

## **8 Literaturverzeichnis<sup>1</sup>**

- Ackermann, G. E., Brombacher, E., Fent, K. (2002):  
 Development of a fish reporter gene system for the assessment of estrogenic compounds and sewage treatment plant effluents. Environ Toxicol Chem 21 (9), 1864-1875.
- Aerle, R. Van, Pounds, N., Hutchinson, T. H., Maddix, S., Tyler, C. R. (2002):  
 Window of sensitivity for the estrogenic effects of ethinylestradiol in early life-stages of Fathead Minnow, *Pimephales promelas*. Ecotoxicology 11, 423-434.
- Agteren, M. H. Van, Keuning, S., Janssens, D. B. (1998):  
 Handbook on biodegradation and biological treatment of hazardous organic compounds. Kluwer Academic Publishers, Dordrecht, Boston, London, 483-488.
- Ahel, M., Giger, W., Koch, M. (1994 a):  
 Behaviour of alkylphenol polyethoxilate surfactants in the aquatic environment - I. Occurrence and transformation in sewage treatment. Water Res 28 (5), 1131-1142.
- Ahel, M., Giger, W., Schaffner, C. (1994 b):  
 Behaviour of alkylphenol polyethoxylate surfactants in the aquatic environment-II. Occurrence and transformation in rivers. Water Res 28, 1143-1152.
- Aherne, G. W., Briggs, R. (1989):  
 The relevance of the presence of certain synthetic steroids in the aquatic environment. J Pharm Pharmacol 41, 735-736.
- Alexander, M. (1965):  
 Biodegradation: problems of molecular recalcitrance and microbial fallibility. Adv Appl Mikrobiol 7, 35-80.
- Alexander, M. (1981):  
 Biodegradation of chemicals of environmental concern. Science 211, 132-138.
- Alfonso, A., Herzog, H. L., Federbush, C., Charney, W. (1966):  
 Microbial degradation of 19-Nor-(1,3,5(10)-Cholestatrien-3-ol. Steroids 7, 429-431.
- Allen, E., Doisy, E. A. (1923):  
 An ovarian hormone. J Am Med Assoc 81, 819-821.
- Apoteker, A., Thévenot, D. R. (1983):  
 Experimental simulation of biodegradation in rivers. Water Res 17, 1267-1274.
- Atkinson, S., Atkinson, M. J., Tarrant, A. M. (2003):  
 Estrogens from sewage in coastal marine environments. Environ Health Perspect Suppl. 111 (4), 531-535.
- Atlas, R. M., Bartha, R. (1998):  
 Microbial Ecology. Fundamentals and applications. 4. Auflage, Addison Wesley Longman, Inc., Menlo Park, Californien, Massachusetts, New York, 218-281, 332-385.

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<sup>1</sup> Zeitschriftentitel-Abkürzungen gemäß:

List of journals indexed in Index Medicus, Bethesda, Md: Nat. Library of Medicine, 1992

- Austin, B. (1988):  
 Identification. In: Austin, B. (Hrsg.): Methods in aquatic bacteriology. John Wiley & Sons Chichester, New York, Brisbane, Toronto, 95-115.
- Bamberg, E. (1994):  
 Chemie, Biochemie und Nachweis der Steroidhormone. In: Döcke, F. (Hrsg.): Veterinärmedizinische Endokrinologie. 3. Aufl., Gustav Fischer Verlag Jena, Stuttgart, 31-40.
- Bamberg, E., Choi, H. S., Möstl, E. (1986):  
 Östrogenbestimmung im Kot zur Trächtigkeitsdiagnose bei Pferd, Rind, Schwein, Schaf und Ziege. Tierärztl Umsch 41, 406-408.
- Baronti, C., Curini, R., D' Ascenzo, G. , Di Corcia, A., Gentili, A., Samperi, R. (2000):  
 Monitoring natural and synthetic estrogens at activated sludge sewage treatment plants and in a receiving river water. Environ Sci Technol 34 (24), 5059-5066.
- Bartholomew, G. W., Pfaender, F. K. (1983):  
 Influence of spatial and temporal variations on organic pollutant biodegradation rates in an estuarine environment. Appl Environ Microbiol 45 (1), 103-109.
- Belfroid, A. C., Horst, A. Van der, Vethaak, A. D., Schäfer, A. J., Rijs, G. B. J., Wegener, J., Cofino, W. P. (1999):  
 Analysis and occurrence of oestrogenic hormones and their glucoronides in surface water and waste water in the Netherlands. Sci Total Environ 225, 101-108.
- Bhattachayya, P. K., Krishna Rao, M., Natarajan, R. D., Ramgopal, M., Madyastha, P., Madyastha, K. M. (1984):  
 Microbial oxidation of sterol side-chains. J Indian Chem Soc 61, 1-15.
- Bjerselius, R., Lundstedt-Enkel, K., Olsén, H., Mayer, I., Dimberg, K. (2001):  
 Male goldfish reproductive behavior and physiology are severely affected by exogenous exposure to  $17\beta$ -estradiol. Aquat Toxicol 53, 139-152.
- Böhme, C. (1998):  
 Chemikalien mit östrogenem Potential in Lebensmitteln und kosmetischen Mitteln. Bundesgesundheitsblatt 8, 340-343.
- Boethling, R. S., Alexander, M. (1979):  
 Effect of concentration of organic chemicals on their biodegradation by natural microbial communities. Appl Environ Microbiol 37 (6), 1211-1216.
- Boyle, M. (1993):  
 Microbial ecology of sewage treatment. In: Ford, T. E. (Hrsg.): Aquatic microbiology. An ecological approach. Boston Blackwell Scientific Publications, Oxford, London, Edinburgh, 441-455.
- Bradbury, R. B., White, D. E. (1954):  
 Oestrogens and related substances in plants. Vitam Horm 12, 207-233.
- Brunström, B., Axelsson, J., Halldin, K. (2003):  
 Effects of endocrine modulators on sex differentiation in birds. Ecotoxicology 12, 287-295.

- Bryan, G. W., Gibbs, P. E., Burt, G. R., Hummerstone, L. G. (1987):  
The effects of tributyltin (TBT) accumulation on adult dogwhelks, *Nucella lapillus*: long-term field and laboratory experiments. *J Mar Biol Ass U K* 67, 524-544.
- Bülbüng, E., Burn, J. H. (1935):  
The estimation of estrin and male hormone in oily solution. *J Physiol* 85, 320-333.
- Bundesumweltamt (1997):  
Bisphenol A, BUA - Stoffbericht 203, Beratungsgremium für umweltrelevante Altstoffe, S. Hirzel Wissenschaftliche Verlagsgesellschaft Stuttgart.
- Bursch, W., Bamberg, E. (1990):  
Trächtigkeitsdiagnose beim Schaf. *Tierärztl Umsch* 45, 430-434.
- Bursch, W., Schulte-Hermann, R., (1998):  
Toxikologische Bewertung des Vorkommens hormonell wirksamer Chemikalien in der Umwelt. *Wiener Mitteilungen* 153, 119-129.
- Cairns, J., Jr. (1984):  
Editorial. Multispecies toxicity testing. *Environ Toxicol Chem* 3, 1-3.
- Carlsen, E., Givernan, A., Keiding, N., Skakkebaek, N. E. (1992):  
Evidence for decreasing quality of semen during past 50 years. *Br Med J* 305, 609-613.
- Carson, C. (1962):  
Silent spring. Houghton Mifflin; deutsche Ausgabe: Der stumme Frühling. C. H. Beck, 1990.
- Cayman, (2000):  
Chemical Company, Ann Arbor, MI, USA, Catalog No. 582251.
- Choi, H. S. (1987):  
Immunologische Bestimmung von Sexualsteroiden zur Fertilitätskontrolle bei Rind, Schwein und Pferd. *Wien tierärztl Mschr* 74, 14-22 und 47-56.
- Clark, H. J., Watson, C., Upchurch, S., Padykula, H., Markaverich, B., Hardin, J. W. (1980):  
Estrogen action in normal and abnormal cell growth. In: McLachlan, J. A. (Hrsg.): *Estrogens in the environment*. Elsevier, New York, 53-67.
- Clark, L. B., Rosen, R. T., Hartman, T. G., Louis, J. B., Suffet, I. H., Leppincott, R. L., Rosen, J. D. (1992):  
Determination of alkylphenol ethoxylates and their acetic acid derivates in drinking water by particle beam liquid chromatography/mass spectrometry. *Int J Environ Anal Chem* 47, 167-180.
- Colborn, T. (2004):  
Neurodevelopment and endocrine disruption. *Environ Health Perspect*, 112 (9), 944-949.
- Colborn, T., Dumanowski, D., Myers, J. P. (1996):  
Our stolen future. Dutton/Penguin, New York; deutsche Ausgabe: Die bedrohte Zukunft – Gefährden wir unsere Fruchtbarkeit und Überlebensfähigkeit? Verlag Droemer Knaur, München.

- Colborn T., Saal, F. S. vom, Soto, A. M. (1993):  
 Developmental effects of endocrine-disrupting chemicals in wildlife and humans.  
*Environ Health Perspect* 101 (5), 378-384.
- Colby, H. D. (1980):  
 Regulation of hepatic and steroid metabolism by androgens and estrogens. In:  
 Thomas, J. A., Singhal, R. L. (Hrsg.): Advances in sex hormone research. Baltimore,  
 MD: Urban and Schwarzenberg, 27-71.
- Coldham, N. G., Dave, M., Sivapathasundaram, S., McDonnell, D. P., Connor, C., Sauer, M.  
 J. (1997):  
 Evaluation of a recombinant yeast cell estrogen screening assay. *Environ Health  
 Perspect* 105 (7), 734-742.
- Colucci, M. S., Bork, H., Topp, E. (2001):  
 Persistence of estrogenic hormones in agricultural soils: I. 17 $\beta$ -Estradiol and Estrone.  
*J Environ Qual* 30, 2070-2076.
- Colucci, M. S., Topp, E. (2001):  
 Persistence of estrogenic hormones in agricultural soils: II. 17 $\alpha$ -Ethynodiol. *J  
 Environ Qual* 30, 2077-2080.
- Comhaire, F., Waeleghem, K. V., De Clerk, N., Schoonjans, F. (1996):  
 Declining sperm quality in European men. *Andrologia* 28, 300-301.
- Cowan, C. E., Versteeg, D. J., Larson, R. J., Kloepper-Sams, P. J. (1995):  
 Integrated approach for environmental assessment of new and existing chemicals.  
*Regul Toxicol Pharmacol* 21, 3-31.
- Crisp, T. M., Clegg, E. D., Cooper, R. L., Wood, W. P., Anderson, D. G., Baetcke, K. P.,  
 Hoffman, J. L., Morrow, M. S., Rodier, D. J., Schaeffer, J. E., Touart, L. W., Zeeman,  
 M. G., Patel, Y. M. (1998):  
 Environmental endocrine disruption: an effects assessment analysis. *Environ Health  
 Perspect* 106 (suppl. 1), 11-56.
- Currie, D. J. (1990):  
 Large-scale variability and interactions among phytoplankton, bacterioplankton and  
 phosphorus. *Limnol Oceanogr* 35 (7), 1437-1455.
- Czekala, N. M., Roocroft, A., Bates, M., Allen, J., Lasley, B. L. (1992):  
 Estrogen metabolism in the Asian elephant (*Elephas maximus*). *Zoo Biol* 11, 75-80.
- Dankwardt, A. (1998):  
 Hormonell und reproduktionstoxisch wirksame Pestizide. Umweltstiftung WWF-  
 Deutschland, 75.
- D' Ascenzo, G., Di Corcia, A., Gentili, A., Mancini, R., Mastropasqua, R., Nazzari, M.,  
 Samperi, R. (2003):  
 Fate of natural estrogen conjugates in municipal sewage transport and treatment  
 facilities. *Sci Total Environ* 302, 199-209.

- Daubner, I. (1972):  
Mikrobiologie des Wassers. Akademie Verlag Berlin, 27-105.
- Daxenberger, A., Ibarreta, D., Meyer, H. H. D. (2001):  
Possible health impact of animal oestrogens in food. *Hum Reprod Update* 7 (3), 340-355.
- Desbrow, C., Routledge, E. J., Brighty, G. C., Sumpter, J. P., Waldock, M. (1998):  
Identification of estrogenic chemicals in STW effluent. 1. Chemical fractionation and in vitro biological screening. *Environ Sci Technol* 32 (11), 1549-1558.
- Dewailly, E., Dodin, S., Verreault, R., Avotte, P., Sauve, I., Morin, J., Brisson, J (1994):  
High organochlorine body burden in women with estrogen receptor-positive breast cancer. *J Natl Cancer Inst* 86, 232-234.
- Ding, A., Zhang, Z., Fu, J., Cheng, L. (2001):  
Biological control of leachate from municipal landfills. *Chemosphere* 44, 1-8.
- Dobretsberger, A. (1996):  
Androgen- und Östrogenausscheidung mit dem Kot trächtiger Kühe und die Stabilität dieser Metaboliten im Misthaufen. *Vet. Med. Diss. Wien*.
- Faber, R., Hickey, J. (1973):  
Eggshell thinning, chlorinated hydrocarbons, and mercury in inland aquatic bird eggs, 1969 and 1970. *Pestic Monit J* 7, 27-36.
- Falck, F., Ricci, A., Wolff, M. S., Godbold, J., Deckers, P. (1992):  
Pesticides and polychlorinated biphenyl residues in human breast lipids and their relation to breast cancer. *Arch Environ Health* 47, 143-146.
- Feldman, D. (1997):  
Editorial: Estrogens from plastic - are we being exposed? *Endocrinology* 138, 1777-1779.
- Folmar, L. C., Hemmer, M. J., Denslow, N. D., Kroll, K., Chen, J., Cheek, A., Richman, H., Meredith, H., Grau, E. G. (2002):  
A comparison of the estrogenic potencies of estradiol, ethynodiol, diethylestradiol, nonylphenol and methoxychlor in vivo and in vitro. *Aquat Toxicol* 60, 101-110.
- Folmer, L. C., Hemmer, M. J., Hemmer, R., Bowman, C., Kroll, K., Denslow, N. D. (2000):  
Comparative estrogenicity of estradiol, ethynodiol and diethylstilbestrol in an in vivo, male sheepshead minnow (*Cyprinodon variegatus*), vitellogenin bioassay. *Aquat Toxicol* 49, 77-88.
- Forth, W., Henschler, D., Rummel, W., Starke, K. (1992):  
Allgemeine und spezielle Pharmakologie und Toxikologie: für Studenten der Medizin, Veterinärmedizin, Pharmazie, Chemie, Biologie sowie für Ärzte, Tierärzte und Apotheker. 6. Auflage, Wissenschaftsverlag Mannheim, Leipzig, Wien, 528-579.
- Forman, D., Möller, H. (1994):  
Testicular cancer. *Cancer Surv.* 19/20, 323-341.

- Foster, W. G., Hughes, C. L., Chan, S., Platt, L. (2002):  
 Human developmental exposure to endocrine active compounds. Environ Toxicol Pharmacol 12, 75-81.
- Fotsis, T., Adlercreutz, H. (1987):  
 The multicomponent analysis of estrogens in urine by ion exchange chromatography and GC-MS—I. Quantification of estrogens after initial hydrolysis of conjugates. J Steroid Biochem 28 (2), 203-13.
- Fotsis, T., Järvenpää, P., Adlercreutz, H. (1980):  
 Purification of urine for quantification of the complete estrogen profile. J Steroid Biochem 12, 503-508.
- Fürhacker, M. (1998):  
 Hormonell wirksame Substanzen im Klärschlamm - ein Problem? Wiener Mitteilungen 153, 71-92.
- Fürhacker, M., Breithofer, A., Jungbauer, A. (1999):  
 17 $\beta$ -Estradiol: Behavior during waste water analyses. Chemosphere 39 (11), 1903-1909.
- Fürhacker, M., Scharf, S., Weber, H. (2000):  
 Bisphenol A: emission from point sources. Chemosphere 41, 751-756.
- Fujii K., Kikuchi, S., Satomi, M., Ushio-Sata, N., Morita, N., (2002):  
 Degradation of 17 $\beta$ -Estradiol by a gram- negative bacterium isolatsd from activated sludge in a sewage treatment plant in Tokyo, Japan. Appl Environ Microbiol 68 (4), 2057-2060.
- Ghonheim, I. M. (1989):  
 Steroid hormones in the blood and milk during different productive phases of swiss brown cows measured with RIA and EIA. Vet.-med. Diss. Zürich, 1989.
- Gies, A. (1997):  
 Hormonell wirksame Chemikalien. In: Haury, H.-J., Aßmann, G., Froese, B., Jahn, T. (Hrsg.): Umweltchemikalien mit hormoneller Wirkung. Journalistenseminar der Information Umwelt, Band 21, 1-2.
- Giese, C., Schlenker, G., Miethe, N. (2003):  
 Untersuchungen zur Biodegradation von Östrogenen im Oberflächenwasser. AG Ökologie und Umwelt: 16. Herbstkolloquium, Berlin, 1. und 2. Okt. 2003.
- Gimeno, S., Gerritsen, A., Bowmer, T., Komen, H. (1996):  
 Feminization of male carp. Nature 384, 221-222.
- Gobas, F. A. P. C. (2001):  
 Assessing bioaccumulation factors of persistent organic pollutants in aquatic food-chains. In: Harrad, S. (Hrsg.): Persistent organic pollutants. Environmental behaviour and pathways of human exposure. Kluwer Academic Publishers Boston, Dordrecht, London, 145-167.
- Goes de Pinho, T. (1995):  
 Untersuchungen zum Verlauf freier und konjugierter Östrogene im Blutplasma, Kot und Urin während der Trächtigkeit des Rindes. Vet.-med. Diss. Gießen, 1995.

- Greim, H. (1998):  
 Hormonähnlich wirkende Stoffe in der Umwelt - Einführung und Sachstand.  
 Bundesgesundheitsblatt 8, 326-329.
- Grossman, C. J. (1984):  
 Regulation of the immune system by sex steroids. Endocr Rev 5, 435-455.
- Grunert, E., Ahlers, D. (1969):  
 Harnöstrogenbestimmung beim Rind zur Diagnose intra-uterin abgestorbener Früchte. Dtsch Tierärztl Wschr 76, 497-536.
- Gülden, M., Turan, A., Seibert, H. (1997):  
 Substanzen mit endokriner Wirkung in Oberflächengewässern. Umweltbundesamt Berlin, Texte 46/97.
- Guilette, L. J., Jr., Gross, T. S., Masson, G. R., Matter, J. M., Franklin Percival, H., Woodward, A. R. (1994):  
 Developmental abnormalities of the gonad and abnormal sex hormone concentrations in juvenile alligators from contaminated and control lakes in Florida. Environ Health Perspect 102 (8), 680-688.
- Gupta, C. (2000):  
 Reproductive malformation of the male offspring following maternal exposure to estrogenic chemicals. Soc Exp Biol Med 224, 61-68.
- Gustafsson, J.-Å. (2000 a):  
 Novel aspects of estrogen action. J Soc Gynecol Investig 7 (1), 8-9.
- Gustafsson, J.-Å. (2000 b):  
 Estrogens and woman's health - benefit or threat? Nobel Symposium No 113, June 29 - July 1, 1999 - Karlskoga, Sweden. J Steroid Biochem Mol Biol 74, 243.
- Haltrich, W. G., Pagga, U., Wellens, H. (1980):  
 Die Prüfung der biologischen Abbaubarkeit von wasserlöslichen Stoffen. Vom Wasser 54, 51-62.
- Hanselman, T. A., Graetz, D. A., Wilkie, A. C. (2003):  
 Manure-borne estrogens as potential environmental contaminants: a review. Environ Sci Technol 37 (24), 5471-5478.
- Harries, J. E., Janbakhsh, A., Jobling, S., Matthiessen, P., Sumpter, J. P., Tyler, C. R. (1999):  
 Estrogenic potency of effluent from two sewage treatment works in the United Kingdom. Environ Toxicol Chem 18 (5), 932-937.
- Harries, J. E., Sheahan, D. A., Jobling, S., Matthiessen, P., Neall, P., Routledge, E. J., Rycroft, R., Sumpter, J. P., Tylor, T. (1996):  
 A survey of estrogenic activity in United Kingdom inland waters. Environ Toxicol Chem 15 (11), 1993-2002.
- Harvey, P. W., Darbre, P. (2004):  
 Endocrine disrupters and human health: could oestrogenic chemicals in body care cosmetics adversely affect breast cancer incidence in woman? A review of evidence and call for further research. J Appl Toxicol 24, 167-176.

- Hawkins, M. B., Thornton, J. W., Crews, D., Skipper, J. K., Dotte, A., Thomas, P (2000): Identification of a third distinct estrogen receptor and reclassification of estrogen receptors in teleosts. *Proc Natl Acad Sci U.S.A.* 97, 10751-10756.
- Heemken, O. P., Reinke, H., Stachel, B., Theobald, N. (2001): The occurrence of xenoestrogens in the Elbe river and the North Sea. *Chemosphere* 45, 245-259.
- Hill, R. L., Jr., Janz, D. M. (2003): Developmental estrogenic exposure in zebrafish (*Danio rerio*): I. Effects on sex ratio and breeding success. *Aquat Toxicol* 63, 417-429.
- Hoffmann, B. (1994): Gravidität, Geburt und Puerperium. In: Döcke, F. (Hrsg.): Veterinärmedizinische Endokrinologie. 3. Auflage, Gustav Fischer Verlag, Jena, Stuttgart, 509-546.
- Hoffmann, B., Evers, P. (1986): Anabolic agents with sex hormonelike activities: Problems of residues. In: Andre, G., Rico, E. (Hrsg.): Drug Residues in Animals. Academic Press, Inc., New York, 111-146.
- Hoffmann, B. T., Goes de Pinho, T., Schuler, G. (1997): Determination of free and conjugated oestrogens in peripheral blood plasma, feces and urine of cattle throughout pregnancy. *Exp Clin Endocrinol Diabetes* 105, 296-303.
- Hoffmann, B., Wagner, W. C., Giménez, T. (1976): Free and conjugated steroids in maternal and fetal plasma in the cow near term. *Biol Reprod* 15, 126-133.
- Hoover, D. G., Borgonovi, G. E., Jones, S. H., Alexander, M. (1986): Anomalies in mineralization of low concentrations of organic compounds in lake water and sewage. *Appl Environ Microbiol* 51 (2), 226-232.
- Howard, P. H. (1984): Review: Interpreting results from biodegradability tests of chemicals in water and soil. *Environ Toxicol Chem* 3, 551-562.
- Howard, P. H. (1985): Determining „Real World“ biodegradation rates. *Environ Toxicol Chem* 4, 129-130.
- Huang, C.-H., Chang, M.-C., Alexander, M. (1981): Effect of protozoa on bacterial degradation of an aromatic compound. *Appl Environ Microbiol* 4 (1), 229-232.
- Huang, C.-H., Sedlak, D. L. (2001): Analysis of estrogenic hormones in municipal wastewater effluent and surface water using Enzyme-Linked Immunosorbent Assay and Gas Chromatography / Tandem Mass Spectrometry. *Environ Toxicol Chem* 20 (1), 133-139.
- Huet, M.-C. (2000): OECD activity on endocrine disruptors test guidelines development. *Ecotoxicology* 9, 77-84.

- Hunter, D. J., Hankinson, S. E., Laden, F., Colditz, G. A., Manson, J. E., Willett, W. C., Speizer, F. E., Wolff, M. S. (1997):  
Plasma organochlorine levels and the risk of breast cancer. *N Engl J Med* 337, 1253-1258.
- Irwin, L. K., Gray, S., Oberdörster, E. (2001):  
Vitellogenin induction in painted turtle, *Chrysemys picta*, as a biomarker of exposure to environmental levels of estradiol. *Aquat Toxicol* 55, 49-60.
- Jensen, A. A., Slorach, S. A. (1991):  
Chemical contaminants in human milk. Boston, MA:CRC Press.
- Jobling, S., Nolan, M., Tyler, C. R., Brighty, G., Sumpter, J. G. (1998):  
Widespread sexual disruption in wild fish. *Environ Sci Technol* 32, 2498-2506.
- Johnson, A. C., Belfroid, A., Di Corcia, A. (2000):  
Estimating steroid oestrogen inputs into activated sludge treatment works and observations on their removal from the effluent. *Sci Total Environ* 256, 163-173.
- Jones, S. H., Alexander, M. (1988) :  
Effect of inorganic nutrients on the acclimation period preceding mineralization of organic chemicals in lake water. *Appl Environ Microbiol* 54 (12), 3177-3179.
- Jouannet, P., Wang, C., Eustache, F., Kold-Jensen, T., Auger, J. (2001):  
Semen quality and male reproductive health: the controversy about human sperm concentration decline. *APMIS* 109, 333-344.
- Jouany, J.-M. (2000):  
Introduction to meeting on endocrine disruptors. *Ecotoxicology* 9, 19-20.
- Juberg, D. R. (2000):  
Review with conclusions. An evaluation of endocrine modulators: Implications for human health. *Ecotoxicol Environ Saf* 45, 93-105.
- Jürgens, M. D., Holthaus, K. I. E., Johnson, A. C., Smith, J. J. L., Hetheridge, M., Williams, R. J. (2002):  
The potential for estradiol and ethinylestradiol degradation in English rivers. *Environ Toxicol Chem* 21 (3), 480-488.
- Jungbauer, A., Graumann, K. (1998):  
Hormonelle Substanzen in der Umwelt - Hysterie oder Realität. *Wiener Mitteilungen* 153, 1-15.
- Kalbfus, W. (1998):  
Exposition und Wirkung endokriner Substanzen im aquatischen System. *Wiener Mitteilungen* 153, 33-44.
- Kalsch, W., Knacker, T., Robertz, M., Schallnaß, H.-J. (1997):  
Entwicklung eines Testsystems für die Prüfung des biologischen Abbaus in Oberflächengewässern. *Umweltbundesamt Texte* 13/97.

- Kaplan, A. M. (1979):  
 Prediction from laboratory studies of biodegradation of pollutants in „natural“ environments. In: Bourquin, A. W., Pritchard, P. H. (Hrsg.): Proceedings of the workshop: microbial degradation of pollutants in marine environments. U. S. Environmental Protection Agency, Gulf Breeze, Fla., 479-484.
- Karbe, L. (1997):  
 Auswirkungen von Umwelthormonen auf das Ökosystem. In: Haury, H.-J., Aßmann, G., Froese, B., Jahn, T. (Hrsg.): Umweltchemikalien mit hormoneller Wirkung. Journalistenseminar der Information Umwelt, Band 21, 2-7.
- Karg, H. (1994):  
 Hormonanalytische Kontrolle von Fortpflanzungsfunktionen. In: Döcke, F. (Hrsg.): Veterinärmedizinische Endokrinologie. 3. Auflage, Gustav Fischer Verlag Jena, Stuttgart, 766-783.
- Karlson, P., Doenecke, D., Koolman, J. (1994):  
 Kurzes Lehrbuch der Biochemie für Mediziner und Naturwissenschaftler. 14. Auflage, Georg Thieme Verlag, Stuttgart, New York, 271-288.
- Katzenellenbogen, B. S., Choi, I., Delage-Mourroux, R., Ediger, T. R., Martini, P. G. V., Montano, M., Sun, J., Weis, K., Katzenellenbogen J. A. (2000):  
 Molecular mechanisms of estrogen action: selective ligands and receptor pharmacology. *J Steroid Biochem Mol Biol* 74, 279-285.
- Kavlock, R. J., Daston, G. P., DeRosa, C., Fenner-Crisp, P., Earl Gray, L., Kaattari, S., Lucier, G., Luster, M., Mac, M. J., Maczka, C., Miller, R., Moore, J., Rolland, R., Scott, G., Sheehan, D. M., Sinks, T., Tilson, H. A. (1996):  
 Research needs for the risk assessment of health and environmental effects of endocrine disruptors: a report of the U.S. EPA -sponsored workshop. *Environmental Health Perspectives*, Volume 104 (4), 715-740.
- Kirk, L. A., Tyler, C. R., Lye, C. M., Sumpter, J. P. (2002):  
 Changes in estrogenic and androgenic activities at different stages of treatment in wastewater treatment works. *Environ Toxicol Chem* 21 (5), 972-979.
- Klee, O. (1990):  
 Wasser untersuchen. Einfache Analysenmethoden und Beurteilungskriterien. Quelle und Meyer Verlag, Heidelberg, Wiesbaden, 27-108; 196-214.
- Knight, W. M. (1979):  
 Estrogens administered to food-producing animals: environmental considerations. In: McLachlan, J. A. (Hrsg.): *Estrogens in the environment. Developments in toxicology and environmental science*, Vol. 5. Elsevier New York, Amsterdam, Oxford, 391-403.
- Knopp, A., Knopp, D., Niessner, R. (1999):  
 ELISA determination of the sulfonylurea herbicide Metsulfuron-Methyl in different water types. *Environ Sci Technol* 33 (2), 358-361.
- Körner, W., Bolz, U., Süßmuth, W., Hiller, G., Schuller, W., Hanf, V., Hagenmaier, H. (2000):  
 Input / output balance of estrogenic active compounds in a major municipal sewage plant in Germany. *Chemosphere* 40, 1131-1142.

- Körner, W., Hanf, V., Schuller, W., Kempter, C., Metzger, J., Hagenmaier, H. (1999): Development of a sensitive E-screen assay for quantitative analysis of estrogenic activity in municipal sewage plant effluents. *Sci Total Environ* 225, 33-48.
- Kolpin, D. W., Furlong, E. T., Meyer, M. T., Thurman, E. M., Zaugg, S. D., Barber, L. B., Buxton, H. T. (2002): Pharmaceuticals, hormones, and other organic wastewater contaminants in U.S. streams, 1999-2000: A national reconnaissance. *Environ Sci Technol* 36 (6), 1202-1211.
- Kooij, D. Van der, Visser, A., Hijken, W. A., H. (1982): Determining the concentration of easily assimilate organic carbon in drinking water. *J Am Water Works Assoc* 74, 540-545.
- Korach, K. S., Sarver, P., Chae, K., McLachlan, J. A., McKinney, J. D. (1987): Estrogen receptor-binding activity of polychlorinated hydroxybiphenols: conformationally restricted structural probes. *Mol Pharmacol* 33, 120-126.
- Kreuzinger, N. (1998): Zum Verhalten einiger hormonell wirkender Substanzen in der Abwasserreinigung. *Wiener Mitteilungen* 153, 93-118.
- Kroker, R., Schmädicke, I. (1998): Stellt die veterinärmedizinische Anwendung von steroidalen Sexualhormonen und ihren Abkömmlingen ein Risiko für die Umwelt dar? *Bundesgesundheitsblatt* 8, 344-345.
- Kuch, H. M., Ballschmiter, K. (1999): Hormonell wirksame Verbindungen in der Umwelt Baden-Württembergs. Akademie für Technikfolgenabschätzung in Baden-Württemberg, Nr. 151, 50-53.
- Kuch, H. M., Ballschmiter, K. (2000): Determination of endogenous and exogenous estrogens in effluents from sewage treatment plants at the ng/l - level. *Fresenius J Anal Chem* 366, 392-395.
- Kuiper, G. G. J. M., Enmark, E., Pelto-Huikko, M., Nilsson, S., Gustafsson, J-A. (1996): Cloning of a novel estrogen receptor expressed in rat prostate and ovary. *Proc Natl Acad Sci U S A* 3, 5925-5930.
- Lai, K. M., Johnson, K. L., Scrimshaw, M. D., Lester, J. N. (2000): Binding of waterborne steroid estrogens to solid phases in river and estuarine systems. *Environ Sci Technol* 34 (18), 3890-3894.
- Lai, K. M., Scrimshaw, M. D., Lester, J. N. (2002): Biotransformation and bioconcentration of steroid estrogens by Chlorella vulgaris. *Appl Environ Microbiol* 68 (2), 859-864.
- Lange, I. G., Daxenberger, A., Schiffer, B., Witters, H., Ibarreta, D., Meyer, H. H. D. (2002): Sex hormones originating from different livestock production systems: fate and potential disrupting activity in the environment. *Anal Chim Acta* 473, 27-37.
- Lange, I. G., Hartel, A., Meyer, H. H. D. (2003): Review: Evolution of oestrogen functions in vertebrates. *J Steroid Biochem Mol Biol* 83, 219-226.

- Larson, R. J., Clinckemaillie, G. G., Van Belle, L. (1981):  
 Effect of temperature and dissolved oxygen on biodegradation of nitrilotriacetate.  
*Water Res* 15, 615-620.
- Larsson, D. G. J., Adolfsson-Erici, M., Parkkonen, J., Pettersson, M., Berg, A. H., Olsson, P.-E., Förlin, L. (1999):  
 Ethinylestradiol - an undesired fish contraceptive? *Aquat Toxicol* 45, 91-97.
- Lauritzen, C. (1988):  
 Natürliche und synthetische Sexualhormone - biologische Grundlagen und Behandlungsprinzipien. Natural and synthetic sexual hormones - biological basis and medical treatment principles. In: Schneider H. P. G., Lauritzen, C., Nieschlag, E. (Hrsg.): *Grundlagen und Klinik der menschlichen Fortpflanzung*. Walter de Gruyter Berlin, New York.
- Layton, A. C., Gregory, B. W., Seward, J. R., Schultz, T. W., Sayler, G. S. (2000):  
 Mineralization of steroid hormones by biosolids in wastewater treatment systems in Tennessee USA *Environ Sci Technol* 34 (18), 3925-3931.
- Leatherland, J. F., Sonstgard, R. A. B. (1982):  
 Thyroid responses in rats fed diets formulated with Great Lakes Coho salmon. *Bull Environ Contam Toxicol* 29, 341-346.
- Leffers, H., Naesby, M., Vendelbo, B., Skakkabaek, N. E., Jørgensen, M. (2001):  
 Oestrogenic potencies of zeranol, oestradiol, diethylstilboestrol, bisphenol A, and genistein: implications for exposure assessment of potential endocrine disrupters. *Hum Reprod* 16 (5), 1037-1045.
- Lewis, D. L., Holm, H. W., Hodson, R. E. (1984):  
 Application of single and multiphasic Michaelis-Menten kinetics to predictive modeling for aquatic ecosystems. *Environ Toxicol Chem* 3, 563-574.
- Liu, B., Liu, X. (2004):  
 Direct photolysis of estrogens in aqueous solutions. *Sci Total Environ* 320 (2-3), 269-274.
- Mackay, D., DiGuardo, A., Paterson, S., Kicsi, G., Cowan, C. (1996):  
 Assessing the fate of new and existing chemicals: a five-stage process. *Environ Toxicol Chem* 15, 1618-1626.
- Mann, R. M., Boddy, M. R. (2000):  
 Biodegradation of a nonylphenol ethoxylate by the autochthonous microflora in lake water with observations on the influence of light. *Chemosphere* 41, 1361-1369.
- Matthiessen, P. (2001):  
 Hormones and endocrine disrupters in aquatic environment. *APMIS* 109, 187-188.
- Mc Ewen, B. S. (1981):  
 Neural gonadal steroid actions. *Science* 211, 1303-1311.
- McLachlan, J. A. (1993):  
 Functional Toxicology: A new approach to detect biologically active xenobiotics. *Environ Health Perspect* 101 (5), 386-387.

- McLachlan, J. A. (2001):  
 Environmental signaling: What embryos and evolution teach us about endocrine disrupting chemicals. *Endocr Rev* 22 (3), 319-341.
- Metzler, M., Pfeiffer, E. (2001):  
 Chemistry of natural and anthropogenic endocrine active compounds. In: Dörr, H. G. (Hrsg.): *Endocrine disruptors Part I. The handbook of environmental chemistry* 3 L. Springer Verlag Berlin, Heidelberg, New York, 63-80.
- Miles-Richardson, S. R., Kramer, V. J., Fitzgerald, S. D., Render, J. A., Yamini, B., Barbee, S. J., Giesy, J. P. (1999):  
 Effects of waterborne exposure of 17 $\beta$ -estradiol on secondary sex characteristics and gonads of fathead minnows (*Pimephales promelas*). *Aquat Toxicol* 47, 129-145.
- Mitscherlich, E., Marth, E. H. (1984):  
 Microbial survival in the environment. *Bacteria und rickettsiae important in human and animal health*. Springer Verlag, Berlin, Heidelberg, New York, 1-560, 709-744.
- Möstl, E., Choi, H. S., Wurm, W., Bamberg, E. (1983):  
 Trächtigkeitsdiagnose beim Rind mittels Östrogenbestimmung im Kot. *Wie Tierärztl Mschr* 70, 60-61.
- Möstl, E., Dobretsberger, A., Palme, R. (1997):  
 Östrogenkonzentration im Stallmist trächtiger Rinder. *Wien Tierärztl Mschr* 84, 140-143.
- Monk, E. L., Erb, R. E., Mollett, T. A. (1974):  
 Relationship between immunoreactive estrone and estradiol in milk, blood and urine of dairy cows. *J Dairy Sci* 58, 34-40.
- Mueller, S. O., Korach, K. S. (2001):  
 Mechanisms of estrogen receptor-mediated agonistic and antagonistic effects. In: Dörr, H. G. (Hrsg.): *Endocrine disruptors Part I. The handbook of environmental chemistry* 3 L. Springer Verlag Berlin, Heidelberg, New York, 1-21.
- Müller, W., Schlenker, G. (2004):  
 Kompendium der Tierhygiene. Gesundheits-, Tier-, Umwelt- und Verbraucherschutz. 2. Auflage, Lehmanns Media, Berlin.
- Mussalo-Rauhamaa, H., Hässänen, E., Pyysalo, H., Antervo, K., Kauppila, R., Pantzar, P. (1990):  
 Occurrence of beta-hexachlorocyclohexane in breast cancer patients. *Cancer* 66, 2124-2128.
- Mutschler, E. (1996):  
 Arzneimittelwirkungen, Lehrbuch der Pharmakologie und Toxikologie. 7. Auflage, Wissenschaftliche Verlagsgesellschaft mbH Stuttgart, 363-384.
- Naylor, C. G., Mieure, J. P., Adams, W. J., Weeks, J. A., Castaldi, F. J., Ogle, L. D., Romano, R. R. (1992):  
 Alkylphenol ethoxylates in the environment. *J Am Oil Chem Soc* 69, 695-703.

- Neumann, G., Gottschalk, J., Eulenberger, K., Grün, E. (2002): Untersuchungen zur Stabilität des Progesterons im Kot bei verschiedenen im Zoo gehaltenen Wildtierarten. *Dtsch tierärztl Wschr* 109 (5), 245-249.
- Niven, S. J., Snape, J., Hetheridge, M., Evans, M., McEvoy, J., Rowland, S. J. (2001): Investigations of cholesterol transforming during sewage treatment: relevance to estrogen formation pathways? *Sci Total Environ* 279, 75-86.
- OECD (1993): Guidelines for the testing of chemicals. Section 3 – Degradation and accumulation, 301 A, 303 A.
- OECD (2001): Guideline for the testing of chemicals. Revised proposal for a new guideline: 309.
- Oettel, M. (1996): Endokrinpharmakologie. In: Frey, H.-H., Löscher, W. (Hrsg.): Lehrbuch der Pharmakologie und Toxikologie für die Veterinärmedizin. Ferdinand Enke Verlag, Stuttgart, 370-423.
- Oh, S.-M., Choung, S.-Y., Sheen, Y.-Y., Chung, K.-H. (2000): Quantitative assessment of estrogenic activity in the water environment of Korea by the E-sceen assay. *Sci Total Environ* 263, 161-169.
- Orlando, E. F., Kolok, A. S., Binzcik, G. A., Gates, J. L., Horton, M. K., Lambright, C. S., Earl Gray, L., Jr., Soto, A. M., Guillette, L. J., Jr. (2004): Endocrine-disrupting effects of cattle feedlot effluent on an aquatic sentinel species, the Fathead Minnow. *Environ Health Perspect* 112 (3), 353-358.
- Panter, G. H., Thompson, R. S., Beresford, N., Sumpter, J. P. (1999): Transformation of a nonoOestrogenic steroid metabolite to an oestrogenically active substance by minimal bacterial activity. *Chemosphere* 38 (15), 3579-3596.
- Pauli, W., Jax, K., Berger, S. (2001): Protozoa in wastewater treatment: funktion and importance. In: Beek, B (Hrsg.): Biodegradation and persistance. Springer-Verlag Berlin, Heidelberg, 203-253.
- Peterson, E. W., Davis, R. K., Orndorff, H. A. (2000): 17 $\beta$ -Estradiol as an indicator of animal waste contamination in mantled karst aquifer. *J Environ Qual* 29, 826-834.
- Petrovic, M., Solé, M., López de Alda, M. J., Barceló, D (2002): Endocrine disruptors in sewage treatment plants, receiving river waters, and sediments: Integration of chemical analysis and biological effects on feral carp. *Environ Toxicol Chem* 21 (10), 2146-2156.
- Price, K. R., Fenwick, G. R. (1985): Naturally occurring oestrogens in foods - a review. *Food Addit Contam* 2, 73-106.
- Przyrembel, H. (1998): Natürliche Pflanzeninhaltsstoffe mit Wirkung auf das Hormonsystem. *Bundesgesundheitsblatt* 8, 335-340.
- Quéméneur, M., Marty, Y. (1994): Fatty acids and sterols in domestic wastewaters. *Water Res* 28 (5), 1217-1226.

- Ramadan, M. A., El-Tayeb, O. M., Alexander, M. (1990):  
 Inoculum size as a factor limiting success of inoculation for biodegradation. App. Environ Microbiol 56 (5), 1392-1396.
- Reinecke, W. (2001):  
 Aerobic and anaerobic biodegradation potentials of mikroorganisms. In: Beek, B (Hrsg.): Biodegradation and persistance. Springer-Verlag Berlin, Heidelberg, 1-163.
- Reisner-Oberlehner, M. (1998):  
 Bestehende gesetzliche Regelungen und internationale Aktivitäten. Wiener Mitteilungen 153, 131-138.
- Remesar, X., Tang, V., Ferrer, E., Torregrosa, C., Virgili, J., Masanés, R. M., Fernández-López, J. A., Alemany, M. (1999):  
 Estrone in food: a factor influencing the development of obesity? Eur J Nutr 38, 247-253.
- Rheinheimer, G. (1985):  
 Mikrobiologie der Gewässer. 4. Auflage, VEB Gustav Fischer Verlag Jena, 11-18; 62-94; 204-222.
- Rheinheimer, G., Gericke, H., Wesnigk, J. (1992):  
 Prüfung der biologischen Abbaubarkeit von organischen Chemikalien im umweltrelevanten Konzentrationsbereich. Umweltbundesamt, Texte 33/92.
- Richtlinie 96/22/EG
- Richtlinie 96/23/EG
- Robinson, C. D., Brown, E., Craft, J. A., Davies, I. M., Moffat, C. F., Pirie, D., Robertson, F., Stagg, R. M., Struthers, S. (2003):  
 Effects of sewage effluent and ethynodiol upon molecular markers of oestrogenic exposure, maturation and reproductive success in the sand goby (*Pomatoschistus minutus*, Pallas). Aquat Toxicol 62, 119-134.
- Rodgers-Gray, T. P., Jobling, S., Morris, S., Kelly, C., Kirby, S., Janbakhsh, A., Harries, J. E., Waldock, M. J., Sumpter, J. P., Tyler, C. R. (2000):  
 Long-term temporal changes in the estrogenic composition of treated sewage effluent and its biological effects on fish. Environ Sci Technol 34 (8), 1521-1528.
- Römbke, J., Knacker, T., Stahlschmidt-Allner, P. (1996):  
 Umweltprobleme durch Arzneimittel. Umweltbundesamt, Texte 60/96.
- Routledge, E. J., Sheahan, D., Desbrow, C., Brighty, G. C., Waldock, M., Sumpter, J. P. (1998):  
 Identification of estrogenic chemicals in STW effluent. 2. In vivo responses in trout and roach. Environ Sci Technol 32 (11), 1559-1565.
- Routledge, E. J., Waldock, M., Sumpter, J. P. (1999):  
 Response to Comment on „Identification of estrogenic chemicals in STW effluent. 1. Chemical fractionation and in vitro biological screening“. Environ Sci Technol 33 (2), 371.
- Rurainski, R. D., Theiss, J. H., Zimmermann, W. (1977):  
 The occurrence of natural and synthetic estrogens in drinking water. Gwf-Wasser/Abwasser 118, 288-291.

- Saal, F. S. vom, Cooke, P. S., Buchanan, D. L., Palanza, P., Thayer, K. A., Nagel, S. C., Parmigiani, S., Welshons, W. V. (1998):  
A physiologically based approach to the study of bisphenol A and other estrogenic chemicals on the size of reproductive organs, daily sperm production, and behavior. *Toxicol Ind Health* 14 (1/2), 239-260.
- Saal, F. S. vom, Timms, B. G., Montano, M. M., Palanza, P., Thayer, K. A., Nagel, S. C., Dhar, M. D., Ganjam, V. K., Parmigiani, S., Welshons, W. V. (1997):  
Prostate enlargement in mice due to fetal exposure to low doses of estradiol or diethylstilbestrol and opposite effects at high doses. *Proc Natl Acad Sci U S A* 94, 2056-2061.
- Safe, S. H. (1995):  
Environment and dietary estrogens and human health: Is there a problem? *Environ Health Persp* 10 (4), 346-351.
- Sasco, A. J. (2001):  
Epidemiology of breast cancer: an environmental disease? *APMIS* 109, 321-332.
- Sattelberger, R., Hartl, W., Loorbeer, G., Scharf, S. (1998):  
Steroidhormone in der aquatischen Umwelt - erste Untersuchungsergebnisse aus der Umwelt. *Wiener Mitteilungen* 153, 59-70.
- Schäfer, A. I., Nghiem, L. D., Waite, T. D. (2003):  
Removal of the natural hormone estrone from aqueous solutions using nanofiltration and reverse osmosis. *Environ Sci Technol* 37, 182-188.
- Schlenker, G., Birkelbach, C., Glatzel, P. S. (1999 b):  
Verlaufsuntersuchungen zum Temperatureinfluss auf die Stabilität von Sexualsteroiden im Kot von Kühen. *Berl Münch Tierärztl Wschr* 112, 459-464.
- Schlenker, G., Müller, W., Birkelbach, C., Glatzel, P. S. (1999 a):  
Experimentelle Untersuchungen zum Einfluss von *Escherichia coli* und *Clostridium perfringens* auf das Steroid Östron. *Berl Münch Tierärztl Wschr* 112, 14-17.
- Schmid, E., Frühauf, P. (1998):  
Instrumentelle Methoden zur Bestimmung von Steroiden im Wasser. *Wiener Mitteilungen* 153, 17-32.
- Schmidt, R., Brockmeyer, R. (2000):  
Arzneimittel in der Umwelt. *Schriftenr Ver Wasser Boden Lufthyg* 106, 49-58.
- Schmidt, S. K., Simkins, S., Alexander, M. (1985):  
Models for the kinetics of biodegradation of organic compounds not supporting growth. *Appl Environ Microbiol* 50 (2), 323-331.
- Schneider, J., Rheinheimer, G. (1988):  
Isolation Methods. In: Austin, B (Hrsg.): *Methods in aquatic bacteriology*. John Wiley & Sons Chichester, New York, Brisbane, Toronto, 73-95.
- Schwabe, U., Paffrath, D. (1994):  
Arzneimittelreport 1994: Aktuelle Daten, Kosten, Trends und Kommentare. Gustav Fischer Verlag, Stuttgart, Jena.

- Schweinfurth, H., Länge, R., Günzel, P. (1996):  
 Environmental fate and ecological effects of steroidal estrogens. In: Proceedings of the IBC conference: Oestrogenic chemicals in the environment, May 1996, Whitehall Place, London, SW1.
- Sedlak, D. L., Gray, J. L., Pinkston, K. E. (2000):  
 Understanding microcontaminants in recycled water. Environ Sci Technol 34 (23), 508A-515A.
- Servais, P., Anzil, A., Ventresque, C. (1989):  
 Simple method for the determination of biodegradable dissolved organic carbon in water. Appl Environ Microbiol 55 (10), 2732-2734.
- Servais, P., Billen, G., Hascoët, M. C. (1987):  
 Determination of the biodegradable fraction of dissolved organic matter in waters. Water Res 21 (4), 445-450.
- Shape, R. M., Skakkebaek, N. E. (1993):  
 Are oestrogens involved in falling sperm counts and disorders of the male reproductive tract? Lancet 341, 1392-1395.
- Shore, L. S., Correll, D. L., Chakraborty, P. K. (1995):  
 Relationship of fertilization with chicken manure and concentrations of estrogens in small streams. In: Steele, K. (Hrsg.): Animal waste and land-water interface. CRC Press, Boca Raton, FL., 155-162.
- Shore, L. S., Gurevitz, M., Shemesh, M. (1993):  
 Estrogen as an environmental pollutant. Bull Environ Contam Toxicol 51, 361-366.
- Shore, L. S., Shemesh, M., Cohen, R. (1988):  
 The role of oestradiol and oestrone in chicken manure silage in hyperoestrogenism in cattle. Aust Vet J 65 (2), 68.
- Shutt, D. A. (1976):  
 The effects of plant estrogens on animal reproduction. Endeavour 35, 110-113.
- Sijim, D. T. H. M., Broersen, K. W., Roode, D. F. de, Mayer, P. (1998):  
 Bioconcentration kinetics of hydrophobic chemicals in different densities of Chlorella pyrenoidosa. Environ Toxicol Chem 17, 1695-1704.
- Simkins, S., Alexander, M. (1984):  
 Models for mineralization kinetics with the variables of substrate concentration and population density. Appl Environ Microbiol 47 (6), 1299-1306.
- Snyder, S. A., Keith, T. L., Verbrugge, D. A., Snyder, E. M., Gross, T. S., Kannan, K., Giesy, J. P. (1999):  
 Analytical methods for detection of selected estrogenic compounds in aqueous mixtures. Environ Sci Technol 33 (16), 2814-2820.
- Sonnenschein, C., Soto, A. M. (1998):  
 An updated review of environmental estrogen and androgen mimics and antagonists. J Steroid Biochem Mol Biol 65 (1-6), 143-150.

- Soto, A. M., Sonnenschein, C., Chung, K. L., Fernandez, M. F., Olea, N., Olea Serrano, F. (1995):  
The E-screen assay as a tool to identify estrogens: An update on estrogenic environmental pollutants. Environ Health Perspect 103 (7), 113-122.
- Spain, J. C., Veld, P. A. Van (1983):  
Adaptation of natural microbial communities to degradation of xenobiotic compounds: Effects of concentration, exposure time, inoculum, and chemical structure. Appl Environ Microbiol 45 (2), 428-435.
- Stahlschmidt-Allner, P., Nagel, R. (1993):  
Bioabbau von Fremdstoffen in Oberflächengewässern. Literaturstudie an das Umweltbundesamt im Rahmen des F+E-Vorhabens Nr. 106 03 120/02.
- Stoker, T. E., Lee Robinette, C., Cooper, R. L. (1999):  
Perinatal exposure to estrogenic compounds and the subsequent effects on the prostate of the adult rat: evaluation of inflammation in the ventral and lateral lobes. Reprod Toxicol 13, 463-472.
- Stumpf, M., Ternes, T. A., Haberer, K., Baumann, W. (1996):  
Nachweis von natürlichen und synthetischen Östrogenen in Kläranlagen und Fließgewässern. Vom Wasser 87, 251-261.
- Subba-Rao, R. V., Rubin, H. E., Alexander, M. (1982):  
Kinetics and extent of mineralization of organic chemicals at trace levels in freshwater and sewage. Appl Environ Microbiol 43 (5), 1139-1150.
- Sumpter, J. P. (1998):  
Xenoendocrine disrupters - environmental impacts. Toxocol Lett, 102-103, 337-342.
- Swannell, R. P. J., Rose, C. L., Williams, R. J., Johnson, A. C., Besien, T. J., Leeks, G. J. L. (1995):  
Test guidelines of the biodegradability of pesticides in natural sediment/water systems: A review. Final report to the department of the environment, contact No. EPG 1/5/47, London, U. K.
- Ternes, T. A. (1998):  
Occurrence of drugs in German sewage treatment plants and rivers. Water Res 32 (11), 3245-3260.
- Ternes, T. A., Kreckel, P., Mueller, J. (1999 b):  
Behavior and occurrence of estrogens in municipal sewage treatment plants - II. Aerobic batch experiments with activated sludge. Sci Total Environ 225, 91-99.
- Ternes, T. A., Stumpf, M., Mueller, J., Haberer, K., Wilken, R.-D., Servos, M. (1999 a):  
Behavior and occurrence of estrogens in municipal sewage treatment plants - I. Investigations in Germany, Canada and Brazil. Sci Total Environ 225, 81-90.
- Thayer, K. A., Ruhlen, R. L., Howdeshell, K. L., Buchanan, D. L., Cooke, P. S., Preziosi, D., Welshons, W. V., Haseman, J., Saal, F. S. vom (2001):  
Altered prostate growth and daily sperm production in male mice exposed prenatally to subclinical doses of 17 $\alpha$ -ethinyl oestradiol. Hum Reprod 16 (5), 988-996.

Thomanetz, E. (1982):

Untersuchungen zur Charakterisierung und quantitativen Erfassung der Biomasse von belebten Schlämmen. Stuttgarter Berichte zur Siedlungswasserwirtschaft, Band 74.

Thomas, K., Colborn, T. (1992):

Organochlorine endocrine disruptors in human tissue. In: , Colborn, T., Clement, C. (Hrsg.): Chemically induced alterations in sexual and functional development: the wildlife/human connection. Princeton Scientific Publishing New York, 365-394.

Tilton, F., Benson, W. H., Schlenk, D. (2002):

Evaluation of estrogenic activity from a municipal wastewater treatment plant with predominantly domestic input. *Aquat Toxicol* 61, 211-224.

Toppari, J., Larsen, J. C., Christiansen, P., Giwercman, A., Grandjean, P., Guillette, L. J. Jr., Legou, B., Jensen, T. K., Jouannet, P., Keiding, N., Leffers, H., McLachlan, J. A., Meyer, O., Mueller, J., Raipert-De Meyts, E., Scheik, T., Shape, R., Sumpter, J., Skakkebaek, N. E. (1996):

Male reproductive health and environmental xenoestrogens. *Environ Health Perspect* 104 (4), 741-803.

Turan, A. (1995):

Exkretion natürlicher und synthetischer Östrogene und ihrer Metabolite: Vorkommen und Verhalten im Wasser. Fachgespräch Umweltchemikalien mit endokriner Wirkung. Umweltbundesamt Berlin, 65/95, 16-21.

Vandenbergh, G. F., Adriaens, D., Verslycke, T., Janssen, C. R. (2003):

Effects of 17 $\alpha$ -ethinylestradiol on sexual development of the amphipod *Hyalella azteca*. *Ecotoxicol Environ Saf* 54, 216-222.

Wang, Y.-S., Subba-Rao, R. V., Alexander, M. (1984):

Effect of substrate concentration and organic and inorganic compounds on the occurrence and rate of mineralization and cometabolism. *Appl Environ Microbiol* 47 (6), 1195-1200.

Ward, W. E., Thompson, L. U (2001):

Dietary estrogens of plant and fungal origin: occurrence and exposure. In: Dörr, H. G., (Hrsg.): Endocrine disruptors Part I. The handbook of environmental chemistry 3 L. Springer Verlag Berlin, Heidelberg, New York, 101-128.

Watkins, C. W. (1995):

Oestrogens in mares urine. *Vet Rec* 136, 424.

Wegener, G., Persin, J., Karrenbrock, F., Rörden, O., Hübner, I. (1999):

Vorkommen und Verhalten von natürlichen und synthetischen Östrogenen und deren Konjugate in der aquatischen Umwelt. *Vom Wasser* 92, 347-360.

Wenzel, A., Küchler, T., Henschel, K.-P., Schnaak, W., Dietrich, M., Müller, J. (1998):

Konzentrationen östrogen wirkender Substanzen in Umweltmedien.  
Umweltforschungsplan des MBU, Forschungsbericht 216 02 011/11

Wesnigk, J. B., (1991):

Untersuchungen zum Abbau von Fremdstoffen in umweltrelevanten Konzentrationen durch mikrobielle Mischpopulationen aus der Ostsee. Berichte aus dem Institut für Meereskunde an der Christian-Albrechts-Universität Kiel, Nr. 214.

- Wiggins, B. A., Jones, S. H., Alexander, M. (1987):  
Explanations for the acclimation period preceding the mineralization of organic  
chemicals in aquatic environments. *Appl Environ Microbiol* 53 (4), 791-796.
- Williams, R. J., Jürgens, M. D., Johnson, A. C. (1999):  
Initial predictions of the concentrations and distribution of 17 $\beta$ -Oestradiol, Oestrone  
and Ethinylestradiol in 3 English rivers. *Water Res* 33 (7), 1663-1671.
- Willingham, E., Rehn, T., Sakata, J. T., Crews, D. (2000):  
Embryonic treatment with xenobiotics disrupts steroid hormone profiles in hatchling  
red-eared slider turtles (*Trachemys scripta elegans*). *Environ Health Perspect* 108  
(4), 329-332.
- Wolfgang (2001): Persönliche Mitteilung
- Wolff, M. S., Toniolo, P. G., Lee, E. W., Rivera, M., Dublin, N. (1993):  
Blood levels of organochlorine residues and risk of breast cancer. *J Natl Cancer Inst*  
85, 648-652.
- Wuttke, W., Jarry, H., Seidlová, D. (1999):  
Endocrine Disrupters. *Reproduktionsmedizin* 15, 173-178.
- Ying, G-G., Kookana, R. S., Ru, Y-J. (2002):  
Occurrence and fate of hormone steroids in the environment. *Environ Int* 28, 545-551.
- Yoshimoto, T., Nagai, F., Fujimoto, J., Watanabe, K., Mizukoshi, H., Makino, T., Kimura, K.,  
Saino, H., Sawada, H., Omura, H. (2004) :  
Degradation of estrogens by *Rhodococcus zopfii* and *Rhodococcus equi* isolates  
from activated sludge in wastewater treatment plant. *Appl Environ Microbiol* 70 (9),  
5283-5289.
- Yoshimura, K. (1986):  
Biodegradation and fish toxicity of nonionic surfactants. *J Am Oil Chem Soc* 63,  
1590-1596.
- Zacharewski, T. (1997):  
In vitro bioassays for assessing estrogenic substances. *Environ Sci Technol* 31 (3),  
613-623.
- Zaidi, B. R., Murakami, Y., Alexander, M. (1989):  
Predation and inhibitors in lake water affect the success of inoculation to enhance  
biodegradation of organic chemicals. *Environ Sci Technol* 23 (7), 859-863.