



Intensified Biological Phosphorus Removal Using Integrated Microvi Activated Sludge

Biological phosphorus (P) removal is increasing in popularity as concerns about the sustainability of metal precipitation methods and demands for phosphorus recovery grow.

The capital cost of retrofitting chemical phosphorus removal is less than the implementation of full Enhanced Phosphorus Biological Removal (EPBR). With phosphorus a finite resource, economic and sustainability interests drive toward phosphorus recovery making EPBR more attractive than chemical dosing. Existing facilities may not have enough reactor capacity for EBPR conversion which requires extensive capital updates at high cost.

Integration of Microvi MNE within existing reactors can release 50% reactor capacity allowing low capital conversion to EPBR.

To demonstrate this, a multi-stage sidestream Integrated Microvi Activated Sludge (S2-IMAS) pilot was implemented at Oro Loma Sanitary District for period of 6 months.

The installation confirmed S2-IMAS's ability to intensify activated sludge processes while achieving full ammonia and nitrogen removal without additional carbon despite compromised process conditions. Using a RAS sidestream anaerobic zone, biological phosphorus was observed with up to 80% removal following a period of stable operation.

Project Details

Issue: Nitrogen and Phosphorus Removal

Solution: Sidestream Integrated Microvi Activated Sludge (S2-IMAS) for Nutrient Removal

Key Results:

- Full nitrification (95%+) below the minimum SRT
- 75% total inorganic nitrogen removal achieved with full utilization of soluble carbon in the anoxic zone
- Up to 80% orthophosphate removal under non-optimal process and operating conditions
- Higher nitrogen and phosphorus removal post optimization while reducing energy consumption and increasing biogas production

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