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Short Communication

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1 **Membrane concentrate treatment by photosynthetic bacteria: Feasibility and**
2 **tolerance mechanism analysis**

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8 **Abstract:** Refractory membrane concentrate generated from the membrane bioreactor
9 (MBR) process remains a big challenge. With high pollution loads, high salinity and
10 low biodegradability, membrane concentrates are difficult to be treated by conventional
11 biological treatments. In this work, photosynthetic bacteria (PSB) were employed to
12 handle this problem. The results showed that PSB could simultaneously remove COD,
13 NH₃-N, NO₃⁻-N, salinity and chroma from the membrane concentrate. The removal
14 efficiency of COD, NH₃-N, NO₃⁻-N, salinity and chroma reached 24.0%, 78.0%, 81.6%,
15 57.0% and 60.0% respectively. Dark-aerobic condition was more beneficial for
16 pollutants removal. The tolerance mechanism of PSB in treating membrane concentrate
17 was then analyzed. The contents of protein and carotenoid in PSB increased by 38.7%
18 and 20.7% due to the defense stress effects. The content of bacteriochlorin decreased by
19 42.9% while the content of coenzyme Q₁₀ was stable at 8.4~8.8%.

20 **Key words:** photosynthetic bacteria; ultrafiltration concentrate; denitrification;
21 tolerance mechanism.

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