Table 5

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Design parameters** | **Algal community** | **Test conditions** | **Influent concentration (mg.L-1)** | **Removal efficiency (%);****Uptake rate (mg.m-2.d-1)** | **Biomass production (g.m-2.d-1) dry weight** | **References** |
| **Substrata;****Area (m2)** | **HRT (d);****Flow velocity (m3.d-1);****Depth (m)** | **Test waters;****Temp (oC);****pH** | **Irradiance (µmol.m-2.s-1)a**  | **NH4+** | **TP** | **NH4+** | **TP** |
| **FLOWAY** |
| Floway periphyton scrubber: plastic sheets 11.5 | --1280.001-0.003 | *Cladophora crispata, Enteromorpha micrococca, Stigeoclonium tenue, Cladphora* sp, *Spirogyra rivularis, Dichotomosiphon tuberosus, Eunotia pectinalis, Melsoria varians, Oscillatoria subbrevis, Cosmospogan coeruleus* | Agricultural run-off18.1-27.27.7 | -- | -- | 0.058 | -- | 17.0124 | 21.2 | (Adey et al., 1993) |
| Serial periphyton scrubber: plastic sheets2.7 | --37-- | Agricultural run-off18.1-27.27.7 | -- | -- | 0.038 | -- | 15.2102 | 21.6 | (Adey et al., 1993) |
| Algal Turf Scrubber Single Floway1012 | --436-12260.02-0.04 | *Oscillatoria, Navicula* sp*. Nitzschia* sp*., Cyclotella* sp*., Ulothrix* sp*.,**Cladophora* sp*., Microspora* sp*.* | Secondary effluent18.98.4 | -- | 3.3 | 3.1 | 24.21,110a | 45.2730 | 35.0 | (Craggs et al., 1996a; Craggs et al., 1996b; Craggs, 2001) |
| Flow lanes 0.0048  | 3---- | Community sampled from sedimentation tank | Modified BG1120-30-- | 15-120  | -- | -- | -- | --0.3-119.9 | 0.17-29.0 | (Guzzon et al., 2008) |
| PVC sheet flow cell1.8 | 0.0060.0004-0.0070.02 | *Nitzchia* and green filamentous | Synthetic wastewater227.0 | 230  | -- | -- | --1d | --130 | -- | (Boelee et al., 2011) |
| Unglazed pre-soaked quarry tiles12.2  | ----0.005-0.01 | *Characium pringsheimii; Oedogonium; Palmellopsis gelatinosa; Pseudopleurococcus* sp*; Scensdesmus quadrucauda; Stigeoclonium; Ulothrix* plus other cyanobacteria and diatoms | Secondary effluent11.9-- | 270.3 g.cal.cm-2.d-1 | -- | -- | --1,903b | --157  | 130 g.m-2 | (Davis et al., 1990a; Davis et al., 1990b) |
| Plastic mesh *(Periphyton-fish system)* 48 | -- | -- | Secondary effluent---- | -- | -- | -- | 82c108c | 2327 | -- | (Rectenwald and Drenner, 2000) |
| **SUBSTRATE SUBMERSION** |
| Rotating Algal Biofilm Reactor (RABR)4.26 | 1216.40.9 | *Diatoma, Pediastrum, Chlorella* sp | Wastewater effluent11.8-- | 208 | 7.8 | 4.5 | --14,100 | --2,100 | 31.0 | (Christenson and Sims, 2012) |
| Polyurethane foam 0.00045 | --0.5 L.L-1.d-10.26 | *Chlorella* sp. | Pre-treated cattle manure-- | 53a | 237.0 | 34.0b | 66.9-- | 64.1e-- | -- | (Travieso et al., 1996) |
| Polyurethane foam 0.00045 | --1 L.L-1.d-10.26 | *Chlorella* sp. | Pre-treated cattle manure-- | 53a | 237.0 | 34.0b | 62.8-- | 60.3e-- | -- | (Travieso et al., 1996) |
| Polyurethane foam 0.00045 | --1.5 L.L-1.d-10.26 | *Chlorella* sp. | Pre-treated cattle manure-- | 53a | 237.0 | 34.0b | 59.5-- | 57.6e-- | -- | (Travieso et al., 1996) |
| Polyurethane foam 0.00045 | --2.0 L.L-1.d-10.26 | *Chlorella* sp. | Pre-treated cattle manure-- | 53a | 237.0 | 34.0b | 52.6-- | 51.5e-- | -- | (Travieso et al., 1996) |
| Polyurethane foam 0.00045 | --2.5 L.L-1.d-10.26 | *Chlorella* sp. | Pre-treated cattle manure-- | 53a | 237.0 | 34.0b | 47.2-- | 48.0e-- | -- | (Travieso et al., 1996) |
| Polyurethane foam 0.00045 | --2.5 L.L-1.d-10.26 | *Chlorella* sp. | Pre-treated cattle manure-- | 265-372a | 237.0 | 34.0b | 58.2-- | 55.4e-- | -- | (Travieso et al., 1996) |
| Polyurethane foam 0.00045 | --0.5 L.L-1.d-10.26 | *Scenedesmus* sp. | Pre-treated cattle manure-- | 53a | 237.0 | 34.0b | 60.6-- | 59.2e-- | -- | (Travieso et al., 1996) |
| Polyurethane foam 0.00045 | --1 L.L-1.d-10.26 | *Scenedesmus* sp. | Pre-treated cattle manure-- | 53a | 237.0 | 34.0b | 58.6-- | 57.8e-- | -- | (Travieso et al., 1996) |
| Polyurethane foam 0.00045 | --1.5 L.L-1.d-10.26 | *Scenedesmus* sp. | Pre-treated cattle manure-- | 53a | 237.0 | 34.0b | 54.5-- | 53.2d-- | -- | (Travieso et al., 1996) |
| Polyurethane foam 0.00045 | --2.0 L.L-1.d-10.26 | *Scenedesmus* sp. | Pre-treated cattle manure-- | 53a | 237.0 | 34.0b | 48.5-- | 48.3e-- | -- | (Travieso et al., 1996) |
| Polyurethane foam 0.00045 | --2.5 L.L-1.d-10.26 | *Scenedesmus* sp. | Pre-treated cattle manure-- | 53a | 237.0 | 34.0b | 42.0-- | 44.0e-- | -- | (Travieso et al., 1996) |
| Polyurethane foam 0.00045 | --2.5 L.L-1.d-10.26 | *Scenedesmus* sp. | Pre-treated cattle manure-- | 265-372a | 237.0 | 34.0b | 53.4-- | 50.8e-- | -- | (Travieso et al., 1996) |
| Polystyrene foam 0.0136 | 6Batch-- | *Chlorella* sp.Initial growth | Dairy manure wastewater20-- | 110-120  | 309 | 770 | 94.3-- | 73.4-- | 4.3 | (Johnson and Wen, 2010) |
| Polystyrene foam 0.0136 | 10Batch-- | *Chlorella* sp.Initial growth | Dairy manure wastewater20-- | 110-120  | 309 | 770 | 97.0-- | 90.0-- | 2.6 | (Johnson and Wen, 2010) |
| Polystyrene foam 0.0136 | 15Batch-- | *Chlorella* sp.Initial growth | Dairy manure wastewater20-- | 110-120  | 309 | 770 | 98.7-- | 93.0-- | 1.7 | (Johnson and Wen, 2010) |
| Polystyrene foam 0.0136 | 6Batch-- | *Chlorella* sp.Re-growth | Dairy manure wastewater20-- | 110-120  | 309 | 770 | 97.1-- | 76.6-- | 4.3 | (Johnson and Wen, 2010) |
| Polystyrene foam 0.0136 | 10Batch-- | *Chlorella* sp.Re-growth | Dairy manure wastewater20-- | 110-120  | 309 | 770 | 99.9-- | 70.8-- | 2.6 | (Johnson and Wen, 2010) |
| Polystyrene foam 0.0136 | 15Batch-- | *Chlorella* sp.Re-growth | Dairy manure wastewater20-- | 110-120  | 309 | 770 | 99.9-- | 62.3-- | 1.7 | (Johnson and Wen, 2010) |
| Radial flexibility PVC fillers -- | 6Batch0.8 | *Chlorella pyrenoidosa, Scenedesmus obliquus, Anabaena flosaque, Microcystis aeruginosa* | Artificial wastewater24-298.0 | 47a | 18.2 | 10.4 | 91.9-- | 98.2-- | -- | (Wei et al., 2008) |
| Radial flexibility PVC fillers -- | 240.0050.8 | Artificial wastewater24-298.0 | 47a | 12.3 | 9.0 | 82.4-- | 95.4-- | -- | (Wei et al., 2008)  |

a Irradiance units converted to µmol.m-2.s-1 using conversion guidelines within (Thimijan and Heins, 1983)
b Total Kjeldahl Nitrogen(TKN)
c Total Nitrogen
d Nitrate
e Orthophosphate