of nature and its cycles.

VTA ®
we clean water

> 99 Clean water,
> clean environment –
> for our future
> generations.

*– Ing. Dr. h.c. Ulrich Kubinger
CEO VTA Group*

We clean water.