

Best feeding hygiene with liquid feeding – No mission impossible!

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Benefits of liquid feeding

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- Feeding of low-priced components
- Feed losses are about 10% lower against dry feeders
- Thus reduction of costs of production up to 0,18 € / kg meat gain (6,5 Cent from better gain performance and 11,5 Cent from costs of feed), Source „Improve performance with liquid feeding, Dr.B.P.Gill, UK, International Pig Topics, Vol 22, No.7/2007
- Best accuracy of feed distribution – approved by DLG
- Computer controlled feed management and feedback information about feed consumption

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Content

- Critical factors of feeding hygiene – biofilm
- Critical factors of feeding hygiene – feeding system
- Current technical solutions for cleaning and disinfection
- Hygiene concepts of liquid feeding systems



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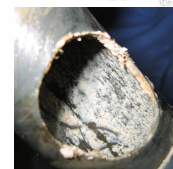
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Critical points regarding liquid feeding

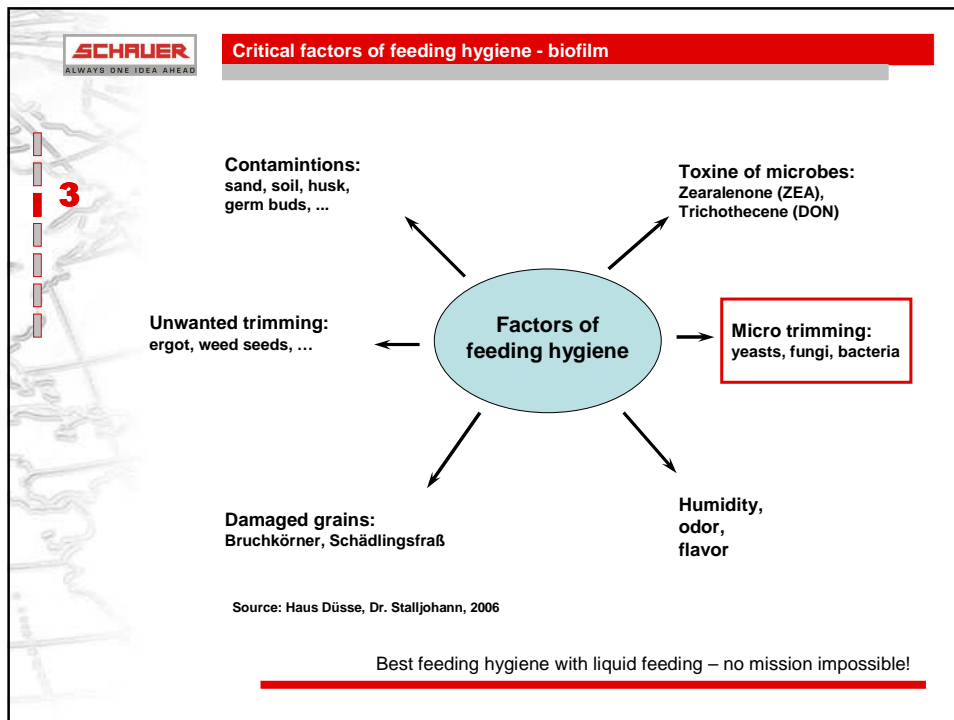
by-products: amylum, syrup, potato litter, and so forth are ideal substrate for negative germ development

drinking water especially open drinking systems: danger of pathogenic germs

pipes the so called „biofilm“ at the surface of the pipes is made of countless germs, that contaminate the feed each feeding time.



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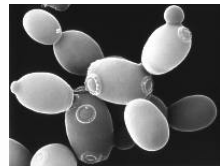
SCHAUER
ALWAYS ONE IDEA AHEAD

Critical factors of feeding hygiene - biofilm

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The yeasts:

- * Decomposes sugar and proteins and can produce alcohol
- * Cause loss of dry matter
- * Inhibits lactobacillus
- * Alters the flora of the small intestine of swine
- * Producing much gas within the pipes and in the dump
- * And inside the animal's stomach, what leads to satiety feeling
- * Changing the taste and smell of the feed

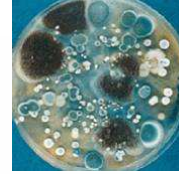


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The fungi:

- * Decomposes sugar and proteins
- * Building most of toxins (aspergillus and fusarium) often causing fertility troubles.
- * Aerobe growth (surface)
- * Fungi growth mostly at dry substratum (60-88%TS): just like CCM, bread...
- * Downgrades the taste and the palatability: (bad feed intake or refusing of feed!)
- * Can cause up to 20% loss of dry matter



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The entero bacteria:

- * Ammonia and toxins are byproducts of the digestion of proteins by those bacteria.
- * Altering the taste and smell of the feed
- * Potential danger for animals and men



The coliform bacteria:

- * Escherichia coli and salmonella are a great risk
- * Deadly potential
- * Causing diarrhea



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- **Used water tank**

- **Mixing tank**

- **Down pipes**



- **Feeding pipes**

The so called „biofilm“ at the surface of the pipes is made of countless yeasts, that contaminate the feed each feeding time

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Consequences of insufficient feeding hygiene

- **Lower feed consumption of pigs and sows**
- **Infringments resulting from pig being nervous, biting and fighting**
- **Undesirable fermentation of feed (mainly caused by yeasts and high temperature)**
- **Sudden death of pigs**
- **Worse feed conversion rate, causing higher feed costs.**

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Caring about tank hygiene



Flat tank design

Slider for component lock without formation of shades

No pipes inside the tank



Because of the special design of mixing paddles, no feed residues

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Caring about tank hygiene



Rotating nozzles for mechanical prepurification via feed pump

Fresh water mixing paddle with integrated tank cleaning sprayer (like dishwasher)

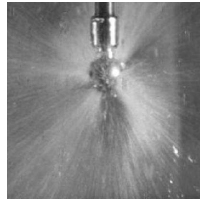
Mixing paddle cleaning with hot water optional



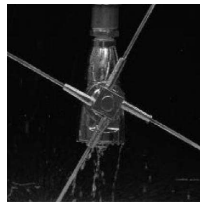
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Caring about tank hygiene

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(High pressure) water
cleaning nozzels for
mechanical tank cleaning



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Caring about tank hygiene and feeding pipes

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UV Hy Light (Weda) tank
disinfection with UV light

Chemophysical cleaning and
disinfection system

automatic acid – base cleaning



Hygiene arrangements for liquid feeding

Caring about tank hygiene



Easy Ozone disinfection system

- very efficiently against bacteria, yeasts, and fungi
- low operating costs
- residue-free
- more tanks disinfected

Acid sprayer reduces lubricating film and prevents growth of yeasts and fungi



Combination of acid sprayer and ozone generator is the best solution, in order to combine both benefits

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Overview of procedures of drinking water disinfection ¹⁾

	CHLORINE	ClO ₂	OZONE	UV
DISINFECTION POWER	MEDIUM	STRONG	STRONGEST	MEDIUM
DEPOT EFFECT	HOURS	DAYS	MINUTES	NON
PH-DEPENDENCE	EXTREM	NON	MEDIUM	NON
BY-PRODUCTS	THM, AOX	CHLORITE	BROMATE (MAYBE)	NITRITE (MAYBE)
INVESTITION	LIGHT-STRONG	MEDIUM	MEDIUM-STRONG	MEDIUM
MAINTENANCE	MEDIUM	MEDIUM	LIGHT	LIGHT

1) Source: ProMinent Dosiertechnik
Ges.m.b.H. , 2006


**Effectiveness
of OZONE**

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Bactericid results of OZON

TAB.:1 RESULTS OF GERM CARRIERS WITH EASY OZONE


GERM TYPE	GERM NUMBER INOCULATION SUSPENSION	COTTON BUD		STARCH PULP	
		BASIS	ASSAY	BASIS	ASSAY
Lactobacillen Species	$5,3 \times 10^8$	2.300	< 10	2,1 Mio.	< 10
Enterobacterien Species	$5,8 \times 10^8$	13 Mio.	< 10	> 1 Mio.	< 10
Enterococoen Species	1×10^7	10.000	65	> 10.000	< 10



Enterobacterien-Isolat
LEFT BASIS, RIGHT ASSAY



Lactobacillen-Isolat
LEFT BASIS, RIGHT ASSAY



Enterococoen-Isolat
LEFT BASIS, RIGHT ASSAY

- 1) Source: germ carrier results Universität für Bodenkultur Vienna, 2005

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Turbo Clean air-water fog cleaning system blowing out and spring-cleaning of pipes and feeding place downpipes.




Uncleaned feeding place downpipe



By using a **medication pump**, it is possible to add acid to the air-water fog. So pipes and downpipes are being disinfected. (also possible with ozone)


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Hygiene concepts of liquid feeding systems

Feeding System	Mixing tank	Used water tank	Feeding pipes	Down pipes
Standard one way distribution system	+ (highpressure) water sprayer + UV light + Acid sprayer	NO	FULL	-- NO - Manual cleaning
Standard circle liquid feeding system	+ (highpressure) water sprayer + UV light + Acid sprayer	NO	FULL	-- NO - Manual cleaning
Standard water-pressure feeding system	+ (highpressure) water sprayer + UV light + Acid sprayer	YES	FULL (water + mixing zone)	-- NO - Water feeding; - Manual cleaning
EASY water pressure feeding system	+ (highpressure) water sprayer + OZON disinfect. + Acid sprayer	NO Fresh water tank	FULL (fresh water)	-- NO - Water feeding; - Manual cleaning
TURBOJET feeding system	+ (highpressure) water sprayer + OZON disinfect. + Acid sprayer	NO Fresh water tank	EMPTY Clean and disinfected	++ TURBO-CLEAN cleaning and disinfection

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Hygiene concepts of liquid feeding systems

Feeding System	Mixing tank	Used water tank	Feeding pipes	Down pipes
Air feed System (for piglets)	+ (highpressure) water sprayer + UV light + Acid sprayer	NO	EMPTY, clean	+ air pressure cleaning - Water feeding; - Manual cleaning
SPOTMIX, Multiphase feeding system	EMPTY and DRY	NO	EMPTY and DRY	++ TURBO-CLEAN with acid fog optional

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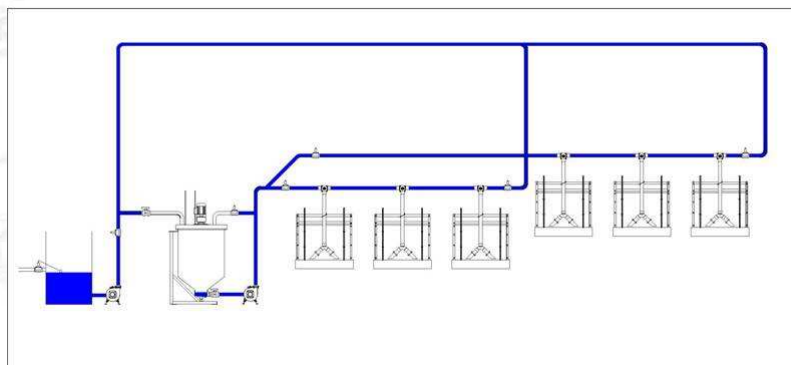
Easy Feed

- residue-free feeding system
- simple technology
- multiphase feeding
- Ad- Libitum possible
- **no used water tank!!!**



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Easy Feed function chart



Easy Feed

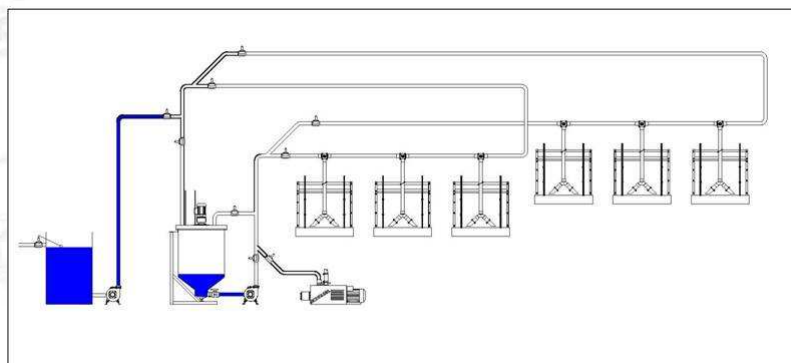
Turbo Jet

- residue-free feeding system
- pipes are clean and empty
- downpipe cleaning possible
- pipe disinfection possible
- **no used water tank!!!**



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Turbo Jet function chart



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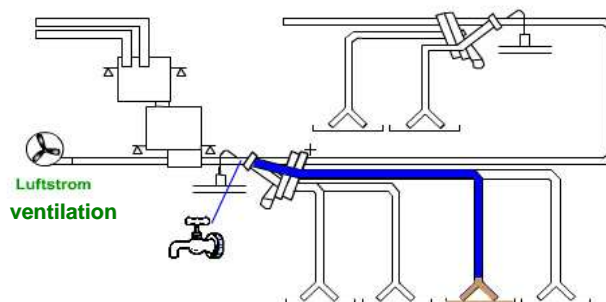
Spotmix Multiphase Feeding System:

- Mixing dryfeed components individually for every feeding point
- distribution of individual receipts by air generator
- Mixing with water, individually adaptable ratio of drymatter at the feeding point
- systematically cleaning of downpipes after every feeding process.



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Spotmix Multiphase Feeding System:



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Summary

- **Acceptable (mechanical) water cleaning systems for mixing tanks offered by all suppliers**
- **Acid/base disinfection is the technical standard solution for mixing tanks and feeding pipes**
- **The effort of (multi-)phase feeding is causing many suppliers to keep the liquid feed in the pipes between feeding times > optimum growing conditions for yeasts**
- **Except SCHAUER TURBOCLEAN no supplier offer an automatic cleaning and disinfection system for downpipes.**
- **SPOTMIX is the most hygiene LIQUID FEEDING SYSTEM, the only multiphase feeding systems without forcing compromises in feeding hygiene.**

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