

Innovations for clean water



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Practical Report Fishing Industry

The paradise of Aschauteiche

**Practised Ecology: A fish farming business in
North Germany is a good example!**

As morning breaks and the sun is still hidden behind the bank of fog the fishermen from Aschauteiche are already on the move - by the breeding tanks, in the smoke-house or with the small punt on the clean water of the wide fish ponds...



Report: Hans-H. Goedereis
Photos: Uwe S. Meschede

What is the use of each engagement in and improvement of the quality of the product, of life and of the environment if the heavily polluted wastewater from fish processing at the end gets into the groundwater with insufficient treatment?

The following report by the firm of Abwasser Service Goerdereis makes clear, what experiences have been made with the commissioning of a small wastewater treatment plant and why the AQUAMAX® GASTRO is predestined for the wastewater from fish processing.

Here is the world in order, as one sees!

As a rule fish farming enterprises in Germany process their catch immediately. The fish are gutted, washed and usually smoked. Gutting is either by hand or automatically using machines. The entrails are retained through sieving and are disposed of separately. However, frequently small amounts of residue from fish waste also get into the wastewater treatment plant.

Particular attention has to be paid to the employment of cleaning agents. These should be biologically degradable and used sparingly.

As fish farming enterprises often do not have a sewer connection wastewater treatment has to take place over decentralised wastewater treatment plants. Currently, in almost all cases, the wastewater is not completely biologically treated. Frequently the wastewater is discharged via a septic tank into an irrigation system or into a pond. As a rule, with such solutions, one can assume an inadmissibly high pollution of surface waters.

Experience of economic methods of wastewater treatment and their dimensioning is currently not available. Through the requirement placed on a fish farming business by the Rural District Authority in Celle to install a decentralised wastewater treatment plant a possibility arose of realising a research object.



The slaughtering operation

The business lies in Eschede in the German Federal State of Niedersachsen. There is intensive fish breeding in partially artificial ponds. The

fish are caught as required and are subsequently processed and smoked. One is concerned here mainly with various types of trout.

Normally, fish processing takes place in the early hours of the morning up to about 10 o'clock. Due to the very heavy demand in the pre-Christmas period the amounts processed increase sharply for some 10 days in December. In January and February the amounts processed are smaller than in other periods.

The business processes ca. 70 t annually. In the pre-Christmas period ca. 15 t of fish are processed.

The washing water for the processing is taken from the fishponds and, up until now, discharged via a single-chamber tank of 8.5 m³ capacity and via a three-chamber tank with a capacity of 4 m³ into an underground irrigation system. The daily cleaning of equipment and working spaces takes place using the detergent "Calgonit". Faecal wastewater is discharged only from those belonging to the business.

Trial set-up

In order to determine the biological degradability and the future dimensioning capacity the existing tanks were equipped with an AQUAMAX[®] S. The AQUAMAX[®] S consists of a submerged aerator, a clarified water pump and a float switch, which are all secured to a special steel frame and suspended on chains into the first tank with the 8.5 m³ capacity. The three-chamber tank serves as surplus sludge store. A preliminary settling stage was dispensed with. The plant was operated in the SBR procedure. The cycle time was 24 hours and the wastewater treatment time 22 hours. Following a settling phase of 2 hours the treated water was pumped out at one o'clock in the morning.

The trial set-up was commissioned in December 2000 and replaced by the final plant in September 2001. Following a run-in phase of approx. one month the COD was degraded by 80 % and the nitrogen by 95 %. The inflow pollution load with COD was 2000 mg/l and with nitrogen 120 mg/l. As a preliminary settling stage



Managers and driving force of the Aschauteiche and innovators in the branch: the Heese brothers.

was missing the settleable solids transported were also treated.

New model of the wastewater treatment plant:

The following monitoring values were laid down by the Environment Office: COD 100 mgO₂/l, BOD₅ 25 mgO₂/l, N_{tot} 18 mg/l, P_{tot} 6 mg/l.

With the dimensioning of the SB reactor we doubled the volume of the trials set-up. For this purpose a monolithic concrete shaft with a total volume of 16.9 m³ was installed.

The technical installation was realised using an AQUAMAX[®] GASTRO for 53 PT.

The existing pre-treatment facility, with a capacity of 12.5 m³, was used as sludge store and buffer tank. The second and third chambers of the second tank of the pre-treatment facility were converted into a buffer tank and equipped with a feed pump. The SB reactor received a submerged aerator, the surplus sludge pump and

Healthy fish need a clean environment...





Wastewater treatment plant in the Aschauteiche fish farming enterprise using the AQUAMAX® GASTRO

the clarified water pump On commissioning the surplus sludge from the trials plant was pumped into the SB reactor for the seeding of the biology.

On 12.10.01, some 3.5 weeks after commissioning the new plant, the following values were measured:

Inflow:	CSB	1396 mgO ₂ /l
	N _{ges}	77 mg/l
Outflow:	CSB	86 mgO ₂ /l
	N _{ges}	8 mg/l

On 18.12.01, during the high load phase, a sampling was carried out jointly by the Rural District Authority Celle and us. The quantity of wastewater discharged was determined as 8 m³/d. the following values were measured:

Inflow:	CSB	1800 mgO ₂ /l
	N _{ges}	128 mg/l
Outflow:	CSB	78 mgO ₂ /l
	N _{ges}	4 mg/l.

The pollution load corresponded with a discharge from 120 PT.

During the low annual loading the following values were measured on 09.01.01:

Inflow:	CSB	799 mgO ₂ /l
	N _{ges}	34 mg/l,
Outflow:	CSB	44 mgO ₂ /l
	N _{ges}	2 mg/l
	P _{ges}	16,6 mg/l
Temperature:		3,9° C

The settings of the plant were not altered from commissioning onwards. Oxygen supply was sufficient also for the high load phase. Despite the high sludge volume component (VLV 900

ml/l) in the activated sludge stage no settleable solids were determined in the outflow. It is to be expected that the high sludge volume in the aeration stage will again sink in the weak load phase. The relatively high P component is probably to be traced back to the use of cleaning agents.

Outlook:

it can be assumed as certain that wastewater from the fish processing can be viewed as easily degradable. Using the AQUAMAX® system an

Guests who intend to make a pause or do so unintentionally enjoy the detectable environmentally friendly attitude of the facility



evenly good treatment performance can also be achieved under very different loadings. Through automatic detection of weak load periods the altered oxygen demand can be matched using automatic economical operation.

A modification of the aeration periods is not required in these cases. Nitrification and denitrification, even with a wastewater temperature of 3.9° C, are possible without limitation. Large variations of the sludge volume in the activated sludge stage have no disadvantageous effect on the settleable solids in the run-off. Settleable solids have, up until now not been verifiable.

Recognisable when driving by: here there are freshly caught fish. The romantic grace in the middle of meadows has made many passers-by curious.



The overall ASCHAUTEICHE PROJECT AT A GLANCE:

Owner Mr. Heese

Project Management Abwasserservice Goedereis

Implementation Plant technology
ATB GmbH

Installation
Abwasserservice Goedereis

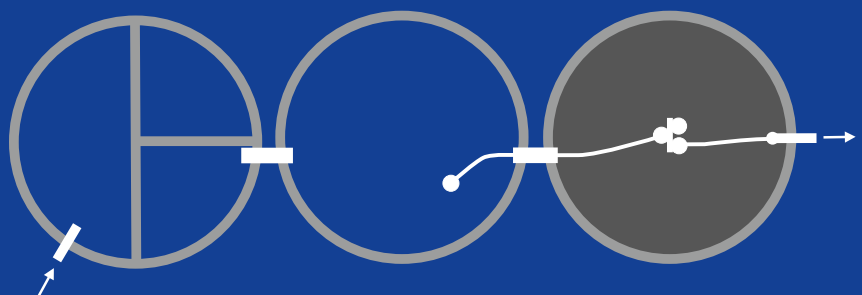
Peculiarities At peak times 1,5 t of fish per day;
1.000 - 1.800 mg CSB/l in the inflow; 50 PT pollution load;
2 - 8 m³ inflow per day

Cost of plant technology Ca. 16.000,- € (retrofitting)

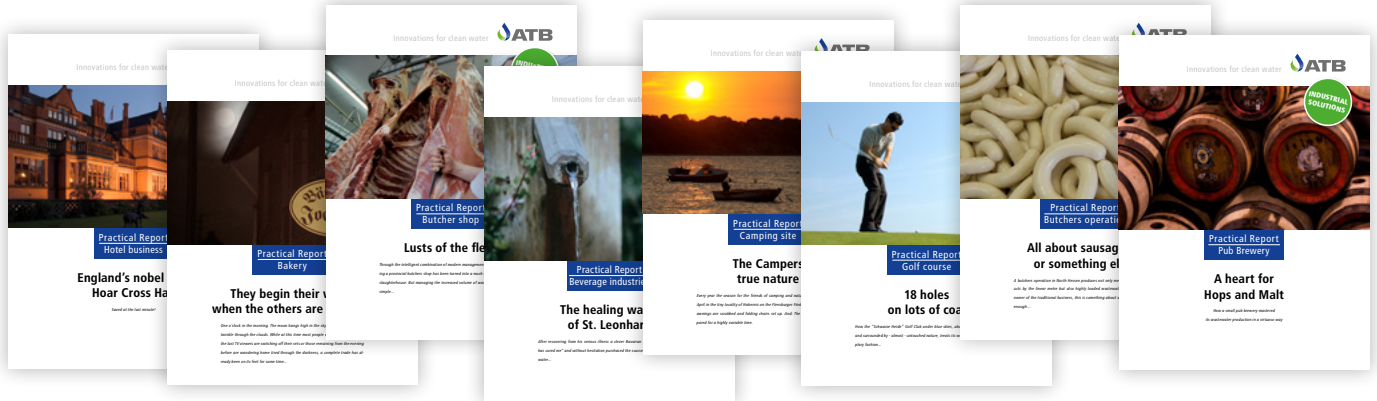
Commissioning September 2001

Required treatment performance COD < 100 mg/l
BOD₅ < 20 mg/l
NH₄-N < 10 mg/l

Outflow values COD < 80 mg/l
BOD₅ < 5 mg/l
NH₄-N < 10 mg/l



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