R E F E R E N C E S

Adamse, A.D.: 1968:

Formation and final composition of the bacterial flora of a dairy waste activated sludge. Water Research, 2: 665-671.

Algal Assay Procedure Bottle Test, 1971:

National Eutrophication Program. Environmental Protection Agency, August, 82, pages.

Allen, L.A.: 1944:

The bacteriology of activated sludge. J. Hyg., 43, 424-431.

Allen, M.B.: 1955-a:

Photosynthetic nitrogen fixation by blue-green algae. Transactions of the Conference on the use of solar energy. The Scientific basis, Turison, Arizona, Vol.4. Chapter 9, 27-37.

Allen, M.B.: 1955-b:

General features of algal growth in sewage oxidation ponds. Publication No.18, California State Water Pollution Control Board, Sacremanto.

Arceivala, S.J., Lakshminarayan, J.S.S., Alagarsamy, S.R. and Sastry, C.A.: 1969:

Design, Construction and operation of waste stabilization Ponds in India. Central Public Health Engineering Research Institute, Nagpur, India. 128 pages.

Association of Official Agricultural Chemist: 1945:

6th Edition, 1945 Official and Tentative methods of Analysis, Published by the Association of Agricultural Chemist, Washington,D.C.

Basu, N.M.: 1963:

Oxidation Pond at Durgapur Steel Township. Symposium on Waste Treatment by Oxidation Ponds, held at CPHERI, Nagpur, India on October, 29-30.

Beck, L.A., Oswald, W.J., and Goldman, J.C.: 1969:

Nitrate removal from Agricultural tile drainage by photosynthetic systems. Presented to ASCE, Second National Symposium on Sanitary Engineering Research, Development and Design, July 15, 1969, Cornell University, Ithace, New York.

Bhaskaran, T.R. and Chakrabarti, R.N.: 1966:

Pilot plant for the treatment of Cane sugar waste. Jour. Wat. Poll. Contr. Fed. 38(7): 1160-1169.

Birge, E.A. and Juday, C: 1911:

The Inland lakes and Wisconsin. The dissolved gases of the water and their biological significance. Wis. Nat. Hist. Sur. Bull. 28 Sci. Ser. 7, 259 pages.

Bogan, H.H., O.E. Alberton and J.C. Pluntze: 1960:

Use of algae in removing phosphorus from Sewage. J. San. Engr. Div. Proc. ASCE, 86. S.A. 5, 1-20.

Breed, R.S. Murrary, E.G.D., Smith, N.R. and Ninetyfour Contributors: 1957:

Bergey's Manual of Determinative Bacteriology, 7th Ed. The Williams and Wilkins Co., Baltimore.

Buck, T.C. and Keefer, C.E.: 1959:

Studies of a Zoogloeal forming organisms found in activated sludge. Sew. Ind. Wastes 31:1267 cited by Van Gils, 1964.

Burlew, J.S. 1953:

Algal culture from Laboratory Pilot Plant Carneige Institution of Washington Publication 600.

Bush, A.F., J.D. Ishwerwood and S. Rodgi, 1961:

Dissolved solids removal by algae: J. San. Engr. Div. Proc. ASCE, 87, SA.S. 39-57.

Buswell, A.M. and Long, H.L.: 1923:

Microbiology and theory of activated sludge. Jour. Amer. Wat. Wks. Ass. 10: 309-321.

Butterfield, C.T.: 1935:

Studies of sewage purification. A Zoogloea forming bacterium isolated from activated sludge. Publ. Health Rep. 50, 671-864.

Butterfield, C.T., Ruchhoft, C.C. and McNamee, R.D. 1937:

Studies of Sewage Purification VI. Biochemical Oxidation of sludges developed by pure cultures of Bacteria isolated from cultivated sludge. Sewage Works, J. 9: 173-178.

Butterfield, C.T. and E. Wattie: 1941:

Studies of Sewage purification XV. Effective bacteria in purification by Trickling Filters. Sewage Works, J. 13, 639-658.

Calaway, W.T.: Carroll, W.R., and Long S.K.: 1952 :Heterotrophic Bacteria.....filtration of sewage. Sewage and Ind. Wastes, 24: 642-653.

Caldwell, D.H.: 1946:

Sewage Oxidation Ponds; performance operation and design. Sewage Works, J. 18: 433-458.

Cook, B.B.: 1962:

The nutritive value of waste grown algae. Am.J. Publ. Hlth. 52, 243-251.

Cramer, M. and Meyers, J.: 1948:

Nitrate reduction and assimilation in Chlorella pyrenoidosa. Jour. Gen. Physiol. 32, 93-102.

Davis, E.A. et al.: 1953:

Laboratory experiments of Chlorella Cultures at the Carneige Institution of Washington, Dept. of Plant Pathology. Chapter 9, 105-153.

DeLey, J.: 1960:

Comparative carbohydrate metabolism and localization of enzymes in Pseudomonas and related micro-organisms. Appl. Bact. 23, 400-410.

Dias, I.F. and Bhat, J.V.: 1964:

Microbial ecology of activated sludge I. Dominant bacteria. App. Microbiol. 12(5):412-417.

Dugan, P.R. and Lundgren, D.G.: 1960:

Isolation of the floc forming organism Zoogloea ramigera and its culture in complex synthetic media. Appl. Microbiol.8,357-361.

Duttweiter, D.W.: 1963:

Heat Exchange in sewage stabilization Ponds. Symposium on waste treatment by Oxidation Ponds, held at CPHERI, Nagpur, India, on October, 29-30.

EL-Baroudi, H.M. and S.K. Moawad.: 1967:

Rate of BOD reduction by Oxidation Ponds. Part I. Jour. Water Poll. Contr. Fed. 39, 1626-1646.

Eckenfelder, W.S. and Weston, R.F.: 1956:

Kinetics of biological Oxidation. In Biological Treatment of Sewage and Industrial Wastes, 1, 18-34, Reinhold, N.Y.

Eckenfelder, W.W.(Jr.) and Porges, N.: 1957:

Activity of Micro-organisms in Waste Disposal IV. Bio-calculation. Appl. Microbiol. 5:182-187.

Fieldman, A.E.: 1955:

Fungi from trickling filters. Sew. Ind. Wastes, 27, 1243-1251.

Fink, H. and Harold, E.: 1957:

On the protein quality of an uni-cellular alga and its preventive action on liver-necrosis. Parts I & II. Z. Physiol. Chem. Hoppe, Seyler's 305 and 307: 182-200 and 202-218.

Fitzerald, G. R.: 1969:

Some factors in the connection or antagonism among bacteria, algae and aquatic weeds. Jour. Phycol. 5: 351-559.

Fogg, G.E.: 1947:

Cited by Fogg, G.E. in the Metabolism of Algae Ed. 1952.

Fogg, G.E.: 1952:

The production of extra-cellular nitrogenous substances by blue-green algae. Proc. Roy. Soc. B. series, 139, 372-397.

Fogg, G.E.: 1958:

Cited by Fogg, 1960.

Fogg, G.E.: 1960:

The extra cellular products of algae in Fresh Water - In Symp. on Algology. Ind. Coun. of Agr. Res. New Delhi, India.

Ganapati, S.V., Prasadrao, P.S., Godbole, S.H., Kothandaraman, V. and Koshy, T.: 1965:

The Ecology of Solar Sewage Drying beds in the Pirana Sewage Farm at Ahmedabad, India. Hydrobiologia, 26: 242-270.

Ganapati, S.V., and Sreenivasam, R.: 1970.

Energy flow in natural aquatic Ecosystems in India, Arch. of Hydrobiol. 66(4): 458-495.

Ganapati, S.V.: 1971:

Organic production in Seven Types of Aquatic Eecosystems in India. p. 312-350. In Intrnl. Symp. on Tropical Ecology emphasizing organic production under INTECOL - ISTE - INSA, at New Delhi, January, 14-21.

Gellman, I. and Heukelekian, H.: 1953: Studies of Biochemical Oxidation.....Direct Methods-III. Sew. Ind. Wastes. 25: 1196 - 1205.

Gest, H. and Kamen, M.D., 1948:

Studies on the Phosphorus metabolism of green algae and purple bacteria in relation to photosynthesis, J. Biol. Chem. 176: 299-318.

Gloyna, E.F.: 1971:

Waste Stabilization Ponds. WHO, Monograph, Series No.60, 175 pages.

Golueke, C.G., Oswald, W. J. and Gotaas, H.B.: 1957:

Anaerobic digestion of Algae. Appl. Microbiol. 5: 47-52.

Golueke, C.G., Gotaas, H.B., and Oswald, W.J.: 1958:

Recovery of Algae from Waste Stabilization Ponds. Section II. University of California. San. Engr., Res. Lab. Issue 8, I.E.R. Series 44, Jan.

Golueke, C.G., Oswald, W.J., Gee, H.K., and Cook, B.E.:1959:

The Biological Control of Enclosed Environment. Sew. Ind. Wastes. 10, 1125-1132.

Golueke, C.G.: 1960:

TheeEcology of a Biotic Community consisting of Algae and Bacteria, Ecology. 41: 65-73.

Goodman, B.L. and Weiss, F.G.: 1968:

Development of a full scale Activated Algae. Unit. Paper Presented at the Phosphorus Removal Workshop. 2nd Session, Chicago, June, 27.

Gotaas, H.B. and Oswald, W.J., 1955.

Utilization of solar energy for water reclamation. In " Transactions of the Conference on the use of Solar energy". The Scientific Basis, Tucson, Arizona, Vol. 4, Chapter 9, 95-114.

Harrigan, W.F. and McCance, M.E. 1966:

Laboratory Methods in Microbiology. Academic Press, London, p. 67.

Harris, F.W., Cockburn, T. and Anderson, T. 1927:

Biological and Physical properties of activated Sludge. Water Works, 66, 24 cited by Van Gils,1964.

Harvey, H.W., 1940:

Nitrogen and Phosphorus required for the growth of Phytoplankton. Jour. Mar. Biol. Ass. U.K. 24, 115-123.

Heukelekian, H. and Littman, M.L.: 1939:

Morphological and Biochemical studies of Zoogloeal organism. Sewage Works, Jour. 11, 752.

Heukelekian, H. 1941:

Mechanical flocculation and Bio-flocculation of sewage. Sewage Works Jour. 13, 506-523.

Hicks, R.: 1958:

Interim Report on Methods of Harvesting and possible utilization of algae. Report to the Auckland Metropolitan Drainage Board, New Zealand, March.

Hoover, S.R., Jascwicz, L.Z., Proges, N. and Pospinsky, J.B.: 1951:

Assimilation of dairy waste by activated sludge. Sew. Ind. Wastes. 23: 167-173.

Hoover, S.R. and Porges, N.: (1952):
Biochemical Oxidation of Dairy Wastes.
Sew. Ind., Wastes, 24:302- 312.

Hoover, S.R. Jascwicz, L.Z. and Porges, N.:1952:

Biochemical oxidation of dairy waste IV. Endogenour respiration and stability of aerobic dairy waste sludge. Sew. Ind Wastes, 24:1144-49.

Hugh, L. and Leifson, E.: 1953:

The taxonomic significance and fermentative virus oxidative metabolism of Carbohydrate by various Gram Negative bacteria. Jour. Bact. 66: 24-26.

Humenik, F.J. and Hanna, Jr. G.P. 1970:

Respiratory relationships of a symbiotic algal-bacterial culture for waste water nutrient removal. Biotechnology and Bio-engineering 12, 541-560.

Hungate, R. E., 1962:

Ecology of bacteria P. 96-119. In. I.G. Gunsalus and R.Y. Stainer (Ed.). The Bacteria Vol. 4. Academic Press. Inc. New York.

Jagannatha Rao, D.R. and Sharma, T.P.: 1963:

Oxidation Pond Treatment of Domestic Sewage at Bhopal. Symposium on waste treatment by Oxidation Ponds. held at CPHERI, Nagpur, India on October, 29-30.

Jascwicz, L.Z. and Porges, N.: 1956:

Biochemical oxidation of dairy waste VI. Isolation and study of sludge micro-organism. Sew. Ind. Wastes. 28: 1130-1136.

Jewell, W.J. and McCarty, P.L.: 1968:

Aerobic decomposition of algae and nutrient regeneration. Technical Report No.91. Dept. of Civil Engr. Standford University.

Ju-Chang Huang and Gloyna, E.F.: 1968-a.

Effect of organic compounds on Photosynthetic Oxygenation 1. Chlorophyll destruction and Suppression of Photosynthetic oxygen production. Water Research 2, 347-366.

Ju-Chang Huang and Gloyna, E.F.: 1968-b:

Effect of organic compounds on Photosynthetic Oxygenation II. Design Modification for waste Stabilization Ponds. Water Research 2, 459-469.

Juday, C., Birge, E.A., and Meloche, M.V.: 1935:

The Carbon dioxide and hydrogen ion contents of the lake waters of North-Eastern Wisconsin, Trans. Wis. Acad. Sci. Arts and Litt. 29, 1-82.

Kamm, W.: 1917:

Cited by Van Gils, 1964.

Khanade, J.M.: 1963:

Amino acids in the Oxidation Ponds. Symposium on Waste Treatment by Oxidation Ponds, held at CPHERI, Nagpur, India on Oct., 29-30.

King, D.L.: 1970:

The role of Carbon in eutrophication. JWPCF. 42(12): 2035-2051.

Ketchum, B.H.: 1939:

The development and restoration of deficiencies in Phosphorus and Nitrogen Content of Unicellular Plants. J. Cellular and Comp. Physiol. 5:55-74. Cited in Removal of Nitrate by an Algal system Bio-engineering aspects of Agricultural Drainage San. Joaquin Valley, California, April, 1971.

Kountz, R.R. and Forney, C. (Jr.) 1959:

Metabolic energy balances in total "Oxidation activated sludge system. Sew. Ind. Wastes, 31(7): 819-826.

Krogh, A.: 1931:

Dissolved substances as food of aquatic organisms. Biol. Rev. 6: 412-442.

Kuentzel, L.E.: 1969:

Bacteria, Carbon dioxide and algal blooms. Jour. Wat. Poll. Central Fed. 41(10): 1737-1746.

Kuentzel, L.E.: 1970:

Bacterial-algae Symbiosis - a cause of algal bloom. Proc. Nat. Symp. on Hydrobiology. Am. Water Resources Ass. No.8: 321-334.

Kuentzel, L.E.: 1971:

Phosphorus vs Carbon as a factor in algal blooms and deterioration of water quality. Presented at the Division of Environmental Sciences of New York Academy of Sciences. New York City, Feb.,3, 10 pages.

Lakshminarayana, J.S.S., Parabrahman, M., Khan, A.N., and D.Y. Ratnaparkhi, 1963:

Domestic Sewage oxidation Ponds at Nagpur,(India). Symposium on Waste Treatment by Oxidation Ponds, held CPHERI, Nagpur, India, on Oct., 29-30.

Lamana Carl: 1963:

"Studies of endogenous metabolism in bacteriology. Conference entitled Endogenous Metabolism with special reference to bacteria by the New York Academic of Sciences. Spt. 20 and 21, 1962. And published in Annals of New York Academic of Sciences, 102(3): 518-520.

Lederberg, J. and Lederberg, E. 1952:

Replica plating and indirect selection of bacterial mutants. J. Bact. 63, 399-406.

Lefevre, M. and Jakob, H.: 1949:

Sur quelques properties des substances actives tues des cultures' d'Algenes d'eaudvoce. C. R. Acad. Sc. Paris, 229, 234-236.

Lewin, R.A.: 1956:

Green algae extra-cellular polysaccharides. Can. J. Microbiol. 2, 7-22.

Lowry, O.H., Rosebrugh, A.L., Farr and Randall,R.T.: 1951:

Protein measurement with the Folin-phenol reagent J. Biol. Chem., 193, 265-271.

Ludwig, H.F., Oswald, W.J., Gotaas, H.B. and Lynch, V.:1951:

Algae symbiosis in oxidation ponds. I. Growth Characteristics of Luglena gracillus cultured in Sewage. Sewage Ind. Waste, 23,: 1337-1355.

Manual of Microbiological Methods: 1957:

Published by the Society of American Baacteriologists.

Marais Van, R.G.: 1962:

WHO Symposium on new development in sewage treatment, Cincinnati.

Maucha, R.: 1929:

Zur FRAGE der aktuelle Reaktion als Millieu Factor der gewasser. Verh. Internat. Ver. Limnol. 4: 435-450.

McGarry, M.G.: 1967:

The production of food from domestic sewages Publ. Hlth. Engg. (Kerala): 12, 9-15.

McGarry, M.G., and Tangkanse, C. 1971:

Water Reclamation and Harvesting. Jour. Wat. Poll. Contr. Fed. 45: 824-839.

McGarry, M.G.: 1971:

Unicellular protein production using domestic waste water. Paper presented at the 10th Session of the National Conference on Agricultural Sciences. Thiland, Feb. 1. 15 pages.

Mckinney, R.E.: 1952:

A fundamental approach to the activated sludge Process II. A proposed theory of flocculation. Sew. Ind. Wastes. 24: 281-288.

Mckinney, R.E. and Horwood, M.P.: 1952:

Fundamental approach to the activated sludge process III. A proposed theory of floc formation. Sewage Ind. Wastes 24, 117-123.

Mckinney, R.E. and Weichlein, R.C.: 1953:

Isolation of floc producing bacteria of activated sludge. Appl. Microbiol. 1, 259-261.

Mckinney, R.E. 1956:

Biological flocculation. In Biological treatment of sewage and Industrial Wastes. Vol.I. 88-100. Edited by McCabe and W.W. Eckenfelder, Reinhold Publ. Crop. N.Y.

Mckinney, R.E.: 1962:

Microbiology for Sanitary Engineers. McGraw Hills Books Co., N.Y.

Mckinney, R.E. and Waheb, V.N.: 1968:

"Activated algae". In phosphorus removal Workshop. 2nd Session, Chicago, June, 27.

McWhorter, T.R. and Heukelekian, H.:1964:

Growth and Endogenous phases in the Oxidation of glucose. In advances in wastes Pollution Research Proc. Internatl. Conf., in London, Sept. 2, 419-435.

Modak, N.V.: 1960:

Report of the experimental work done on Oxidation Ponds at Bazen Bagh, Nagpur, by CPHERI.

Monod, J.: (1949):

The growth of bacterial Cultures. Ann. Review of Microbiol. 3, 371.

Merz, R.C., J.C. Merrell and Stone, R.: 1957:

Seasonal variations in the algal flora of Oxidation Ponds. Sewage and Industrial Waste, 2: 115-123.

Myers, J.: 1948:

Algae in Oxidation Ponds. Public Works, 79:25-40.

Myers, J.: 1955:

Algal Growth: Process and Production: In Trans. Conf. on the use of Solar Energy. The Scientific Basis. Tucson, Arizona, Vol.4, Chapter IX, Pages, 1-11.

Myers, J.: 1962:

39, Laboratory Cultures, 605-613. pages 609. In Physiology and Biochemistry of algae". Edited by Lewing.

Myers, J. (1964):

Use of algae for support of the human in space. Life Sciences & Space Research II. Ed. M. Florlnin and A. Dolfuss, Amsterdam, North Holland Publ. Co.

Nasbaum, I.: 1957:

Discussion on Photosynthesis. (Photosynthesis in Sewage treatment). Trans. Ann. Soc. Civil Engr. 122, 98-100.

Neel, J.K. and G.J. Hopkins: 1956:

Experimental lagooning of raw sewage. Sewage Ind Wastes, 28: 1326-1356.

Neel, J.K., Dernott, J.H. and Monday (Jr.) C.A.: 1961:

Experimental lagooning of raw sewage at Faytelte, Missouri, Jour. Wat. Poll. Contr. Feder. 33: 603-641.

Nerescheimer, N. and Ruttner,F.: 1929:

Cited by Juday et al. (1935).

Oswald, W. J., H.B. Gotaas, H.F. Ludwig and V. Lynch: 1953-a:

Algae Symbiosis in Oxidation Ponds Part-II. Growth characteristics of Chlorella pyrenoidosa, cultured in Sewage. Sewage Ind. Wastes.25, 26-37.

Oswald, W. J., Gotaas, H.F. Ludwig and V. Lynch: 1953-b:

Algae Symbiosis in Oxidation Ponds. Part III. Photosynthetic Oxygenation, Sewage Ind. Wastes. 25, 692-705.

Oswald, W.J., and H.B. Gotaas: 1957:

Photosynthesis in Sewage treatment. Trans. ASCE: 122, 73-105.

Oswald, W.J., Gotaas, H.B., Golueke, C.G. and Kellen, W.R.: 1957:

Algae in Waste Treatment. Sewage Ind. Wastes, 29: 437-441.

Oswald, W.J., Hee., R.J., Gotaas, H.B.: 1958:

Studies of photosynthetic oxygenation. Pilot Plant Experiments, I,II,III. Progress Report No.8. San. Engg. Res. Lab.I.E.R. Series 44,Issue 9, 192 pages Jan.

Oswald, W. J., Golueke, C.G., and Gee, H.K.: 1959-a:

Waste reclamation through production of algae. San. Engg. Res. Lab., College of Engg. and Public Health. Contribution No.22. Water Resources Centre, University of California, Aug.

Oswald, W.J., Golueke, C.G., and Gotaas, H.B.: 1959-b:

Studies of algal culture in a field scale Oxidation pond. Univ., California. Series 4, 10.

Oswald, W.J., 1960:

Fundamental factors in stabilization pond design. In Conf. on Biol. Waste Treat., Manhattan. College No.44, 357-394.

Oswald, W.J. and Golueke, C.G.: 1960:

Biological treatment of solar energy. In Advances in Applied Microbiology. Academic Press, Inc., New York, 2, 223-241.

Oswald, W.J.: 1962:

The coming Industry of Controlled Photosynthesis. Am. Jour. Publ. Hlth. 52: 235-242.

Oswald, W. J., 1963:

Light Conversion Efficiency of Algae, growing in Sewage. Trans. ASCE. 128: Part III, 47-48.

Oswald, W.J., 1964:

Rational design of waste Ponds. In Proc. Symp. Waste Treatment by Oxidation Ponds. CPHERI, Nagpur, India. Oct. 29-30.

Oswald, W.J., Crosby, D.G. and Golueke, C.G.: 1964:

Removal of pesticides and algal growth potentials from San Joaquin Valley drainage water. (A feasibility study). California Dept. of Water Resources.

Oswald, W.J. and Golueke, C.G.: 1968:

Harvesting and Processing of waste-grown microalgae. In Algae, Man and the Environment. Ed. Jackson, D.F. Proc. Symp. Jan.18-30, 1967, 371-389.

Others (Algology Section): 1961:

Studies on Oxidation Ponds carried out. The Sewage Research Station of CPHERI, Benzon Bagh, Nagpur, India. - Symposium.

PAAP: 1969:

Provisional Algal Assay Procedure. Joint industry. Govt. Task Force on Eutrophication. February, 62 pages.

Palmer, C.D.P.: 1956:

Photosynthesis in the Algae. Discussion, Ind. Engg. Chem. 48, 1456-1457.

Parhad, N.M. and Rao, N.V.: 1963:

Preliminary Studies on the Microbiology of Oxidation Ponds. Symposium on Waste Treatment by Oxidation Pond. at CPHERI, Nagpur, India. India, on October, 29-30.

Parker, C.D.: 1962:

Microbial aspects of Lagoon treatment. J. Water Poll. Contr. Fed. 33, 603-641.

Pasche, E.: 1960:

On the relationship between production and Standing Crop of Phytoplankton. Jour. Cons. Perm. Inst. Explor. Mor. 24, 33-48.

Philip, B., Hawk, Bernard, L. Oser and William H., Summerson: 1954:

"Practical Physiological Chem.(13th Ed.)p.923.

Prakasam, T.B.S.: 1966:

Enumeration, Characterization and adaptation of Aerobic heterotrophic bacterial populations of activated sludge. Ph.D. thesis Cornell, Univ., Ithaca, N.Y.

Porges, J. 1960:

Newer aspects of Waste Treatment. In Advances in Microbiology: 2, 1-30.

Rabinowitch, E.I.: 1955:

The Photocyemical Storage of energy. In Trans. Conf.on the use of Solar energy. The Scienc -tific Basis, Tucson, Arizona, Vol.4, Chapter 19: 182-187.

Russel, J.J.: 1944:

Cited from practical physiological chemistry by P.B.Hawk, B.L. Oscr and W.H. Summerson. 13th Ed. 1954, p.565. McGraw-Hill Book Co., Inc., N.Y.

Russel, R. and Bartow, E.: 1916:

Bacteriological Study of Sewage Purification by aeration - Cited by Van Gils, 1964.

Sawyer, C.N.: 1952:

Some newer aspects of phosphates in relation to lake fertilizers. Sew. Ind Waste, 24(6): 768-776.

Sawyer, C.N.: 1956:

Bacterial nutrition and Synthesis. In "Biol. Treat. of Sewage and Industr. Wastes, 1, 3-17, Reinhold, N.Y.

Sawyer, C.N. 1971:

ABCs of Cultural eutrophication and its control, Part-I. Cultural changes presented at meeting of Physiological Society of America, Indiana, University, Aug.,27, 1970, Water and Sewage Water Vol.118, No.9, Sept., 1971: 278-281.

Schelef, G., Oswald, W.J., and Golueke, C.G., 1968:

Light intensity and nitrogen Concentration of growth limiting factors, Univ., Californ. Engg., Res. Lab. Report No.68.

Schuler, J.F., Diller, C.N. and Kerslen, H.R.: 1953:

Preferential assimilation of ammonia ion by Chlorella vulgaris. Plant Physiol.22:290-303.

Schutow, B.A.: 1926:

Die Assimilation der Wasserpflanzen und die aktuelle Reaction des Mileu. Plant-Art. Wis. Bot. 2:132-151 cited by Juday et al.(1935)

Seeley H.W.(Jr.) and Paul J. Vandemark,: 1970):

Microbes in Action. A Laboratory Manual of Microbiology. W.H. Freeman & Co., San Francisco, and London.

Silva, D.C. and Papenfuss, G.F.: 1953:

Report on a systematic study of algae of Sewage Oxidation Ponds, California State Water Poll. Contr. Publ. No.7.

Soong, P.: 1961:

Mass culture of algae in Taiwan, Presented at the Tenth Pacific Science Congress, Honolulu, Hawaii.

Spoehr, H.A., Smith, J.H.C., Strain, H.H., Milner, H.W., and Hardin, G.J.: 1949:

Fatty acid antibacterials from plants. Carneige Inst., Washington, Publication, 585.

Standard Methods: 1971:

For the Examination of Water and Waste Water by APHA, AWWA, and WPCF, New York, 13th Ed.

Stumm, W.: 1968:

"Waste Treatment and Productivity". In Symp. on "Chemical Aspects of Water Treatment and Distribution", held 11-13 April, at V.J.T.I., Bombay, India.

Suwannkarn, V. and Gloyna, E.F.: 1963:

Temperature Effects on Waste Stabilization Pond Treatment. Symposium on Waste Treatment by Oxidation Ponds held at CPHERI, Nagpur, India, Oct., 29-30.

Swanson, C.A.: 1943:

The effect of Culture Filtrates on Respiration in Chlorella vulgaris. Am. Jour. Bot. 30,8-14.

Symons, J.M. and Mckinney, R.E. 1958:
The Biochemistry of Nitrogen in the Synthesis of activated sludge.
Sewage and Ind. Waste. 30:874-890.

Talling, J.F.: 1961:

Photosynthesis under natural conditions. Ann. Rev. Plant Physiol. 12:133-154.

Tamiya, A: 1957:

Large Scale Production of algae for food, feed and Agriculture. Am. Rev. Plant Physiol. 8:309-329.

Thirumurthi, D. and Gloyna, E.F.: 1965:

Relative toxicity of organics to Chlorella pyrenoidosa, Univ., of Taxas. Report No.11-6503, Austin, Taxas.

Thirumurthi, D. and Gloyna, E.F.,: 1967:

Suppression of Photosynthetic oxygenation. Water Sewage Works, 114, 83-88.

Van Gils: 1964:

Bacteriology of activated sludge. Doctorate thesis. IGTNO. Report No.32. Research Institute of Public Health Engineering. The Hague. Netherlands.

Vollenweider, P.A. 1969:

A Manual on Methods for measuring primary production in aquatic environments including a Chapter on bacteria. IBP Handbook No.12, Blackwell Scientific Publications,Oxford,213 pages.

Watanabe, A.: 1951:

Production in cultural solution of some amino acids by the atmospheric nitrogen fixing blue-green algae. Arch. Biochem., Biophys. 34,50-55.

Washington, D.R., and Hetting, L.J., 1965:

Volatile sludge accumulation in Activated sludge Plants. Jour. Water Poll. Confr. Feder. 37, 499-507.

Washington, D.R. and Symons, M.: 1962:

Volatile sludge accumulation activated sludge systems. Jour. Water Poll. Contr. Fed. 34, 767-780.

Wassink, E.C., Kok, K., Van Oorschol, J.I.P.: 1953:

1 The efficiency of light-energy conversion in Chlorella cultures as compared with higher plants. In J.S. Burlews Algae Cultures from Laboratory to Pilot Plant, Carneige, Institute, Washington Publication No. 600.

Wattie, E.: 1943:

Cultural characteristics of Zoogloea forming bacteria isolated from activated sludge and trickling filters. Sew. Works,J. 15:476-479.

Weston, R.F. and Eckenfelder, W.H. : 1956:

Application of Biological treatment to Industrial I. Kinetics of Equilibria of oxidative treatment. Sew. Ind. Wastes.27:7, 802-810.

Whitton, B.A.: 1965:

Extra-cellular products of Blue-green alga. J. Gen. Microbiol. 40: 1-11.

Williamson, A.E. 1970:

"Welcome to the Symposium 2nd Internatl., Symp., for Waste Treatment Lagoons. Edited by ROSE. E. Mckinney. 217 Nuclear Reactor Centre, University of Kansas, Lawrence, Kansas 66044.

Winogradsky, H.: 1937:

Contribution to the study of nitrifying microflora in the activated sludge of Paris. Ann., Inst. Pasteur. 58, 326 cited by Van Gils,1964.

Wuhrmann, K. : 1964:

Microbial aspects of water Pollution Control. In Advances in Appl. Microbiol. 6, 119-124.

Zabat, M., Oswald, W.J., Golueke, C.G. and Gee, H.: 1970:

Kinetics of Algal Systems in Waste Treatment, Phosphorus as a Growth Limiting Factor. SERL Publ., Cal. Berkeley. Cited b in "Removal of nitrate by an algal System", April,1971, Water Pollution Control Research Series,DWR-WQO grant/13030 ELY.

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TABLE - I

PHYSICO-CHEMICAL ASPECTS USING OSCILLATORIA Spp.

Tests	Detention Period in Days							
	Control Raw Sewage				Raw Sewage + Oscillatoria Spp.			
	0	2	4	6	0	2	4	6
A. PHYSICAL								
Water Temperature (0°C)	27.5	27.5	28.0	28.0	27.5	28.0	28.0	28.5
Colour and Turbidity	Brown turbid	Brown turbid flocs	Brown turbid flocs	Brown turbid flocs	Brown	Pale green	Green and Clear	Green and clear
pH	7.8	7.8	7.8	8.3	7.8	8.0	8.6	9.6
B. CHEMICAL (mg/l)								
Phenolphthelein alkalinity	30	35	39	45	30	55	70	75
Am-N	37.8	36.0	34.6	32.8	37.8	5.3	2.8	1.6
NO_2-N	0.20	0.14	0.16	0.24	0.30	0.09	0.49	0.53
NO_3-N	0.26	0.11	0.28	0.25	0.39	0.12	0.18	0.32
PO_4	12.5	15.7	14.8	14.0	12.5	2.9	2.3	1.1
BOD_5 at 20°C ##	280	191	105	73	280	50	25	20
COD ##	372	294	200	132	372	116	56	36
C. BIOLOGICAL (mg/l)								
Algal Biomass dry weight	-	-	-	-	-	288	302	310

Centrifuged Supernatant

TABLE - II

PHYSICO-CHEMICAL ASPECTS USING ANACYSTIS NIDULANS

Tests	Detention Period in Days							
	Control Raw Sewage				Raw Sewage + Anacystis nidulans			
	0	2	4	6	0	2	4	6
A. PHYSICAL								
Water temperature (0°C)	28.0	28.2	28.2	28.2	28.0	28.2	28.3	28.3
Colour and Turbidity	Brown	Brownish & turbid	Brownish & turbid	Brownish turbid & flocs	Brown	Bluish green	Bluish green & clear	Bluish green & clear
pH	7.5	7.8	7.8	7.9	7.5	8.4	9.0	9.7
B. CHEMICAL (mg/l)								
Phenolphthelein alkalinity	34	41	46	50	34	72	89	95
Am-N	28.8	26.0	24.6	22.8	28.8	11.9	7.0	5.7
NO_2-N	0.20	0.24	0.18	0.22	0.20	0.14	0.18	0.26
NO_3-N	0.22	0.20	0.24	0.28	0.22	0.20	0.25	0.34
PO_4	18.3	19.0	17.8	16.4	18.3	6.8	6.0	4.7
BOD_5 at 20°C ##	166	125	108	58	166	64	35	14
COD ##	280	200	170	95	280	98	56	22
C. BIOLOGICAL (mg/l)								
Algal Biomass dry weight	-	-	-	-	-	192	200	204

Centrifuged Supernatant

TABLE - III

BIOLOGICAL CHANGES USING OSCILLATORIA Spp.

Description	Control: Raw Sewage				Raw Sewage + Algae			
	0	2	4	5	0	2	4	6
1. Dark to light brown filament (Leptothrix Ochraceae)	Nil	C	C	C	Nil	r	CC	CCC
2. Organic debris intermixed with the algae	Nil	Nil	Nil	Nil	Nil	r	C	CC
3. Flloculant brown precipitate separately seen at the bottom or in suspension.	Nil	r	C	CC	Nil	Nil	Nil	Nil
4. Ciliophora(free swimming)								
Paramoceium caudatum	Nil	r	r	C	Nil	rr	r	Nil
Paramoecium Spp.	Nil	r	rr	Nil	Nil	Nil	Nil	Nil
Aspidisca costata	Nil	rr	r	r	Nil	r	C	C
Spathidium spathule	Nil	rr	rrr	rrr	Nil	Nil	Nil	Nil
5. Ciliophora (Stalked)								
Vorticella Spp.	Nil	CCC	CC	CC	Nil	C	CC	CC
6. Rotifera:								
Lecane Spp.	Nil	Nil	Nil	Nil	Nil	r	C	C
7. Algae:-								
Oscillatoria Spp.	-	-	-	-	r	CC	CC	CC
Chlorella vulgaris	-	-	-	-	r	C	C	C
Spirulina Sp.	-	-	-	-	r	r	r	r

CCC = Most Common; CC = More common
C = Common;
r = Less Common; rr = Rare
rrr = Stray form.

TABLE - IV

PHYSICO-CHEMICAL AND BIOCHEMICAL CONDITIONS USING SCENEDESMUS OBLIQUS

Tests	Detention Period in Days							
	Control: Raw Sewage				Raw Sewage + Scenedesmus			
	0	2	4	6	0	2	4	6
A. PHYSICAL								
Water Temp.(°C)	29.0	29.0	29.4	29.4	29.0	29.2	29.2	29.3
Colour	Brown	Brown	Brown	Brown	Brown	Green	Green	Green
pH	7.7	7.8	8.1	8.3	7.7	8.1	8.6	9.0
B. CHEMICAL (mg/l)								
Amino-nitrogen	32.0	24.2	24.0	17.6	31.2	8.9	7.6	5.8
Phosphate	14	12	10	8	15	6	5.4	4.5
COD	368	296	148	124	408	144	64	46
C. BIO-CHEMICAL (mg/l)								
Carbohydrates								
(a) Free Sugar	41.8	35.6	22.2	18.7	41.8	29.6	14.8	15.6
(b) Total Sugar	110.8	96.5	70.3	45.2	120.4	89.4	53.3	20.8
Protein	6.1	4.8	4.5	2.7	6.0	3.8	3.2	2.0
Amino-nitrogen	5.1	3.8	3.1	2.4	5.3	3.0	2.6	2.1
Volatile acids	82.8	46.8	30.0	15.6	84.0	44.8	15.0	10.0
D. BIOLOGICAL (mg/l)								
Algal Biomass dry Wt.	-	-	-	-	-	248	281	286

TABLE - V

BIOLOGICAL CHANGES USING SCENEDESMUS OBLIQUS

Description	Detention Period in days							
	Control: Raw Sewage				Raw Sewage + Scenedesmus			
	0	2	4	6	0	2	4	6
Dark brown filament (Leptothrix Ochracea)	nil	nil	r	r	nil	r	c	c
Organic debris*	nil	r	c	c	-	-	-	-
Zoogloea colony (Ciliophora) free swimming		**rr**	**rr**	**r**	**nil**	**rr**	**nil**	**nil**
Paramoecium caudatum	nil	r	r	r	nil	nil	r	rr
Spathidium spathula	nil	r	rr	rr	-	-	-	rrr
Aspidisca costata	nil	nil	rr	r	nil	c	c	c
Ciliophora (Stalked)								
Vorticella spp.	nil	rrr	c	cc	nil	nil	nil	nil

*Organic debris is not seen separately at the bottom of the culture flasks but is seen enmeshed with the algal forms when seen under the microscope.

ccc = Most common
cc = More common
c = Common
r = Less common
rr = rare
rrr = Stray form

TABLE - VI

Bacteriological examination (Sanitary Aspect) in High-Rate aerobic Oxidation Pond using Oscillatoria Spp.

Detention period in days.	Control : Raw Sewage		High-rate Algae treated	
	Coliforms (MPN/100 ml) at 37°C	Total count per ml at 37°C temp. after 24 hours	Coliforms (MPN/100 ml) at 37°C	Total count per ml at 37°C temp. after 24 hours
0	16.09×10^{12}	10.2×10^{11}	16.09×10^{10}	17.9×10^{10}
2	16.09×10^{11}	18.7×10^{10}	16.09×10^{11}	84.3×10^{10}
4	34×10^{5}	10.2×10^{7}	2×10^{7}	68.5×10^{7}
6	46×10^{4}	14.1×10^{6}	18×10^{4}	14.6×10^{5}

TABLE - VII

Distribution of a few important attributes among the 200 dominant bacteria isolated from the alga, Oscillatoria Spp. treated in high-rate aerobic pond on different detention periods. Fifty isolates were studied for each detention period. Results expressed in percentage of positive isolates.

Tests	Detention period in days			
	Raw Sewage + Oscillatoria Spp.			
	0	2	4	6
Rods	100	100	100	100
Colour : Whitish	100	100	100	100
Gram : Negative	100	100	100	100
Flagella : Polar	44	42	48	34
Peritrichorous	56	58	52	66
Citrate utilizers	54	38	30	24
Starch hydrolysers	56	38	32	26
Gelatin hydrolysers	62	66	0	0
Tributyrin hydrolysers	30	38	16	18
Catalase activity	100	100	100	100
Reserve Materials				
Glycogen	100	100	100	100
Lipid inclusions	100	100	100	100
Volutin	100	100	100	100

TABLE - VIII

Important Biochemical characteristics of the dominant bacteria in High-rate aerobic Oxidation Pond using Oscillatoria Spp. 200 Isolates studied, fifty on each day. Results expressed as percentage positive isolates.

Characteristics	Detention periods in days			
	0	2	4	6
Acid from glucose	46	42	32	16
Acid and gas from glucose	46	30	32	26
No reaction in glucose	8	28	36	58
Nitrate reduced	56	48	48	44
H_2S formed	12	4	-	-
Hugh and Leifson's medium glucose				
Oxidative	48	40	16	16
Fermentative	28	24	26	26
Neutral	22	26	40	40
Alkaline	2	10	18	18

TABLE - IX

Dominant Bacteria in High-rate Aerobic Oxidation Pond with Oscillatoria Spp. isolated on different detention pefiods. 200 isolates studied, fifty on each day. Results expressed as percentage of positive.

Detention period in days	0	2	4	6
Organisms : Genera	Percentage positive			
Achromobacter	8	4	-	-
Aerobacter	8	16	30	24
Aeromonas	12	4	-	-
Alcaligenes	4	18	20	40
Azotobacter	2	-	-	-
Bacillus	12	8	-	-
Comamonas	2	-	16	18
E. coli	8	4	2	2
Proteus	14	6	-	-
Pseudomonas	16	24	-	-
Zooglea	10	16	32	16
Zymomonas	4	-	-	-

TABLE - X

Dominant bacteria isolated from Assimilatory and Endogenous phases of a High-rate aerobic oxidation pond. 200 isolates studied, fifty on each day.

Results expressed as percentage of positive isolates.

Metabolic phase	Assimilatory		Endogenous	
Detention periods in days	0	2	4	6
Organisms Genera	Percentage positive			
Achromobacter	8	-	-	-
Aerobacter	8	16	30	24
Aeromonas	12	-	-	-
Alcaligenes	4	18	20	40
Azotobacter	2	-	-	-
Bacillus	12	-	-	-
Comamonas	2	-	16	18
E. coli	8	-	-	-
Proteus	14	-	-	-
Pseudomonas	16	24	-	-
Zooglea	10	16	32	16
Zymomonas	4	-	-	-