APPLICATION OF EM TECHNOLOGY IN INDUSTRIAL WASTEWATER TREATMENT PLANT OF MEAT PROCESSING INDUSTRY

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1. **Abstract**

EM® application in industrial wastewater treatment plant of meat processing industry “Valvita”, situated in Valpovo, Croatia, is described in this report.

EM® treatment of industrial wastewater was conducted from 8 May to 1 June 2006. eMB® product, in the form of eMBa solution, was applied in the mechanical and biological phase of wastewater treatment plant of “Valvita” meat processing industry.

The goal of the treatment was to assess the eMBa ability in stimulating proliferation of active sludge microbial flora (active sludge stabilization), and achieving physical, chemical and biological improvement of wastewater quality.

*Key words: EM® Technology, eMB®, Active sludge Method, Meat Processing Industry, Wastewater Quality*

2. **Introduction**

Meat processing industry “Valvita” was established in 2003. Main business activity of “Valvita” meat processing industry is production, processing and preservation of meat and meat products. Present production capacities of slaughtering are 60 hogs and 20 calf / hour. In addition to those, daily processing capacities are 3 000 kg of meat products.

The wastewater treatment plant of “Valvita” meat processing industry was constructed with purpose of wastewater handling in terms of achieving satisfactory physical, chemical and biological indicators of wastewater quality.

The WWT plant is divided into two purification phases. The first one is mechanical phase of purification which is conducted in primary sedimentation tank and separator where mechanical particles and grease are removed from the wastewater.

The second one is biological (aerobic) phase of purification, conducted in aeration tank by active sludge method which acquires 8-12 hours of aeration.
3. **Methodology**

eMB® supplement was activated by means of anaerobic fermentation into aqueous eMBa solution.

Effluent receiving tank, as well as, aeration tank were inoculated with eMBa solution in amount of 1 liter eMBa / 7 m³ wastewater (calculated according to daily wastewater flow in WW effluent receiving tank). Although aeration tank was inoculated during aeration process, the treatment can also be conducted during non-aeration period.

The calculated amount of eMBa solution was applied on a daily basis and, in addition to it, some EM-Bokashi compost was also used as a purification enhancer in a biological phase of WW treatment.

Total of three wastewater sampling (first sample before the treatment, second sample 14 days after initial treatment and third sample 25 days after initial treatment), was done throughout the course of inoculation with the purpose of comparing wastewater quality before and after eMBa application.

Wastewater analysis was conducted in Belišće d.d., Belišće.

4. **Results and discussion**

   a) **Foul Odour Elimination**

   Several days after initial treatment, significant reduction in foul odour was achieved. By the end of the first week, WW became completely odourless.

   b) **Transparency**

   An improvement in transparency (muddy to nearly transparent), was visible after third week of inoculation.

   c) **pH Value**

   There was not any significant change in pH value throughout the course of the treatment (7.6 – 7.8).

   d) **SS Content**

   Total reduction of SS content during the treatment was 38%
e) Chemical Oxygen Demand (COD) Level
Total reduction of COD level during the treatment was around 9%.

f) Biological Oxygen Demand (BOD) Level
There was no change in BOD level during the treatment.

g) Oil and Fat Content
There was a 100% reduction of oil and fat content during the treatment.

Foul odour emission was determined organoleptically. Properly timed and targeted inoculation of eMBa solution resulted in efficient foul odour elimination, occurring shortly after the initial treatment, which strongly odourous wastewater converted to odourless one.

Wastewater transparency was determined organoleptically. Third week after eMBa inoculation, wastewater became nearly transparent which was due to 38% reduction of suspended solids content.

Inoculation of eMBa solution did not change the pH value, which ranged from 7.6 to 7.8; making it, therefore, suitable for further active sludge microbial culture proliferation.

The eMBa microbial inoculant improved active sludge digesting, not emulsifying, oil and fat compounds which was evidenced by their 100% reduction and drop in a COD level.

5. Conclusion

Through the eMBa solution inoculation in “Valvita” meat processing industry of Valpovo, the active sludge microbial culture concentration and adaptability to the environment was raised and, accordingly, wastewater purification process was improved. In addition to that, efficient foul odour elimination, as well as, transparency level was achieved shortly after initial treatment.

Further studies should be conducted with purpose of achieving BOD level reduction.

Implementation of EM technology in meat, as well as other food industry, can improve wastewater quality and, due to active sludge stabilization, decrease the cost of purification.