There is worldwide concern related to the issue of fermentation. Scientists have to precisely control the pH in a narrow range because fluctuation of pH level can tremendously influence the strains’ performance. Therefore, a pH balance machine is needed to solve this problem. Our pH-balanced machine contains two sub-systems, one is the resistance system and the other is the regulation system. The resistance system can make bacteria survive in an expanded range of pH. The regulation system is used to adjust the microenvironment pH by synthesis of acid or alkali. The two sub-systems working together allows for lowered cost and energy of artificial pH regulation, because the host with our machine can maintain the high fermentation efficiency when the environmental pH is not optimal.

2015年BIT-China团队在大肠杆菌菌体内构建了一条名为“pH-Controller”的基因线路，使大肠杆菌不仅能耐受酸性或者碱性的环境，并且能通过自身产酸或者产碱，将外环境的pH调节至自身最适范围内。因为在发酵工业中，企业经常需要花费大量的人力、物力来精确调控发酵体系的pH。一旦体系pH值不在工程菌的最适范围内，发酵最终的生产效率大幅降低，当工程菌被导入“pH-Controller”后，即使体系pH不在工程菌的最适范围内，工程菌仍旧能保持高活性并且能自己调节环境的pH。

gaoxiaopeng@bit.edu.cn