Cultivation of aerobic granular sludge with a mixed wastewater rich in toxic organics

Aerobic granular sludge was successfully cultivated in a sequencing batch reactor fed with a mixture of chemical industrial wastewater rich in toxic organics and the effluent from an anaerobic acidogenic reactor. After 30-day operation, stable granules with a size of 1.0–3.0mm were obtained. These granules appeared to have rougher surface than those cultivated with the carbohydrate- or acetate-rich wastewaters. There exhibited a “core” in the internal structure of the granules, which might benefit microorganisms to survive and resist the harsh environment. The formation of granules significantly improved the ability of sludge to withstand the toxic substances. The chemical oxygen demand removal efficiency of the granule-based reactor could reach around 80%, while its ammonia and total nitrogen removal efficiencies reached 90% and 40%, respectively. The aerobic-granule-based reactor showed an ability to resist the wastewater toxicity.