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yeast – a sequence with its own signal peptide (SP) and without SP. For this study we chose the yeast vector pINA1296, which contains a strong hybrid promoter hp4d and a secretion signal (XPR2 pre region). To clone the phytase gene, restriction sites KpnI and SfiI were used. Restricted vector and gene sequences were ligated. The resulting ligation constructs pINA1296/agpP (with SP) and pINA1296/agpP(without SP) were transformed into *E. coli* DH5α cells. Transformants were examined for the presence of the phytase gene by PCR and restriction analysis which was confirmed by sequencing. Resulting plasmids were isolated and linearized by *Not*I restriction enzyme prior to transformation. *Y. lipolytica* strain Po1 g was used for transformation by electroporation. Transformants were selected on the medium containing no leucine. Integration of the bacterial phytase gene into the *Y. lipolytica* genome was confirmed by PCR analyses. Expression of AgpP phytase in yeast is now being studied.

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P.Mis-039
Diversity of microbial siderophores excreted by electrogenic bacteria in microbial fuel cells treating swine wastewater

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Bio-electrochemical systems such as microbial fuel cells (MFCs) are promising new technologies for efficient removal of organic compounds from industrial wastewaters, including that generated from swine farming. Inside the confined anaerobic chamber of an MFC a consortium of bacteria catalyze oxidation reactions, depositing electrons on the anode by a variety of means, including directly via outer membrane proteins or conductive pili or indirectly via secretion and recycling of redox-active molecules. We inoculated two pairs of laboratory-scale MFCs with sludge granules from a beer wastewater treating anaerobic digester (IGBS) and from sludge taken from the bottom of a tank receiving swine wastewater (SS). Using a metagenomic approach we describe the microbial diversity of the MFC planktonic and anodic communities derived from the different inocula. Among the class *Deltaproteobacteria*, *Geobacter,* which produce electron-transferring pili, was identified as the most highly abundant genus on the anodes of both MFCs. The most abundant genera of *Archaea* were *Methanosarcina* on the anode of the SS-MFCs and *Methanothermobacter* on the anode of the IGBS-MFCs. We further carried out functional analysis to identify genes encoding for the production of a diversity of potential low weight redox active mediators, such as siderophores. We found that the most abundant types of siderophore producing genes were fluorescent siderophores, such as pyoverdin and pyochelin, in anodic and planktonic communities of both MFCs. Additionally, genes encoding for production of catechol-type siderophores like enterobactin and bacillibactin were identified. Genes for hybrid NRPS-PKS siderophores were represented by yersiniabactin in the anodic and planktonic communities of both MFCs. Thus, despite the fact that dominant bacterial genus was *Geobacter,* it is likely that the variety of redox active mediators excreted by other abundant species contribute to electricity generation in the MFCs.

P.Mis-040
Mortality and developmental delay of marsh frog (*Rana ridibunda*) embryos exposed to oil

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The decrease of biodiversity and population of aquatic animals can be connected with contamination of the environment with oil and oil products. Therefore, the study of impact of water-soluble fraction of oil (WSFO) on the early developmental stages of *R. ridibunda* was carried out. To obtain eggs, 5 sexually mature specimens of *R. ridibunda* were used: 2 females with body length of 110 ± 2.5 mm and body weight of 150 ± 6.2 g and 3 males with body length of 102 ± 2.7 mm and body weight of 115 ± 5.4 g. The animals were intraperitoneally injected with hormonal preparation consisting of des-Gly10, D-Ala6, Pro-NHEt9-GnRH (GnRH-A) and metoclopramide HCL (MET) at a dose of 5 μl/g of body weight. 4800 fertilized eggs were placed into experimental 20 L aquaria containing dechlorinated water. The water temperature was maintained at 23 ± 0.5°C. Exposure to the WSFO (Dunga oil field, Mangystau region, Kazakhstan) was started when all eggs reached gastrulation stage, which corresponds with Gosner stage (GS) 10. WSFO was obtained by mixing 100 ml of oil with 900 ml of distilled water for 48 h with following filtration. In total there were 3 replicates for each experimental group containing 400 eggs which were exposed to: I – control (pure water), II – 0.05% of WSFO, III – 0.5% of WSFO, IV – 1% of WSFO. The development of eggs was observed using stereoscopic microscope Motic (China). In 24, 48, 72 and 96 h mortality was checked, and photographs of embryos were also taken to measure morphometric parameters. Mortality in control groups was 6% ($P \geq 0.05$), and 17% ($P \geq 0.05$) among embryos of group II, mortality of embryos at higher concentrations in groups III and IV was 46% ($P \geq 0.01$) and 80% ($P \geq 0.01$), respectively. Also among the surviving embryos in groups III and IV, their smaller size and developmental delay and abnormalities were noted compared to the control group. Thus, oil pollution can cause high mortality, morphological disruptions and supress development rate of amphibians.

P.Mis-041
Self-assembling triton-based micellar clusters: formation features and modification strategies for new functional materials creation

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Low aqueous solubility of many compounds is usually a major obstacle in the development of therapeutic agents, drug delivery, sensing or during investigation of properties of materials. There many approaches commonly used to enhance the solubility of poorly soluble drugs exist. Micellar solubilization is a widely used alternative for the dissolution of many hydrophobic compounds. However, not always using of pure micellar aqueous solutions is suitable for solubilization. The concept of micellar conjugation followed by clusters formation showed a great potential in the aspect of hydrophobic compounds solubilization beyond their solubilization limit. With the aim to extend the application fields of micellar clusters, we developed new schemes for micellar

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