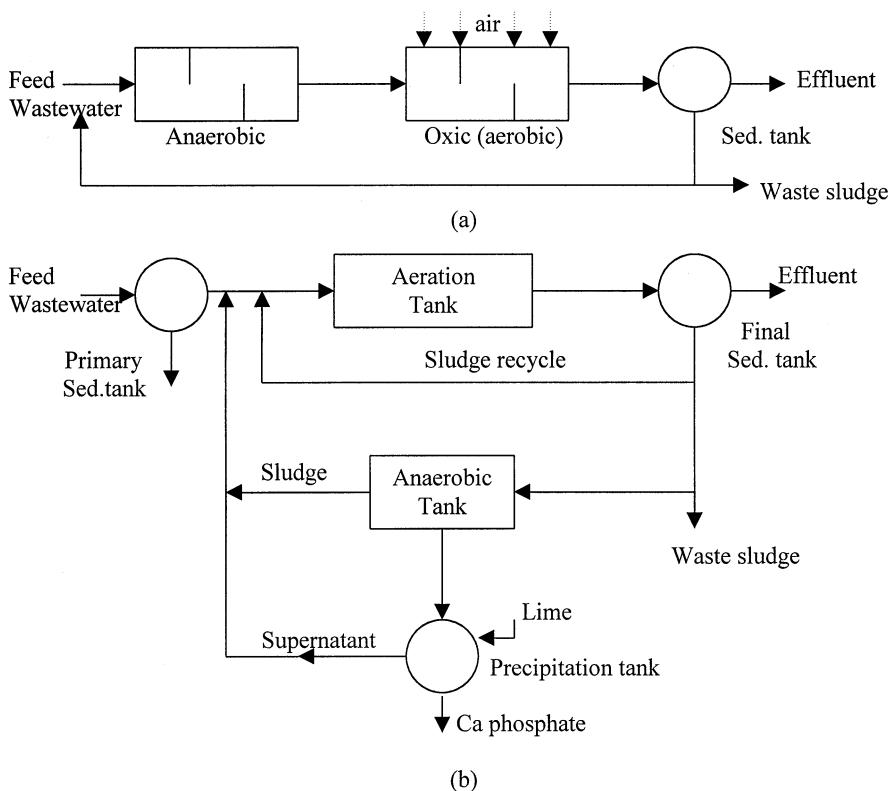


In phosphate removal bioprocesses, organisms are exposed to alternating anaerobic and aerobic conditions. The two major processes developed to promote luxury phosphate uptake are the A/O (Anaerobic/Oxic) and PhoStrip processes.

The A/O process is used for combined BOD and phosphate removal. It is a two-stage process incorporating anaerobic and oxic (aerobic) steps in sequence. In the anaerobic stage, the phosphate in the recycled sludge is released into liquid media. The released phosphate is taken up by the cells under aerobic conditions along with phosphate in the feed waste-water stream and is stored as polyphosphate granules. Polyphosphate is removed from the system by the waste sludge, which has a high value as fertilizer. When the BOD/P ratio in the feed wastewater is greater than 10, the effluent phosphate levels can be lower than 1 mg/l (Fig. 16.12).

The PhoStrip process consists of an aerobic stage and an anaerobic one on the sludge recycle stream, as shown in Fig. 16.12. The waste-water stream is fed to the aerobic stage for polyphosphate synthesis, the effluent of which is fed to a sedimentation tank. The underflow of the sedimentation tank is fed to the anaerobic stage for phosphate release. The released phosphate is precipitated in a sedimentation tank with the addition of lime in form of calcium phosphate. Part of the sedimented sludge and anaerobic reactor sludge is recycled back to the aerobic stage. Phosphate is removed from the process in the



**Figure 16.12** Phosphate removal processes: (a) A/O Process, (b) PhoStrip Process.