

ProECO

Ecological waste water cleaning

New organic preparation for homogenization of manure, liquid manure and other types of agricultural waste



LIQUID MANURE before first use of **APD 900 4X**



LIQUID MANURE after four months use of **APD 900 4X**



LIQUID MANURE after for six months use of **APD 900 4X**

- reduction of ammonia in the air
(37.6% - authorized measurement)
- reducing the volume of dry matter
in the manure tank
- odour reduction
- decomposition of organic waste
- simplification of pumping of liquid manure
- protection of animal health
(upper respiratory tract)
- possibility of using it in organic agriculture
certificate of Central Agricultural Inspection
and Testing Institute in Bratislava (ÚKSÚP)

reduction of operating costs !!!

Nature is never wrong

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Effect of APD 900 4X preparation with the content of selected bacteria species on ammonia volume in microclimate of stable in the fattening of pigs and on the quality of the liquid manure

A THIRD REDUCTION IN AMMONIA EMISSIONS

In addition to other toxic gases, ammonia is a major contributor to environmental pollution as the product of urea degradation released by animal urine. Effects of ammoniacal compounds on the environment cause eutrophication and acidification of ecosystems with negative impacts on plant species. Harmful effects of ammonia also appear in the environment of stable itself, where the crossing of the concentration limit directly affects the health of livestock but also humans and is the cause of reduced livestock productivity. [Central Agricultural Inspection and Testing Institute, branch office in Zvolen.](#)

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Directive 95/61 / EC on Integrated Pollution Prevention Control also deals with agricultural production where it is imposed on owners and livestock farmers to use the available means to eliminate the occurrence of ammonia in the stable environment and in the vicinity of farms.

The product teste - APD 900 4X - is a mixture of selected bacterial cultures, enzymes and nutrients that enhance and accelerate the natural biodegradation process. In the natural environment, both bacteria and enzymes (these are non-catalytic catalysts that decompose macromolecules) play an important role in the process of biodegradation.

Basic methodological principles and organization of the experiment

The experiment was carried out as a two-group comparative experiment in one repetition at the biological testing station of the Central Agricultural Inspection and Testing Institute (ÚKSÚP) of the Zvolen branch in Viglaš. The experiment was carried out in two halls, the experimental group was housed in one hall and the control group in other one. Pigs of the same average of live weight, of the same type of crossing, in the number of 40 and 24 animals, and in the same sex ratio in both groups were included in both halls. The animals selected for the experiment were healthy, well-suited and without external defects. The pigs were housed in shelters without debris under the same technological conditions. The experiment was terminated on the 138th day after the stocking of the pigs.

In order to ensure the same conditions for housing the animals, the number of animals in the groups was equalized during the experiment so that the same volume of air per animal was always present in both groups.

Microclimatic indicators - air temperature and air humidity - were measured and recorded three times a day at 7.00, 12.00 and 17.00 in parallel with the ammonia volume measurement. The measurement was performed in the animal zone. The ventilation was carried out, if necessary, without restrictions in both halls for fattening of pigs using the ventilators. The volume of ammonia was measured at nine pre-marked locations in the stabling area. The values from all measurements were recorded, averaging from all measurements in one day. Before the measurements, the individual halls were closed and the ventilation of the air in both halls was drained for the same length of time. Measurement of ammonia volume in ambient air was performed by the X-AM 7000. This device is innovatively designed for simultaneous and continuous measurement of the concentration of up to five types of gases. All sensors on this portable device are pre-calibrated. The device is water and dust-resistant and can even be immersed in water. The device is the holder of the world-recognized ATEX, UL and CSA certificates. Instruments have been calibrated at the intervals recommended by the service technician.

Quality of liquid manure of pigs was assessed by analytical determination of the dry matter content and total nitrogen content of the samples taken from the circulating manure dozer in which the was collected throughout the period. Sampling of manure was carried out in accordance with the methodical guidelines for manure sampling and was performed concurrently in a group of pigs with application of the preparation as well as without its application.

Dosage and dilution of the validated product APD 900 4X

Each dose of the APD 900 4X product was mixed in ten liters of warm water at 31-35 °C, incubated for 30-45 minutes, then uniformly applied to the manure in a circulating manure dozer in the hall of the experimental group.

Tracking indicators

1. Technological conditions of housing - air temperature, air humidity, ammonia volume.
2. From the ammonia volume values obtained from the 15th day of fattening (experimental period) to the end of the experiment, average values for one day and over the entire experimental period were calculated.
3. Live weight of pigs, health status and mortality. From each production of the feed mixture the content of nitrogenous substances was determined.
4. The results of the microclimate observations were statistically evaluated by the baseline statistic calculation and the differences in averages between groups were tested by Student's t-test

Results of the experiment

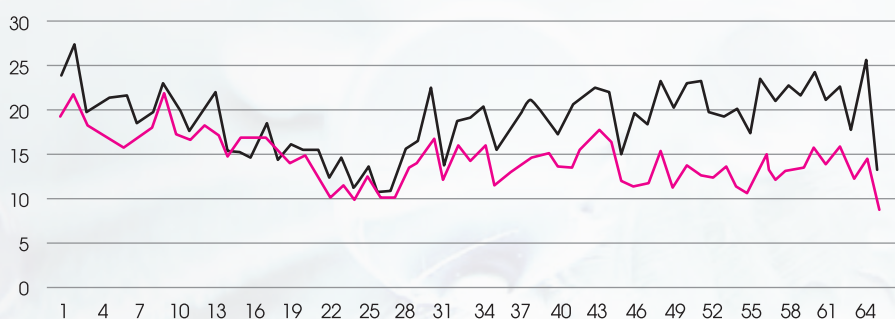
The results of the experiment indicate that the starting load of halls with ammonia was not the same. The hall of the experiment group was 7.22% more loaded with ammonia than the control group. In the control group hall, we recorded higher average air temperatures during all the monitored periods. Already after the first application of the standard dose of the product tested - APD 900 2X (100 and 70 gram) - the volume of ammonia in the microclimate of the housing was reduced.

After switching to a 35-gram dose, differences in ammonia volume between groups were not so significant. Even at lower doses of AMD 900 2X, however, in the experimental period, the average ammonia volume, except for three days, was always lower in the experimental group. The differences in average daily ammonia volume in the first half of the experimental period were not constant. We observed high variability between groups from 0.38% to 27.41%, but in the second half of the experiment the variability decreased.

Maximum differences between experimental and control groups at lower variability were noted over the last three weeks of the experiment. In the overall assessment, the volume of ammonia in the housing facility of the fattening of pigs can be reduced by 31.27%. The development of average daily ammonia volumes in a housing has shown that APD 900 4X should be used for a long time to reduce ammonia emissions.

In the subjective comparison between groups, the liquid manure in the second group was more fluid, without sedimentation of the solid and liquid component, as it was characterized by minor odours. The fertilizer quality assessment was carried out by five samples of manure during the period under review from both halls. On the basis of the analyses, we find that the test preparation has a well-established use in manure farms, since its action as well as the action of the added liquid component has positively influenced the consistency of the liquid manure by lowering the solids, which together with the formation of solid organic bonds in the organisms presently impinged on the emission nitrogen losses. A slight reduction in the weight percentage of total nitrogen in manure is also positively evaluated, due to its reduced consistency, which reduces the risk of hydrosphere damage by nitrates from agricultural activity in the case of used and permitted application rates of fertilizer. The biogas character of the test product APD 900 4X gives the opportunity to use manure treated with manure and agri-environmental management conditions.

ppm **Graph no. 1: Average ammonia volume in experimental period**



Results of experiment - microclimate of housing

Indication	1st group	2st group	index
Period of hall testing - the first four weeks of experiment			
Average volume of ammonia in ppm	8.87	9.51	107.22
Average air temperature in °C	20.92	10.92	95.22
Average relative humidity in %	68.87	69.07	100.29
Period of the first fourteen days of application			
Average volume of ammonia in ppm	17.68	15.43	87.27
Average air temperature in °C	21.17	20.45	96.60
Average relative humidity in %	67.05	70.26	104.79
Feeding period - experimental period			
Average volume of ammonia in ppm	19.13	14.53	75.95
Average air temperature in °C	24.30	22.93	94.86
Average relative humidity in %	75.32	78.01	103.57