

References

- Adams, Krenkel and Bingham (1970): Investigations into the reduction of high nitrogen concentrations. Proc. 5th Int. Water Poll. Res. Conf. I-13.
- Aguirre and Gloyna (1967): Nitrification and denitrification in a model waste stabilization pond. Univ. Tex. Centr. Res. Water Resource. CRWR-19.
- Ahn, K.-H. and Chang, J.-S. (1991): Performance evaluation of compact RBC-settling tank system. Wat. Sci. Tech. 23 1467-1476.
- Akai, D., Miki, O and Ohgaki, S (1983): Nitrification model with an Inhibitory Effect of Sea Water. Ecological Modelling, Vol. 19, pp 189/98.
- Ambühl, H. (1969): Die neueste Entwicklung der Vierwaldstättersees. Inst. Verein. Theor. angew. Limnologie 17 210-230.
- Andersen, K.B. and Poulsen, K.M. (1976): M.Sc. Thesis, Department of sanitary Eng. Technical Univ. of Denmark.
- Anderson, J.H. (1965): Studies on the oxidation of ammonia by *Nitrosomonas*. Biochem. J. 688-698.
- Anthonisen, A.C. (1974): The effect of free ammonia and free nitrous acid on the nitrification process. pH.D. (Eng) Thesis. Cornell Univ, Ithaca New York.
- Anthonisen, A.C., Loehr, R.C., Prakasan, T.B.S. and Shinath, E.G. (1976): Inhibition of nitrification by ammonia and nitrous acid. J. Wat. Poll. Contr. Fed. 48 835-851.
- Antonie, R.L. (1974): Nitrification of activated sludge effluent with the Bio-Surf process. Paper presented at the Annual Conference of the Ohio Water Pollution Control Association, Toledo, Ohio, USA.
- Antonie, R.L. (1976): Fixed Biological Surfaces - Wastewater Treatment, CRC Inc., Cleveland, Ohio, pp. 60-64.
- Antoniou, Hamilton, Koopman, Jain, Holloway, Lyberatos and Svoronos (1990): Effect of temperature and pH on the effective maximum specific growth rate of nitrifying bacteria. Wat. Res. 24 97-101.
- Arvin, W. and Harremoës, P. (1990): Concepts and models for biofilm reactor performance. Wat. Sci. Tech. 22 171-192.
- Atkinson, B. et al. (1967): Kinetics, mass transfer and organism growth in a biological film reactor. Trans. Inst. Chem. Eng. 45 T257-T264.

- Atkinson, B. and Dauod, I.S. (1968): The analogy between micro-biological "reactions" and heterogenous catalysts. Trans. Inst. Chem. Eng. 46 19.
- Atkinson, B. and Fowler, H.W. (1974): The significance of microbial film in fermenters. Adv. Biochem. Eng. 3 221.
- Audic, J.M., Faup, G.M. et al. (1984): Specific activity of *Nitrobacter* through attachment on granular media. Wat. Res. 18 745-750.
- Audoin, L., Barabe, J.P., Brebion, G. and Huriet, B. (1970): The use of plastic material as a medium for trickling filters treating domestic sewage. 5th International Water Pollution Research Conference . Pergamon Press, Oxford,
- Austin, G.T. (1974): The industrially significant organic chemicals. Chem. Eng. 81 127.
- Babekov, E.D. (1983): Size density characteristics of the flocs of a coagulated suspension. Sov. J. Water Chem. (USSR) 3 (1983) 3. 24. Abstr. WRC Info 10 83-2049.
- Badger and Bandero (1955): Introduction to Chemical Engineering. McGraw Hill, New York, 636 pp.
- Balakrishnan, S. (1968): Kinetics of biochemical nitrification and denitrification. Thesis, Univ. of Texas.
- Balakrishnan, S. and Erkenfelder, W.W. (1969): Nitrogen relationship in biological treatment processes. Wat. Res. Vol.3, p.177-188.
- Balakrishnan, S. and Erkenfelder, W.W. (1970): Nitrogen removal by modified activated sludge process. J. Sanit. Enging. Div. Am. Soc. civ. Engrs. Vol.96, p 501-512.
- Barnard, J.L. (1974): Cut O and N without chemicals. Wat. & Wastes Eng. Z, p.33-36.
- Barrenstein, A., Kramer, U. and Obermann, P. (1986): Underground treatment of nitrate rich groundwater by infiltration with treated wastewater or methane rich natural gas. DVGW-Schriftreihe, Wasser, Frankfurt, Germany. Vol.116, p.99-116.
- Barrith, N.W. (1933): The nitrification process in soils and biological filters. Ann. appl. Biol. Vol.20, p 165-184.
- Barth, E.F. and Ettinger (1967): Managing continous flow biological denitrification. 7.th Int. Water Water Conf. Texas Water Pollut. Contr. Assoc. Univ of Texas, Austin.

- Bauer, R.C. and Vernon, L.S. (1973): Reaction of chloramines with active carbon. J. Wat. Poll. Contr. Fed. 45 p.2290-2295.
- Beckman, W.J. et al. (1972): Combined carbon oxidation-nitrification. J. Wat. Poll. Contr. Fed. 44 p.1916.
- Beg, S.A. and Atiqullah, M. (1983): Interactions of noncompetitive inhibitors on the nitrification process. J. Wat. Poll. Contr. Fed. 55 p.1080-1086.
- Beg, S.A. and Atiqullah, M. (1983): Synergism and antagonism of arsenic, chromium and fluoride on nitrification process. J. Environ. Sci. Health A18 p.633-650.
- Beg, S.A. and Hassan, M.M. (1987): Effect of inhibitors on nitrification in a packed-bed biological flow reactor. Wat. Res. 21 p.191-198.
- Beg, S.A., Siddiqi, R.H. and Ilias, S. (1982): Inhibition of nitrification by arsenic, chromium and fluoride. J. Wat. Poll. Contr. Fed. 54 p.482-488.
- Benfield, L.D. and Randall, C.W. (1980): Biological Process Design for Wastewater Treatment, Prentice-Hall, Englewood Cliffs, .
- Benmoussa, H. et al. (1986): Inhibition study of the nitrification by organic compounds. Wat. Res. 20 p.1465-1470.
- Benmoussa, H., Martin, G., Richard and Leprince (1986): Inhibition of nitrification by heavy metal cations. Wat. Res. 20 p.1333-1339.
- Best and Payne (1965): Preliminary enzymatic events in asparagine-dependent denitrification by *Pseudomonas perfectomarinus*. J. Bact. Vol.89, p.1051-1054.
- Bilstad, T. (1989): Membraneparasjon av nitrogen i avløpsvann, in H. Ødegaard (ed.), Fjerning av Nitrogen i Avløpsvann, Tapir Forlag, , pp. 82-94.
- Blum, D.J.W. and Speece, R.E. (1991): "A Database of Chemical Toxicity to Environmental Bacteria and its use in Interspecies Comparisons and Correlations" Res. J. Wat. Poll. Con. Fed. Vol.63, p 198.
- Bock E. et al. (1988): Growth of *Nitrobacter* in the absence of dissolved oxygen. Water Res. 22 245-250.
- Bolin, B. and Cook, R.B. (1983): The Major Biochemical Cycles and Their Interaction, Scope 21, Wiley & Sons, New York, .
- Boller, M. and Gujer, W. (1986): Nitrification in tertiary trickling filters followed by deep-bed filters. Wat. Res. 20 p.1363-1373.

- Boller, M., Gujer, W. and Nyhuis, G. (1990): Tertiart Rotating Biological Contacter. *Wat. Sci. Tech.* Vol.22, p.89-100.
- Boon, A.G. and Burgess, D.R. (1974): Treatment of crude sewage in two high-rate activated-sludge plants operated in series. *Wat Pololut. Control* 73 p.382.
- Boon, B. and Laudelout, H. (1962): Kinetics of nitrate oxidation by *Nitrobacter*. *Biochem. J.* 85 p.440.
- Borchardt, J.A. (1966): Nitrification in the activated sludge process. Univ of Michigan. Ann Arbor.
- Bringmann, Kuhn and Wagner (1959): Modellversuche zur biologischen Stickstoff-Abgassung aus Klarwassen. *Gesundtheitsing* Vol.80, p.364-367.
- Brown and Caldwell (1975): Report on Tertiary Treatment Pilot Plant Studies, prepared for the City of Sunnyvale, California, February 1975.
- Buswell, A.M., Shiota, T., Lawrence, N. and Van Meter, I. (1954): Laboratory studies in the kinetics of growth of *Nitrosomonas* with relation to the nitrification phase of the BOD test. *Appl. Microbiol.* 2 p.21-25.
- California State Water Resources Control Board. (1974): Tentative Water Quality Control Plan, San Fransisco Bay basin.
- Camp, T.R. (1946): Sedimentation and design of settling tanks. *Trans. Am. Soc. Chem. Eng.* 111 p.895.
- Camp, T.R. (1955): Flocculation and flocculation basins. *Trans. Am Soc. Chem. Eng.* 120 p.1.
- Camp. T.R. and Stein, P.C. (1943): Velocity gradients and internal work in fluid motion. *J. Boston Soc. Civ. Eng.* 30 p.219.
- Carlucci, A.F. and McNally, P.M. (1969): Nitrification by marine bacteria in low concentration of substrate and oxygen. *Limnol. Oceanogr.* Vol.14, p 736/39.
- Charley, R.C., Hooper, D.G. and McLee, A.G. (1980): Nitrification kinetics in activated sludge at various temperatures and dissolved oxygen concentrations. *Wat.Res.* 14 p.1387-1396.
- Carlson, (1971): Nitrogen removal and identification for water quality control. OWRR Project No A040 Univ. of Washigton. Dept Civil. Engng.
- Chen, C.W. (1970): Concepts and Utlilities of Ecological Model. *JSED. Proc. ASCE* 96. No SA5 pp 1085-1097.

- Chen, G.H., Ozaki and Terashima. (1989): Modelling of the simultaneous removal of organic substances and nitrogen in a biofilm. *Wat. Sci. Tech.* 21 p.791-804.
- Chen, S.-K., Juaw, C.-K. and Cheng, S.-S. (1991): Nitrification and denitrification of high-strength ammonium and nitrite waste water with biofilm reactors. *Wat. Sci. Tech.* 23 p.1417-1425.
- Christensen, M.H. and Harremoës, P. (1972): Biological denitrification in water treatment. Rep. 72-2. Dep. San. Engng. Tech. Univ. of Denmark
- Christensen, M.H. and Harremoës, P. (1977): Biological denitrification of sewage: a literature review. *Prog. Wat. Tech.* 8(4/5) .
- Christensen, M.H., Harremoës, P. and Roed Jensen O. (1977): Combined sludge denitrification of sewage utilizing internal carbon sources. *Prog. Wat. Tech.* Vol.8, p 589-599.
- Christensen, M.H. and Harremoës, P. (1978): Nitrification and denitrification in wastewater treatment. Chapter 15 in R. Mitchell (ed.), *Water Pollution Microbiology*, Vol. 2, , pp. 391-414.
- Christensen, (1972): Discussion of the paper: The complete treatment of raw sewage with special emphasis on nitrogen removal. Presented: 6.th IAWPR Conf. Israel.
- Christensen, (1973): Rapport over laboratorieforsøg med denitrifikation. Rep. 73-1, Dept. San. Engng., Technical Univ of Denmark (in danish).
- Christenson, Rex, Webster and Virgil (1956): Reduction of nitrate-nitrogen by modified activated sludge. U.S. Atomic Energy Comm., TID-7517.
- Claus, G. and Kurtzner, H.J. (1985): Physiology and kinetics of autotrophic denitrification by *Thiobacillus denitrificans*. *Appl. Microbiology and Biotechnology*. Vol. 22, p.283-288.
- Clayfield, (1974): Respiration and denitrification studies on laboratory and works activated sludge. *Wat.Poll.Contr.* Vol.73, p.51-76.
- Clark, W.E. (1962): Prediction of ultrafiltration membrane performance. *Science* 138 148.
- Climenhage, D.C. and Stelzig, A. (1973): Biological process for nitrogen-BOD removal at Maitland Works, Du Pont of Canada Limited. Proc. 24th Ind. Waste Conf., Toronto. Ontario, .
- Culp, G., Hansen, S. and Richardson, G. (1968): High-rate sedimentation in water treatment works. *J. Am. Water Works Ass .*, Vol. 60. p. 681.

- Czaran, E. et al.: (1988) Separation of ammonia from waste water using clinoptilolite as ion-exchanger. Nuclear and chemical waste management, 8 p.107-113.
- Das, Khan and Dutta, (1966): Removal of nitrogen from the fertilizer factory effluent by biochemical nitrification and denitrification. Technol. Sindri. Vol.3, p.41-45.
- Davies, (1973): Isolation of bacteria capable of utilizing methane as a hydrogen donor in the process of denitrification. Water Res. Vol.7, p.575-579.
- Davies, T.R. and Pretorius, W.A. (1975): Denitrification with a bacterial disk unit. Wat. Res. 9 459-463.
- Dawson and Murphy (1972): The temperature dependency of biological denitrification. Water Res. Vol.6, p.71-83.
- Dixon, M. et al. (1964): Enzyme, Academic Press, New York, , pp. 313-359.
- Dholakia, Stone and Burchfeld, (1970): Methonal requirements and temperature effects in wastewater denitrification. Water Poll. Contr. Res. Ser. Cincinnati USA.
- Doelle, (1969) Bacterial Metabolism. Academic Press. New York
- Dold, P.L. (1991): Incorporation of Biological Excess Phosphorus Removal in a General Activated Sludge Model. Paper Dept. of Civil Engr. and Engr. Mechanics, McMaster Univ. Ontario L8S 4L7.
- Dore, M., Simon, P., Deguin, A., and Victot, J. (1986): Removal of nitrate in drinking water by ion exchange-impact on the chemical quality of treated water. Wat. Res. 20 p.221-232.
- Downing, A.L. (1968): Factors to be considered in the design of activated sludge plants, in E.F. Gloyna and W.W. Eckenfelder, Jr. (eds.), Advances in Water Quality Improvement, University of Texas Press, Austin, , pp. 190.
- Downing, A.L. and Knowles, G. (1966): Population dynamics in biological treatment plants, in Proc. 3rd Int. Conf. Wat. Poll. Res., Series 2, , pp. 117-137.
- Downing, A.L., Painter, H.A. and Knowles, G. (1964): Nitrification in the activated sludge process. J. Proc. Inst. Sew. Purif. 63 p.130-153.
- Downing, A.L., Tomlinson, T.G. and Truesdale, G.A. (1964): Effect of inhibitors on nitrification in the activated sludge process. J. Proc. Inst. Sew. Purif. p.537.

- Downing, A.L. and Hopwood A.P. (1964): Some observations of the Kinetics of Nitrifying Activated Sludge Plants. *Schweizische Zeitschrift für Hydrologie*. Vol.26, p 271
- Duddles, G.A., Richardson, S.E. and Barth, E.F. (1974): Plastic medium trickling filters for biological nitrogen control. *J. Wat. Poll. Contr. Fed.* 46 937-946.
- Edholm, Hultman, Lowen and Sven Nilsson. (1970): Näringsaltreduktion. Fortsatte försök över denitrifikationskinetik. KTH Publ. 70:1, Stockholm, Sverige (in swedish)
- Ekama, G.A., Marais, G.v R. and Siebritz, I.P. (1984): Biological excess phosphorous removal, in Theory, Design and Operation of Nutrient Removal Activated Sludge Processes, Chapter 7, Water Research Commission, Pretoria, South Africa.
- Elmalah, S. and Grasmick, A (1985): Mathematical models for biological aerobic fluidized bed reactors, p.525. In *Developments in Environmental Modelling* 7, Ed. Jørgensen and Gromiec. Elsevier Science Publications, The Netherland.
- Elmghari-Tabib, M., Laplanche, A., Venien, F. and martin, G. (1982): Ozonation of amines in aqueous solutions. *Wat. Res.* 16 223-229.
- Engel, M.S. and Alexander, M. (1958): Growth and autotrophic metabolism of *Nitrosomonas europaea*. *J. Bacteriol.* 76 p.217.
- Engelhart and Haltrich (1968): Vorarbeiten für die Gemeinschaftsklaranlage der BASF und der Stadt Ludwigshafen an Rhein. *Chem.Ing.Tech.* Vol.40, p.275-279.
- EPA (1975): Process Design Manual for Nitrogen Control, Office of Technology Transfer, Washington DC.
- Ericsson, Gustavson and Westberg, (1967): Näringsaltreduktion vid avloppsverk. KTH Publ. 67:5 Stockholm. (in swedish)
- Erkenfelder (1961): Trickling filter design and performance. *J. San. Eng. Div.* 87(SA6) 87.
- Fair, G.M., Geyer, J.C. and Okun, D.A. (1968): *Water and Waste Engineering*, Wiley & Sons, New York, .
- Faup, G.-M., Leprince, A. and Pannier. (1982): Biological nitrification in an up flow fixed bed reactor (UFBR). *Wat. Sci. Tech.* 14 795-810.
- Feige, W.A. and Smith, J.M. (1974): Wastewater applications with a tubular reverse osmosis unit. *Water* (April).

- Fellinger and Pigford, R.L. (1952): Absorption and Extraction, 2nd ed., McGraw-Hill, New York,
- Fetting, J. (1989): Removal of ammonium nitrogen from wastewater by air stripping - a state-of-the-art report, in H. Ødegaard (ed.), Fjerning av Nitrogen i Avløpsvann, Tapir Forlag, pp. 58-77.
- Finsen and Sampson (1959): Denitrification of sewage effluents. *Wat. Waste Treat. Vol.7*, p. 289-300.
- Forster, J.R.M. (1974): Studies on nitrification in marine biological filters. *Aquaculture Vol.4*, p 387-397.
- Fowle, P.J.A. and Shannon, E.E. (1973): Utilization of industrial wastes and waste by-products for phosphorus removal: an inventory and assessment. Canada-Ontario Agreement on Great Lakes Water Quality, Research Report No.6.
- Fox, M.E. (1973): Rapid gas chromatographic method for the determination of residual methanol in sewage. *Environ. Sci. Technol. 7* p.838-840.
- Frick, B.R. and Richard, Y. (1985): Experience with biological denitrification in a full scale drinking water treatment. *Vom. Wasser, Vol. 64*, p. 145-154.
- Fry (1955): *The Nitrogen Metabolism of Microorganisms*. Methuen 1.Edn. London.
- Fruhen, M., Christan, E., Gujer, W. and Wanner, O. (1991): Significance of spatial distribution of microbial species in mixed culture biofilms. *Wat.Sci. Tech. Vol.23*, p.1365-1374.
- Gameson, A.H. and Robertson, H.B. (1955): *J. Appl. Chem. 5* p.503.
- Gangneux, A., Wattiez, D. and Marechal, E. (1976): Synthèse et étude de celluloses échangeuses d'ions leur emploi dans l'épuration. Des eaux résiduaires de l'industrie textile - III. *Eur. Polymer J. 12* p.551.
- Gasser, J.A., Chen, C.L. and Miele, R.P. (1974): Fixed film nitrification of secondary effluent. Paper presented at the EED-ASCE Specialty Conference, Penn. State Univ., Pennsylvania. USA.
- Gee, C.S., Suidan, M.T. and Pfeffer, J.T. (1990): Modelling of nitrification under substrate-inhibition conditions. *J. Environ. Eng. 116* p.18-31.
- Germain, J.E. (1966): Economical treatment of domestic waste by plastic-media trickling filters. *J. Wat. Poll. Contr. Fed. 38* p.192.
- Van Gils, (1964): *Bacteriology of activated sludge*. Delft Holland

- Grady, C.P.L., Henze, M., Gujer, W., Matsuo, T. and Marais, G.v.R. (1986): A model for single-sludge wastewater treatment systems. *Wat. Sci. Tech.* 18 47-61.
- Grady, C.P.L. and Lim, H.C., (1980): in P.N. Cheremisinoff (ed.), *Biological Wastewater Treatment: Theory and Applications*, Marcel Dekker, New York.
- Grasmick, A. (1982): Contribution a la modelisation des reacteurs a cellules immobilisees sur support granulaire en couche fixe ou fluidisee. Dr.Sc. Thesis, Toulouse.
- Grasmick, A., Elmaleh, S. and Ben Aim, R. (1979): Théorie de l'épuration par filtration biologique immergé. *Water Res.* Vol.13, p. 1137.
- Grasmick, A., Elmaleh, S. and Ben Aim, R. (1980): Etude experimentale de la filtration biologique immergé. *Water Res.* Vol.14, p 613.
- Grasmick, A., Chatib, B., Elmaleh, S. and Ben Aim, R. (1981): Epuration hydrocarbonée en couche fluidisée triphasique. *Water Res.* Vol.15, p.719.
- Guarino, C.F. *et al.* (1980): Upgrading activated-sludge plants using rotary biological contactors. *Wat. Pollut. Control.* Vol.79, p.255-267.
- Gujer, W. and Boller, M. (1984): Operating experience with plastic media tertiary trickling filters for nitrification. *Wat. Sci. Tech.* 16 p.201-213.
- Gujer, W. and Boller, M. (1986): Design of a nitrifying tertiary trickling filter based on theoretical concepts. *Wat. Res.* 20 p.1353-1362.
- Gujer, W. and Boller, M. (1989): A mathematical model for rotating biological contactors. *Wat. Sci. Tech.* 22 53-73.
- Gujer, W. and Jenkins. D. (1974): *The Contact Stabilization Process, Oxygen and Nitrogen Mass Balances*, University of California, Berkeley, Sanitary Engineering Research Laboratory Rep. No. 74-2. .
- Gujer, W. and Jenkins. D. (1975): A nitrification model for the contact stabilization activated sludge process. *Wat. Res.* 9 p.561-566.
- Gujer, W. and Wanner, O. (1989): Modelling mixed population biofilms, in W.G. Charackliss and K.C. Marshall (eds.), *Biofilms*, Wiley & Sons, New York, .
- Gulliecks, H.A. and Cleasby, J.L. (1986): Design of trickling filter nitrification tower. *J.WPCF* 58 p.60-67.
- Gundersen, K. (1966): The growth and respiration of *Nitrocytis Oceanus* at different partial pressure of oxygen. *J. Gen. Microbial.* Vol.42, p 387-396.

- Göncü, E. (1982): Nitrification on Rotating Biological Contactors. Department of Environmental Engineering, Technical Univ. of Denmark. (Report 82-42).
- Haag, W.R., Hoigné, R. and Bader, H. (1984): Improved ammonia oxidation by ozone in the presence of bromide ion during water treatment. *Wat. Res.* 18 p.1125-1128.
- Halling-Sørensen, B. and Hjuler, H. (1992): Simultaneous nitrification and denitrification with an upflow fixed bed reactor applying clinoptilolite as media. *Water Treatment* 7 p.77-88.
- Halling-Sørensen, B. and Hjuler, H (1993): The kinetics of the complete removal using a Biological Aerated Filter with clinoptilolite as matrix. (submitted).
- Haltrich and Jager, (1963): Beobachtungen bei der biologische Reinigung nitrathaltiger industrieller Abwasser mit denitrifizierenden Belebtschlamm. *Gas Wasserfach, Wasser - Abwasser* Vol.104, p.347. (in german).
- Hamm (1970): Simultane N- und P- Elimination. *Z. Wasser- und Abwasserforsch.* Vol.3, p.102-107.
- Haralambous, A., Maliou, E. and Malamis, M. (1992): The use of zeolite for ammonium uptake. *Wat. Sci. Tech.* 25 p.139-145.
- Harkness, N. (1966): Bacteria in sewage treatment processes. *J. Inst. Sew. Purif.* 33 p.542-557.
- Harremoës, P. and Henze Christensen (1971): Denitrification with methan. *Vand* Vol.2, p.7-11
- Harremoës, P. and Riemer, M. (1975): Pilot experiments on down filter denitrification. *Conf. on Nitrogen as a Water Pollutant, Copenhagen.*
- Harremoës, P. (1975): The significance to pore diffusion to filter denitrification. *J. Water Pollut. Control Fed.* Vol.48, p. 2.
- Harremoës, P. (1976): The significance of pore diffusion to filter denitrification. *J. Water Poll. Contr. Fed.* 48 p.377-388.
- Harremoës, P. (1978): Biofilm kinetics. Chapter 4 in R. Mitchell (ed.), *Water Pollution Microbiology*, Vol. 2, , pp. 71-109.
- Harremoës, P. (1982): Criteria for nitrification in fixed film reactors. *Wat. Sci. Tech.* 14 p.167-187.
- Harris, Cockburn and Andersson, (1927): Biological and physical properties of activated sludge. *Waterworks* Vol.66, p.24.

- Harris, R.F. and Sommers, L.E. (1968): Plate dilution frequency technique for assay of microbial ecology. *Appl. Microbiol.* 16 p.330-334.
- Hassan, M.M. and Beg, S.A. (1988): Effect of Enzyme Inhibition on the performance of Packed-bed Biological Reactor - A Theoretical study. *Chem.Eng.Tech-nol.* Vol.11, p.50-56.
- Haug, R.T. and McCarty, P.L.(1972): Nitrification with submerged filter. *J. Wat. Poll. Contr. Fed.* 44 2086-2102.
- Hegemann, W. and Englmann, E. (1983): Belebungsverfahren mit Schaumstoffkörpern zur Aufkonzentrierung von Biomasse. *GWF-Wasser/Abwasser* 124 233-239.
- Henze, M. (1986): Nitrate vs oxygen utilization rates in wastewater and activated sludge systems. *Wat. Sci. Tech.* 18 p.115-122.
- Henze, M. (1987): Theories for estimation of the fraction of denitrifiers in combined nitrifying-denitrifying treatment plants. *Wat. Res.* 21 p.1521-1524.
- Henze, M. and Bundgaard, E. (1981): Bemessung von kombinierten Nitrifikations- und Denitrifikationsanlagen. *GWF-Wasser/Abwasser* 123 p.240-246.
- Henze, M., Gujer, W., Grady, C.P.L., Jr., Marais, G.v.R. and Matsuo, T. (1987): Activated Sludge Model No. 1, Scientific and Technical Report No. 1, IAWP-RC, London.
- Henze, M. and Harremoës, P. (1977): Biological denitrification of sewage. A literature review. *Prog. Wat. Tech.* 8 p.509-555.
- Henze, M., Harremoës, P. and Roed Jensen, O. (1977): Combined sludge denitrification of sewage utilizing internal carbon sources. *Prog. Wat. Tech.* 8 p.589-599.
- Hermann (1962): Stabilization pond as a nitrate-reducing reactor. *Proc ASCE J. San. Engng. Div.* Vol.88, p.1-20.
- Hjuler, H. (1992): Personal communication to B. Halling-Sørensen.
- Hockenbury, M.R. and Grady, C.P.L., Jr. (1977): Inhibition of nitrification effects of selected organic compounds. *J. Wat. Poll. Contr. Fed.* 49 p.768-777.
- Hoek, J.P. van der, Ven, P.J.M. van der and Klapwijk, A. (1988): Combined ion exchange/biological denitrification for nitrate removal from ground water under different process conditions. *Wat. Res.* 22 p.679-684.

- Hofman, T. and Lees, H. (1953): The biochemistry of the nitrifying organisms. The respiration and intermediary metabolism of *Nitrosomonas*. *Biochem. J.* 54 p.579.
- Hopwood, A.P. and Downing, A.L. (1965): Factors affecting the rate of production and properties of activated sludge in plants treating domestic sewage. *J. Proc. Inst. Sew. Purif.* 64 p.435-448.
- Horstkotte, G.A., Niles, D.G. and Parker, D.S. (1974): Full-scale testing a water reclamation system. *J. Wat. Poll. Contr. Fed.* 46 p.181-197.
- Hosomi, M., Yuhei, I., Matsushige, K. and Sudo, R. (1991): Denitrification of landfill leachate by the modified RBC. *Wat. Sci. Tech.* 23 p.1477-1485.
- Huang, C.-S. (1973): Kinetics and process factors of nitrification on a biological filter reactor. Ph.D. thesis. State Univ. of New York at Buffalo.
- Huang, C.-S. and Hopson, N.E. (1974): Nitrification rate in biological processes. *J. Environ. Eng. Div.* 100 p.409-422.
- Hultman (1971): Kinetics fo biological nitrogen removal. *KTH Publ.* 71:5, Stockholm.
- Hünerberg and Sarfert, (1967): Versuche zur stickstoffelimination aus dem Berliner abwasser. *Gas Wasserfach. Wasser - Abwasser*, Vol.108, p.966-69 and 1197-1205.
- Ide, Tohya, Suzuki, Matsuo and Osanai (1972): Removal of nitrogen and phosphorus in waste water treatment. *Pachec 72*, Session 16-3
- Ishiguro, M., Watanabe, Y. and Masuda, S. (1978): Advanced waste-water treatment by rotating biological disk unit. *J. Jap. Sewage Works Assoc.*
- Jansen, J. and Kristensen, G.H. (1980): Fixed film kinetics. Denitrification in fixed films, Technical Univ. of Denmark, Dept of Sanitary Engineering.
- Jasewicz and Porges (1956): Biochemical oxidation of dairy wastes VI. Isolation and study of sludge micro-organisms. *Sew. Ind. Wastes* Vol.28, p.1130.
- Jenkins, D. and Garrison, W.E. (1968): Control of activated sludge by mean cell residence time. *J. Wat. Poll. Contr. Fed.* 40 p.1905.
- Jenkins, D., Richard, M.G. and Daigger, G.T. (1986): Manual on the Causes and Control of Activated Sludge Bulking and Foaming, Water Research Commission, Pretoria.
- Jenkins, S.H. (1969): Nitrification. *Water Pollution Control* p.610-618.

- Johnson, W.K. and Schroepfer, G.J. (1964): Nitrogen removal by nitrification and denitrification. *J. Wat. Poll. Contr. Fed.* 36 p.1015.
- Johnson, J.S., Dresner, L. and Kraus, K.A. (1966): "Hyperfiltration" in *Principles of Desalination*. Academic Press, New York.
- Jones (1972): A study on partial nutrient removal system for waste water treatment plants. *Water Res.* Vol6, p.1389-1397.
- Jørgensen, S.E. (1971): How to treat phenolic waste water. *Vatten*, 27 p.434.
- Jørgensen, S.E. (1971): Precipitation of proteins in waste water. *Vatten* 27 p.58-72.
- Jørgensen, S.E. (1973): The combination precipitation-ion exchange for waste water from the food industry. *Vatten* 29 p.40.
- Jørgensen, S.E. (1973): Industrial waste water treatment by precipitation and ion exchange, in G. Lindner and K. Nyberg (eds.), *Environmental Engineering*, D. Reidel Publ. Co., Holland, pp.364.
- Jørgensen, S.E. (1975): Recovery of ammonia from industrial waste water. *Wat. Res.* 9 1187.
- Jørgensen, S.E. (1976): A eutrophication model for a lake. *Ecol. Modelling* 3 p.147-165.
- Jørgensen, S.E. (1976): Reinigung häuslicher Abwässer durch Kombination eines chemischen Fällungs- und Ionenaustausch Verfahrens. Thesis, Karlsruhe University, .
- Jørgensen, S.E. (1978): The application of cellulose ion exchanger in industrial waste water management. *Water Supply and Management* 5 p.90.
- Jørgensen, S.E. (1988): *Fundamentals of Ecological Modelling*, 2nd ed., Elsevier, Amsterdam.
- Jørgensen, S.E. and Johnsen, I. (1989): *Principles of Environmental Science and Technology*, Elsevier, Amsterdam.
- Jørgensen, S.E., Jørgensen, L.A., Kamp Nielsen, L. and Mejer, H.F. (1981): Parameter estimation in eutrophication. *Ecol. Modelling* 13 111-129.
- Jørgensen, S.E., Kamp-Nielsen, L., Christensen, T., Windolf-Nielsen, J. and Westergaard, B. (1985): Validation of a prognosis based upon a eutrophication model. *Ecol. Modelling*.
- Jørgensen, S.E., Libor, O., Graber, K.L. and Barkacs, K. (1976): Ammonia removal by use of clinoptilolite. *Wat. Res.* 10 p.213-224.

- Jørgensen, S.E., Libor, O., Barkacs, K. and Kuna, L. (1979): Equilibrium and capacity data of clinoptilolite. *Wat. Res.* 13 p.159-165.
- Kaufman, W.J. (1974): Chemical Pollution of Ground Waters. *JAWWA*, 66, No 3 pp 152-159
- Kiff, R.J. (1972): The ecology of nitrification and denitrification systems in activated sludge. *Wat. Pollut. Control Fed.* Vol.71, p 475-484.
- King (1965): Mass transfer during short surface exposures in counter-current flow. *Ind. Eng. Chem. Fundam.*, 4c: 125.
- Kinner N. (1983): A study of the micro-organisms inhibiting the RBC Biofilms during various operating conditions. Ph.D. Thesis, University of New Hampshire, Durham, New Hampshire
- Knowles, G., Downing, A.L. and Barrett, M.J. (1965): Determination of kinetic constants for nitrifying bacteria in mixed culture with the aid of an electronic computer. *J. Gen. Microbiol.* 38 p.263-278.
- Kohn, J.H. and Kaufman, W.J. (1971): Optimization of Ammonia Removal by Ion Exchange Using Clinoptilolite, *Environmental Protection Agency Water Pollution Control Research Series No. 17080 DAR 09/71*.
- Krittiya Lertpocasombut (1984): Nitrification Model with Inhibition of Sea Water. Master Thesis, Asian Institut of Technology, Bangkok.
- Kraus, K.A., Shor, A.J. and Johnson, J.S. (1967): Hyperfiltration studies. *Desalination*, Vol 2, p. 243.
- Kugaprasatham, S., Nagaoka, H. and Ohgaki, S. (1991): Effects of short-term and long-term changes in hydraulic conditions on nitrifying biofilm. *Wat. Sci. Tech.* 23 1487-1494.
- Kurt, M., Dunn, I.J. and Bourne, J.R. (1987): Biological denitrification of drinking water using autotrophic organisms with hydrogen in a fluidized-bed biofilm reactor. *Biotechnology Bioengineering*. Vol 29, p. 493-501.
- Kvælstofomsætningen i dansk landbrugsjord - en evalueringsrapport, *Statens Jordbrugs- og Veterinærvidenskabelige Forskningsråd*, 1985.
- La Cour Jansen, J. and Henze H. (1990): Rensningsanlæg til Nitrifikation, Kapitel 6 i *Spildevandsrensning; Biologisk og Kémisk*. Polyteknisk Forlag, (in danish).
- La Mer, V.K. (1964): Coagulation symposium introduction. *J. Coll. Sci.* 19 p.291.
- La Motta, E.J. (1976): Internal diffusion and reaction in biological films. *Environ. Sci. Tech.* 10 p.765-769.

- Lang, H. (1981): Nitrification in biological treatment with the aid of "Bio-2-SCHLAMM" processing. *Wasserwirtschaft* 71 p.166-169 (in German).
- Lawler, D.F. et al. (1983): Particles in thickening mathematical model. *J. Environ. Eng. Div., Proc. Am. Soc. Civ. Eng.* 109 2, p.332.
- Lawrence, A.W. and McCarty, P.L. (1968): Unified basis for biological treatment design and operation. *J. San. Eng. Div., Proc. Am. Soc. Civil Eng.* 96(SA3) p.757.
- Lee, Y.W. et al. (1988): Kinetics of low solids bio-denitrification of water supplies. *J. Water Poll. Contr. Fed.* 60(10) .
- Lees, H. (1954): The biochemistry of the nitrifying bacteria. *Symp. Autotrophic Microorganism. Cambridge Univ. Press London* pp 84-98.
- Lenhard, (1969): The determination of nitrosase activity in denitrifying systems. *Hydrobiologia* Vol.33, p.186-192.
- Lewis, W.K. and Whitman, W.G. (1924): Principles of gas absorption. *Ind. Eng. Chem.* 16 p.1215.
- Lonsdale, H. Merten, U. and Ripley, R.L. (1965): Transport properties of cellulose acetate osmotic membranes. *J. Appl. Polymer Sci.* 9 p.1341.
- Loveless, J.E. and Painter, H.A. (1968): The influence of metal ions and pH value on the growth of a *Nitrosomonas* strain isolated from activated sludge. *J. Gen. Microbiol.* 52 p.1-14.
- Ludzack, F.J. and Ettinger, M.B. (1962): Controlling operation to minimize activated sludge effluent nitrogen. *J. Wat. Poll. Contr. Fed.* 34 p.920-931.
- Marais, G.v.R. and Ekema, G.A. (1976): The activated sludge process part I - Steady-state behaviour. *Water S.A. Vol.*2, p. 163-200.
- Masuda, S., Watanake, Y. and Ishiguro, M. (1987): Japan Sewage Works Ass. Vol.24, p. 19-31.
- Masuda, S., Watanake, Y. and Ishiguro, M. (1991): Biofilm properties and simultaneous nitrification and denitrification in aerobic rotating biological contractor. *Wat. Sci. Tech.* 23 p.1355-1363.
- Mateles, R.I., Ryv, D.Y. and Yasuda, T. (1965): Measurement of unsteady-state growth rates of microorganisms. *Nature* Vol.208, p 263-265.
- Matschè, N.(1971): The elimination of nitrogen in the treatment plant of Vienna-Blumental. *Water Res.* Vol.6, p. 485-486.

- Matson, J.V. and Charakilis, W.G. (1976): Diffusion into Microbial Aggregates, Dept. of civil. Eng., Univ. of Huston.
- McCarty, P.J: (1969): Feasibility of the denitrification process for removal of nitrate-nitrogen from agriculture drainage waters. Appendix. Calif.Dept.Wat.Res.-Bull. p 174-3.
- McCarty, P.J., Beck and Amant (1969): Biological denitrification of waste waters by addition of organic materials. 24.th Ind. Waste Conf. Purdue Univ. p.1271-1285.
- McCarty, P.J. (1976): Energetics and bacterial growth, in Organic compounds in Aquatic Environments, Marcel Dekker, New York, pp. 635.
- McLaren, J.R. et al. (1973): Factors affecting ammonia removal by clinoptilolite. J. Environ. Eng. Div. (August).
- McHarness, D.D., Hang, R.T. and McCarty, P.L. (1975): Field studies of nitrification with submerged filters. J. Wat. Pollut. Control Fed. Vol.47, p 291-309.
- Mechala, Allan and Matyskiela (1970): A study of nitrification and denitrification. Water Poll. Control Res. Ser. USA
- Meiring and Stander, (1964). Extended aeration in mining sanitation. Civ. Engr. Sth. Afr. Vol.6, p.19-27.
- Mercer, B.W., Ames, L.L., Touhill, C.J., Van Slyke, W.J. and Dean, R.B. (1972): Ammonia removal from secondary effluents by selective ion exchange. J. Wat. Poll. Contr. Fed. 42(2, pt. 2) R95.
- Meyerhof, O. (1916): Untersuchungen über den Atmungsvorgang Nitrifizierenden Bakterien I. Die Atmung des Nitratbildners Pflügers. Arch. Ges. Physiol. 164 p.353.
- Meyerhof, O.: (1917) Untersuchungen über den Atmungsvorgang Nitrifizierenden Bakterien IV. Die Atmung des Nitritbildners (und ihre Beeinflussung durch chemische Substanzen). Pflügers Arch. Ges. Physiol. 166 p.240.
- Metcalf and Eddy Inc. (1973): Nitrification and Denitrification Facilities: Wastewater Treatment 33 pp. Technol. Transfer Seminar Publ. USEPA Washington D.C.
- Metcalf and Eddy Inc.(1979): Wastewater Engineering, Treatment Disposal and Reuse, 2nd ed., McGraw-Hill, New York.
- Metcalf and Eddy Inc. (1991): Wastewater Engineering, Treatment Disposal and Reuse, 3rd ed., McGraw-Hill, New York.

- Michaelis, L. and Menten, M.L. (1931): Die Kinetik der Invertinwirkung. *Biochem. Z.* 49 p.333-369.
- Mitsch, W.J. and Jørgensen, S.E. (eds.) (1989): *Ecological Engineering, An Introduction to Ecotechnology*, Wiley & Sons, New York,.
- Molstad, M.C., McKinney, J.F. and Abbey, R.G.: (1943) *Trans. Am. Inst. Chem. Eng.* 39 p.605.
- Monod, J.: (1949) The growth of bacterial cultures. *Annu. Rev. Microbiol.* 3 p. 371-394.
- Montgomery, J.M.: (1985) *Water Treatment - Principles and Design*, Wiley Interscience, New York.
- Monteith, H.D. et al (1980): Industrial waste carbon source for biological denitrification. *Prog. Wat. Tech.* 12 p.127-141.
- Moore, S.F. (1969): An investigation on the effects of residence time on anaerobic bacterial denitrification. Ms.Thesis. Univ. Calif.
- Moore, S.F. and Schroeder, E.D.: (1970) An investigation of the effects of residence time of anaerobic bacterial denitrification. *Wat. Res.* 4 p.685-694.
- Morris and Jackson: (1953) *Absorption Towers*, McGraw-Hill, New York.
- Morris, J.C.(1953): Kinetics Reactions between Aqueous Chlorine and Nitrogen Compounds, 4th Rudolphs Res. Conf., Rutgers University, June 15-18,
- Mudrack, (1971): Die anwendung der mikrobiellen Denitrifikation zur biologischen reinigung von industrieabwasser. *Gas Wasserfach, Wasser - Abwasser.* Vol.112, p.33. (in german)
- Mulbarger, M.C. (1971): Nitrification and denitrification in activated sludge systems. *J. Wat. Poll. Contr. Fed.* 43 p.2059-2070.
- Murphy, K.L and Dawson (1972): The temperature Dependency of Biological Denitrification. *Water Res.* Vol.6, pp 71-83.
- Murphy, K.L. and Sutton, P.M.: (1954) Pilot scale studies on biological denitrification. *Prog. Wat. Tech.*
- Neufeld, R.D., Greenfield, J. and Rieder, B. (1986) Temperature, cyanide and phenolic nitrification inhibition. *Water Res.* Vol.20, p.633-642
- Neveu, A., Gaspard, M., Blanchard, G. and Martin, G. (1985): Intracrystalline self-diffusion of ions in clinoptilolite ammonia and sodium cations studies. *Wat. Res.* 19 p.611-618.

- Newton, D. and Wilson, T.E. (1973): Oxygen Nitrification Process at Tampa. The Center for Research in Waste Resources.
- NPO-redegørelsen, Miljøstyrelsen, 1984.
- Ohgaki, S. and Wantawin, C. (1989): Nitrification, chapter 13 in *Mathematical Submodels in Water Quality Systems*. Edited by S.E. Jørgensen and M.J. Gromiec. Elsevier Science Publications.
- Okey and Albertson (1989): Diffusion's role in regulating rate and marking temperature effects in fixed-film nitrification. *J. Wat. Poll. Contr. Fed.* 61 4 p.500-519.
- Osborn (1965): Operating Experience with Double Filtration in Johannesburg. *J. Inst of Sew. Purif. Part 3.* pp. 272-281.
- Overbeck, J.T.G.: (1962) Kinetics of flocculation. Chapter VII in H.R. Kruyt (ed.), *Colloid Science, Vol. I, Irreversible Systems*, Elsevier, Amsterdam.
- Painter, H.A.: (1970) A review of literature on inorganic nitrogen metabolism in micro-organisms. *Wat Res.* 4 p.393-450.
- Painter, H.A.: (1977) Microbial transformations of inorganic nitrogen. *Prog. Wat. Tech.* 8(4/5) p.3-29.
- Painter, H.A. and Jones, K.: (1963) The use of the wide-bore dropping-mercury electrode for the determination of rates of oxygen uptake and of oxidation of ammonia by micro-organisms. *J. Appl. Bacteriol.* 29 p.471-483.
- Painter, H.A. and Loveless, J.E.: (1981) Effect of temperature and pH value on the growth-rate constants of nitrifying bacteria in the activated-sludge process. *Wat.Res.* 17 p.237-248.
- Park, Y. and Hegeman, G. (1984): The oxidation of carbon monoxide by bacteria "Microbial Chemoautotroph" W.R. Stohl and O.H. Tuovien eds. Ohio State Univ. Columbus Ohio.
- Parker, D., Aberley and Cadwell, (1975): Development and implementation of biological denitrification for two large plants. Presented at Conf. on nitrogen as a Water Pollut. Copenhagen.
- Parker, D., Lutz, Dahl and Berkopf: (1989) Enhancing reaction rates in nitrifying trickling filters through biofilm control. *J. Wat. Poll. Contr. Fed.* 61 p.618-626.
- Parker, D.S., Lutz, M.B. and Partt, A.M.: (1990) New trickling filter application in the USA. *Wat. Sci. Tech.* 22 p.215-226.

- Parker, D.S. and Merrild, D.T.: (1984) Effect of plastic media configuration on trickling filter performance.
- Parker, D.S. and Richards T. (1986): Nitrification in trickling filters. J. Wat. Poll. Contr. Fed. 58, p. 896-902.
- Pasveer, (1965): Beitrag uber Stickstoffbeseitigung aus Abwassern. Munchner Beitrage zur Abwasser-, Fisherei- und Flussbiologie (ed. Liebmann). Bd. 12 p.197-200.
- Payne, W.J. (1973): Reduction of nitrogenous oxides by microorganisms. Bacteriol. Rev. 37 p.409-452.
- Poduska, R.A. and Andrew, J.F. (1975): Dynamics of nitrification in the activated sludge process. J. Wat. Poll. Contr. Fed. 47 p.2599-2619.
- Polprasert, C. et al.: (1983) Bacterial die-off kinetics in waste stabilization ponds. J. Wat. Poll. Contr. Fed. 55 p.285-296.
- Polprasert, C. and Hoang, L.: (1983) Kinetics of bacteria and bacteriophages in anaerobic filters. J. Wat. Poll. Contr. Fed. 55 p.385-391.
- Polprasert, C. and Park, H.S. (1986): Effluent denitrification with anaerobic filters. Wat. Res. 20 p.1015-1021.
- Pokallus (1963): Toxicity of nitrite to *Nitrosomonas Europea*. Ph.D. Thesis. Rutgers Univ. New Brauswick, New Jersey.
- Porra and Lascelles (1965): Haemoprotein and heamsynthesis in facultative photosynthesis and denitrifying bacteria. Biochem. J. Vol. 94, p.120.
- Praksam, T.B.S. and Loehr, R.C. (1972): Microbial nitrification and denitrification in concentrated wasts. Water Res. Vol. 6, p 859-869.
- Praksam, T.B.S., Joo, Y.D., Srinath, E.G. and Loehr, R.C. (1974): Nitrogen removal from a concentrated waste by nitrification and denitrification. Proc. 29th Int. Waste Conf. Purdue Univ. pp 497-509.
- Pressley, T.A., Bishop, D.F. and Roan, S.G. (1970): Nitrogen Removal by Break-point Chlorination, report prepared for the Environmental Protection Agency, September.
- Pressley, T.A., Bishop, D.F., Pinto, A.P. and Cassel, A.F. (1973): Ammonia-Nitrogen Removal by Breakpoint Chlorination, report prepared for the Environmental Protection Agency, Contract No. 14-12-818, February.
- Pretorius (1972): The complete treatment of raw sewage with special emphasis on nitrogen removal. Presented at 6.th Int. Conf. Wat. Poll. Res. Jerusalem.

- Process Design Manual for Nitrogen Control, Office of the Technology Transfer, Environmental Protection Agency (EPA), Washington, D.C., 1975.
- Randall C.W. and Buth (1984): Nitrite build-up in activated sludge resulting from temperature effects. *J. Water Pollut. Control Fed.* Vol.56, p.1039.
- Reimann, H.: (1990) The Linpor-process for nitrification and denitrification. *Wat. Sci. Tech.* 22 p.297-298.
- Renner (1970): Production of nitric oxide and nitrous oxide during denitrification by *Corynebacterium nephridii*. *J. Bact.* Vol.101, p. 821-826.
- Reverse osmosis renovation of municipal wastewater. Water pollution control research series, Ord-17040EFQ12, EPA, 1969.
- Richards, T. (1988): Personal Communication to D.S. Parker. City of Atlanta, Georgia Univ.
- Riemer, M. and Harremoës, P.: (1978) Multi-component diffusion in denitrifying biofilms. *Prog. Wat. Tech.* 10(5) p.149-165.
- Rimer, A.E. and Woodward, R.L.: (1972) Two-stage activated sludge pilot-plant operations at Fitchburg, Massachusetts. *J. Wat. Poll. Contr. Fed.* 44 p.101.
- Ritchard *et al.* (1980): Denitrification of water for human consumption. *Prog. Wat. Tech.* Vol.12, p173-191.
- Rittmann, B.E. and McCarty, P.L.: (1978) Variable-order model of bacterial-film kinetics. *J. Environ. Eng. Div.* 104(EE5) p.889.
- Rittmann, B.E. and McCarty, P.L. (1981): Substrate flux into biofilms at any thickness. *J. of the Env. Eng. Div. ASCE.*
- Robertson, L.A. and Kuenen, J.G. (1984): Aerobic denitrification: a controversy revived. *Arch. Microbiol.* 139 p.351-354.
- Rogella, F. and Payaraudeau, M. (1987): Tertiary nitrification with fixed biomass reactors. Paper presented at the Specialized Conference on Nitrogen Pollution of Water, IAWPRC, Brussels, Belgium.
- Rogella, F., Bacquet, G, Payaraudeau, M., Bourbigot, M.M., Sibony, J. and Gilles, P. (1988): Nutrient removal with biological aerated filters. Paper presented at the WPCF Conference, Dallas, 2-6 oktober 1988.
- Rogella, F., Ravarini, Larminat and Coutella: (1990) Large-scale biological nitrate and ammonia removal. *J. IWEM* 4 p.319.

- Rozich, A.F. and Castens, D.J.: (1986) Inhibition kinetics of nitrification of continuous-flow reactors. J. Wat. Poll. Contr. Fed. 58 p.220-226.
- Ruffer (1964): Nitrifikation und Denitrifikation bei der Abwasserreinigung. Vom. Wasser. Vol.31, p.134-152.
- Rusten, B. and Ødegaard, H.: (1983) Nitrogen removal in an anoxic/aerobic biodisc system. Proc. EWPCA-IAWPRC seminar on Rotating Biological Discs, Fellbach, BDR.
- Sato, H., Leung, S.W., and Schutor, J.L.: (1988) Toxic response of *Nitrosomonas europae* to copper in inorganic medium and wastewater. Wat. Res. 22 p.1117-1127.
- Sawyer, C.N. and McCarty, P.L.: (1978) Chemistry for Environmental Engineering, 3rd ed., McGraw-Hill, New York.
- Scavia, D. (1980): Conceptual model of phosphorus cycling. In Nutrient Cycling in the Great Lakes, ed. D Scavia and R. Moll, pp 119-140. Special Report 83, Great lakes Research Division, University of Michigan, Ann Arbor.
- Schlegel, S. (1988): The use of submerged biological filters for nitrification. Wat. Sci. Tech. Vol.20, (4/5) p. 177-187.
- Schroeder and Busch, (1968): The role of nitrate nitrogen in bio-oxidation. J.WPCF Vol.40, p.445-459
- Schulze-Rettmer, R. (1991): The simultaneous chemical precipitation of ammonium and phosphate in the form of magnesium-ammonium-phosphate. Wat. Sci. Tech. 23 p.659-667.
- Schuster (1970): Zum gegenwärtigen stand der stickstoffelimination aus abwassern. Fortschr. Wasserchem. Grenzge. Vol.12, p.124-138.
- Semmens, M.J., Booth, A.C. and Tauxe, G.W.: (1978) Clinoptilolite column ammonia removal model. J. Environ. Eng. Div. 104(EE2) p.231.
- Semmens, M. et al.: (1980)Modelling ammonium exchange and regeneration on clinoptilolite. Wat. Res. 15 p.655-666.
- Shammas, N.K.: (1986) Interaction of temperature, pH and biomass on the nitrification process. J. WPCE 58(1) p. 52-59.
- Sharma, B. and Ahlert, R.C. (1976): Nitrification and nitrogen removal. Wat. Res. 11 p.897-923.
- Sharma, B. (1977): Nitrification in a continuous stirred tank biofilm reactor. Ph.D. Thesis, Rutgers University, New Brunswick, New Jersey.

- Sherwood, T.K. and Holloway, F.A.L.: (1940) Trans. Am. Chem. Eng. 36 p.39.
- Siegrist, H. and Gujer, W. (1987): Demonstration of mass transfer and pH effects in a nitrifying biofilm. Wat. Res. 21 p.1481-1487.
- SJVF, Statens Jordbrugs- og Veterinærvidenskabelige forskningsråd (1985)
Kvælstofomsætningen i dansk landbrug - en evalueringsrapport, (in danish).
- Skinner, F.A. and Walker, N.: (1961) Growth of *Nitrosomonas europaea* in batch and continuous culture. Arch. Mikrobiol. 38 p.339.
- Slater J.H. and Bull A.T. (1978): Interactions between microbial populations. In Companion to Microbiology, p. 181 (ed. A.T. Bull and P.M. Meadow). Longmans, London.
- Smith, Masse, Feige and Kamphake, (1972): Nitrogen removal from municipal waste water by columnar denitrification. Envir. Sci. Tech. Vol. 6, p.260-267.
- Srinath, E.G. and Loehr, R.C.: (1974) Ammonia desorption by diffused aeration. J. Wat. Poll. Contr. Fed. 46 p.1939-1957.
- Srna, R. and Baggaley, A. (1975): Kinetic response of perturbed marine nitrification systems. J. Wat. Poll. Contr. Fed. 47 p.472-486
- Stamberg, J.B., Hais, A.B., Bishop, D.F. and Heidman, J.A. (1974): Nitrification in oxygen activated sludge. Unpublished paper, USEPA.
- Standard Methods for the Examination of Water and Wastewater, 16th ed., American Public Health Association (APHA)-AWWA-WPCF, Washington, D.C., 1985.
- Stasuik, W.N., Hetling, L.J. and Shuster, W.W. (1973): Removal of Ammonia Nitrogen by Breakpoint Chlorination Using an Activated Carbon Catalyst, New York State Department of Environmental Conservation Technical Paper No. 26.
- Stensel, (1971) Biological kinetics of the suspended growth denitrification process. Ph.D. Thesis, Cornell University.
- Stensel, Loehr and Lawrence (1973): Biological Kinetics of suspended growth denitrification. WPCF Vol.45, p.399-410.
- Stenstrøm, M.K. and Poduska, R.A. (1980): The effect of Dissolved Oxygen Concentration on Nitrification. Water Research, Vol. 14, pp 643-649.
- Stover, E.L. and Kincannon, D.F. (1976): One - versus two stage nitrification in the activated sludge process. J. Wat. Pollut. Control. Fed. Vol48, p 645-651.

- Straskraba, M. and Gnauck, A.H. (1985): Freshwater ecosystems, Modelling and simulation, in Developments in Environmental Modelling, Elsevier, Amsterdam.
- Stratton, F.E. and McCarty, P.L. (1967): Prediction of nitrification effects on dissolved oxygen balance of streams. *Env. Sci. Technol.* Vol.1, p. 405-510.
- Stumm, W. and Morgan, J.J. (1981): *Aquatic Chemistry*, Wiley & Sons, New York.
- Suhr, L.G. and Kepple, L.: (1974) Design of a Selective Ion Exchange System for Ammonia Removal, presented at the ASCE Environmental Engineering Division Conference, Pennsylvania State University.
- Summary of Design Information on Rotating Biological Contractors, Report from U.S. EPA, 1984.
- Sutton, K.L. Murphy, K.L. and Dawson, R.N. (1980): Low-temperature biological denitrification of wastewater. *J. Wat. Poll. Contr. Fed.* 47 p.122-134.
- Sutton, P.M., Murphy, K.L. and Dawson, R.N. (1974): Continous biological denitrification of wastewater, Water Pollution Control Directorate, Environment Canada, Ottawa, Ontario, Environmental Protection Service Report No. EPS 4-WP-74-6.
- Sutton, P.M., Murphy, K.L. and Jank, B.E. (1977): Nitrogen control: A basis for design with activated sludge systems. *Prog. Wat. Tech.* 8 p.467-481.
- Suzuki, I., Dular, U. and Kwok, S.C. (1974): Ammonia or ammonium ions as substrate for oxidation by *Nitrosomonas Europea* cells and extracts. *J. Bact.* Vol.120, p. 556-558.
- Tanaiguchi (1961): Comparative biochemistry of nitrate metabolism. *Z. allg. Mikrobiel* Vol.1, p.341-375.
- Tanaka, K., Tada, M., Ito, M. and Shimizu, N. (1991): Performance analysis of the RBC process based on particle fraction and improvement of final effluent quality. *Wat. Sci. Tech.* 23 p.1457-1466.
- Taras, M.J. (1953): Effect of free residual chlorine on nitrogen compounds in water. *JAWWA* 45 p.47.
- Tentative Water Quality Control Plan, San Francisco Bay Basin, California State Water Resources Control Board, 1974.
- Tetra Tech. Inc. (1980): Methodology for Evaluation of Multiple Power Plant Cooling System Effects, Volume V. Report EPRI EA - IIII. Lafayette, California.

- Timmermans, P. and Van Haute, A. (1983): Denitrification with methanol. Fundamental study of the growth and denitrification capacity of *Hyphomicrobium* sp. *Water Res.* Vol.17, p.1249-1256.
- Toit and Davies (1973): Denitrification studies with lab. scale continous flow-units. *Water Res.* Vol.7, p.489-500.
- Tood and Nuner (1973): Comparison of two techniques for assesing denitrification in terrestrial ecosystems. *Bull. Ecol. Res. Comm. Stock.* Vol.17, p.277-278.
- Tomlinson, T.G. and Snaddon, D.H.M. (1966): Biological oxidation of sewage by films microorganisms. *Air Wat. Poll. Inst. J.* 10 p.865-881.
- Tomlinson, T.G., Boon, A.G. and Trotman, C.N.A. (1966): Inhibition of nitrification in the activated sludge process of sewage disposal eller treatment. *J. Appl. Bacteriol.* 29 p.266-291.
- USPHS, Division of Water Supply and Pollution Control (1965) *Interation of Heavy Metals and Biological Sewage Treatment Processes.*
- Visut lam-A-Ram (1985): Effect of Sodium Ion on Nitrification. Master Thesis, Asian Institute of Technology.
- Wanner, J. and Grau, P. (1989): Identification of filamentous microorganisms from activated sludge: A compromise between wishes, need and possibilities. *Water Res.* 23 p.883-891.
- Wanner, J., Miroslav, K. and Grau, P. (1990): An innovative technology for up-grading nutrient removal activated sludge plants. *Wat. Sci. Tech.* 22(7/8) 9-20.
- Wanner, O. (1989): Modelling dynamics, in W.G. Charackliss and P. Wilderer (eds.), *Structure and Function of Biofilms*, Dahlem Konferenzen, Wiley & Sons, Chichester.
- Wanner, O. and Gujer, W. (1986): A multispecies biofilm model biotechnologi and bioengineering. 28 p.314-328.
- Wanner, O. and Gujer, W.A. (1984): Competition in biofilms. *Wat. Sci. Tech.* 17 27-44.
- Watanabe, Bravo and Nishidome (1982): Simulation of nitrification and its dynamics in a rotating biological contractor. *Wat. Sci. Tech.* 14 p.811-832.
- Watanabe, Y. and Ishiguro, M. (1978): Denitrification kinetics in a submerged rotating biological disk unit. *Prog. Wat. Tech.* 10 p.187-195.

- Watanabe, Y., Ishiguro, M. and Nisaidome, K. (1980): Nitrification kinetics in a rotating biological disk reactor. *Prog. Wat. Tech.* 12 p.233-251.
- Watanabe, Y. (1985): *Mathematica Modelling of nitrification and denitrification in RBC*, p.419 in Jørgensen and Gromiec, *Developments in Environmental Modelling 7*. Elsevier.
- Watanabe, Y., Masuda, S. and Ishiguro, M. (1992): Simultaneous nitrification and denitrification in Micro-aerobic Biofilms. *Wat.Sci. Tech.* Vol.26, p.511-522.
- Water Pollution Control Federation (1983): *Nutrient Control, Manual of Practise FD-7*.
- Weber, W.J. and Rumer J.C. (1965): Intraparticle transport of sulfonates alkylbenzenes in a porous solid. Diffusion with nonlinear adsorption. *Wat Resources Reseach No 1*.
- Wentzel, M.C., Ekama, G.A. and Marais, G.v.R. (1991): Kinetics of nitrification denitrification. Biological excess phosphorus removal systems - A review. *Wat. Sci. Tech.* 23 p.555-565.
- Weston, R.F. (1984): *Advanced Waste Treatment Performance Evaluation Summary Report USEPA Contract No 68-03-3019*.
- Wild, H.E., Sawyer, C.N. and McMohan T.C. (1971): Factors affecting nitrification kinetics. *J. Wat. Poll. Contr. Fed.* 43 p.1845-1854.
- Williams, D.R. (1978): Denitrifying *Pseudomonas aeruginosa*: some parameters of growth and active transport. *Appl. Environ. Microbiol.* 36 p.257-263.
- Williamson, K. and McCarty, P.L.(1976): A model of substrate utilization by bacterial films. *J. Wat. Poll. Contr. Fed.* 48 p.9.
- Williamson, K. and McCarty, P.L. (1976): Verification studies of the biofilm model for bacterial substrate utilization. *J. Wat. Poll. Contr. Fed.* 48 p.231.
- Williamson, K.J. and Chung, T.H. (1975): Dual limitation of substrate utilization kinetics within bacterial films, presented at 49th Natl. Meet. Am. Inst. Chem. Eng.,Houston, Texas.
- Wilson, T.E, and Newton, D.: (1973) Brewery wastes as a carbon source for denitrification at Tampa, Florida. Proc. 28th Ind. Waste Conf., Purdue University, West Lafayette, Indiana, pp. 138.
- Wong-Chong, G.M. and Loehr, R.C. (1975): The kinetics of microbial nitrification. *Wat. Res.* 9 p.1099-1106.

- Voss, K.D., Burris, F.O. jr. and Riley, R.L. (1966): Kinetic study of hydrolysis of cellulose acetate in the pH range 2-10. *J. Appl. Poly. Sci.*, 10: p.825.
- Wuhrmann, K. (1960): Effect of oxygen on biochemical reactions. Proc. 3.th Conf. Biol. Waste Treatm. Manhattan College, N.Y.
- Wuhrmann, K. (1964): Grundlagen für die Dimensionierung der Beluftung bei Belebtschlammanlagen. *Schweiz. Z. Hydrol.* 26 p.310.
- Yull-Rhee, G. and Frutts, G.W. (1978): Wastewater denitrification with one carbon compounds as energy source. *J. Water Poll. Contr. Fed.* vol. 50, p. 2111-2119.
- Zanoni, A.E. (1969): Secondary Effluent Deoxygenation at Different Temperatures. *J. Water Pollution Control Fed.*, Vol. 41, pp. 640-59.
- Ødegaard, H. (1988): Oversikt over metoder for fjerning af nitrogen i avløpsvann, in H.Ødegaard (ed.), *Fjerning av Nitrogen i Avløpsvann*, Tapir Forlag, pp. 17-35.