# Influence of negative pressure on activity of activated sludge bacteria

## Conference on Water, Waste and Energy Management

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**1. Introduction –** Reduction of pressure for a short time can be used for degassing of activated sludge while wastewater treatment. Degassing is performed before its discharge to secondary clarifier and improves the settling properties of activated sludge [1]. The physical process is known to enhance the nutrients removal efficiency [2]. However, the effect of negative pressure on bacteria is not recognized and improvement of nutrients removal is explained just by the increase of number of bacteria involved in the treatment process being as a consequence of an increased suspended solids concentration in the reaction chamber (resulting from better settling properties). The aim of the research was to determine the effect of negative pressure on activity of activated sludge by means of different activity tests.

**2. Experimental –** The activated sludge taken from municipal wastewater treatment plant was subjected to negative pressure (vacuum) of 700 - 970 hPa for 30 seconds. Both the sludge not subjected to vacuum (control) and subjected to vacuum were analysed by means of oxygen uptake rate, nitrification, denitrification and dephosphatation activity tests.

**3. Results and Discussion** – Overall results of activity tests performed on vacuum exposed activated sludge in relation to not vacuum exposed samples are presented in Table I.

**Table I.** Overall results of activity tests performed on vacuum exposed activated sludge

| **Activity type** | **dependence on vacuum value** | **comparison with control** |
|---|---|---|
| OUR (oxygen uptake rate) | no influence | lower |
| NR (nitrification rate) | no influence | lower |
| DNR (denitrification rate) | yes | lower |
| DPR (dephopshatation rate) | no influence | slightly higher |
| Culturability (only 950 hPa) | not determined | lower |

**4. Conclusions – E**xposition of activated sludge bacteria to vacuum results usually in similar or lower activity that can be explained by destruction of some cells.

Acknowledgements: The research was financed by the National Science Centre under project no 2013/11/D/NZ9/02608 entitled “Assessment of low vacuum effect on bacteria, activated sludge and wastewater treatment efficiency”.

**5. References**

[1] A. Gólcz, European Patent Office (EPO). (2000) Patent No. 0790851.
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