The fumarate reductase is not related to the extracellular electron transfer at polarization

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After whole genome sequencing and genome annotation of newly established Gram-positive bacteria *Paenibacillus profundus* YoMME [1] we began to study the putative role of important enzymes participating in the processes of respiration and acting as alternative electron acceptors and donors in the lack of oxygen. Under anaerobic conditions, it is supposed that fumarate reductase participates in the process of respiration in bacteria and can be reduced by electrons originating from H_2, sulphide, and formate used as electrons` donors. Although gene for fumarate reductase flavoproteins exists in the genome of *P. profundus* YoMME [1], the expression analyses showed that at three different polarization potentials: -200, +155 and +220 mV *vs.* SHE the fumarate reductase is not represented by more than copies (Fig. 1A), which means that this enzyme is nor expressed under polarization. The registered current when using graphite electrodes covered with bacterial biofilm show that this bacterial strain is capable of transferring electrons extracellularly (Fig. 1B) but the rate of this transfer depends on the applied potential.

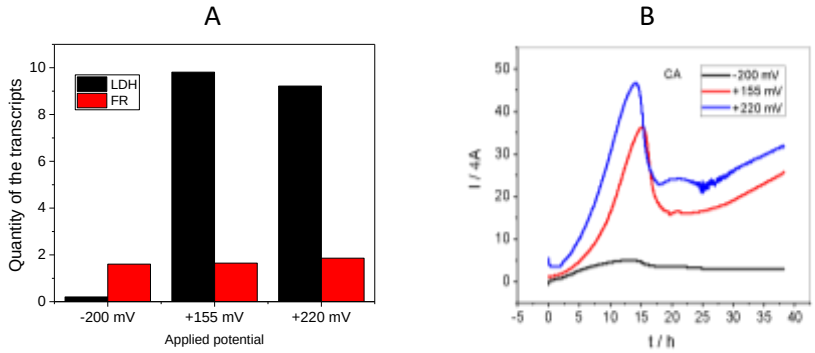

Figure 1. A - quantity of the transcripts calculated from the microliter of the cDNA (results from RT-PCR normalized toward ddPCR) in the total RNA extracted from bacterial biofilm after two days' cultivation at polarization at -200 mV, +155 mV, and +220 mV
B - CA of bacteria cultivated in medium consisting of MPB and fructose under polarization using different potentials

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References

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