

**SHORT CURRICULUM VITAE
THOMAS RICHARD HALBACH**

July 1, 2013

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Current Academic

Rank and Position: Appointed Extension Educator and Professor with Continuous Appointment, July 1, 1995. Extension appointment as of July 1, 1999 is 75 per cent. Teaching appointment is 12.5 per cent. Research appointment is 12.5 per cent.

EMPLOYMENT:

July 1, 1988 - Present

State Specialist, Water Quality and Waste Management, University of Minnesota, Minnesota Extension Service, Department of Soil, Water and Climate, St. Paul, MN.

Director, Rosemount Sewage Sludge Research Project. 1988-2002.

September 1, 1987 - June 30, 1988

Area Agent, Natural Resources, Twin Cities Metro Counties (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington), University of Minnesota, Minnesota Extension Service, Stillwater, MN.

March 17, 1985 - August 29, 1987

National Program Leader - Environmental Quality, Extension Service - United States Department of Agriculture, Washington, D.C.

September 1, 1976 - March 16, 1985

Area CNRD Agent, Minnesota Extension Service, Marshall and Anoka, MN.

March 1, 1974 - August 30, 1976

County 4-H and Youth Agent, Wisconsin Cooperative Extension Service, Ellsworth, WI.

EDUCATION:

A. Degrees

- 1974 Master of Science in Agricultural Geography,
University of Wisconsin - Madison, Emphasis on agricultural systems of North
and South America. Thesis: Determining the Importance of Door Yard
Gardens on Farms in South Central Wisconsin.
- 1971 Bachelor of Science in Education, **Cum Laude**
University of Wisconsin - Eau Claire
Major in Broad Field Social Studies
Minor in Economics
Certification for teaching in secondary schools

PUBLICATIONS:

A. Refereed:

- 2012 Halbach, Thomas, Seena Changirath, University of Minnesota, USA and Stephanie
Stuber, I.C.E. AG, Switzerland, "How Particle Size Affects The Water Holding
Capacity Of Different Compost Media", Proceedings of the ISWA World Congress,
Sept.15-19, 2012, Florence, Italy. Aerobic and Anaerobic Digestion of Bio-waste.
- Feng Xiao, Thomas R. Halbach, Matt F. Simcik, John S. Gulliver, 2012. Input
characterization of perfluoroalkyl substances in wastewater treatment plants: Source
discrimination by exploratory data analysis. Water Research 46, 3101–3109.
- 2010 Halbach, Thomas and Stephanie Stuber, "An Innovative Process For The
Development Of A Composting Facility In Ho Chi Minh City, Vietnam."
Proceedings of the ISWA World Congress Nov.15-18, 2010, Hamburg,
Germany. Reviewed by Dr. Berend Krüger, Dr. Martina Ableidinger (A) Prof. Dr.
Dr. hc. Bernd Bilitewski (D) Prof. Dr. Sabine Flamme (D) Niels J. Hahn (DK)
Dr. Rüdiger Siechau (D) Klaus Evertz (D) Dr. Thorsten Grenz (D) Prof. Dr.
Wolfgang Knobloch (D) Dr. Berend Krüger (D- Chair) Dr. Helmut Stadler
(A) and Dr. Peter Obladen (D).
- 2008 Assisted in the English translation of: Effects of Dissolved Organic Matter on
Residues of Chlorpyrifos in Soil and on Plant Uptake, by Ma Aijun, He Renhong
and Lin Yuso, GSA, Houston TX, USA 2008.
- 2007 Thomas Halbach, Kim Grosenheider, and Paul Bloom (2007). "An Environmental
Screening Tool For The Beneficial Use Of Waste Materials In Soils",

Proceedings of the International Solid Waste Association (ISWA), World Congress 2007, Amsterdam, The Netherlands. Ref. Number 617777.

- 2005 Thomas R. Halbach and Sue Thomas. "The Improvement of Solid Waste Management Operations in the Cities of Colombo, Kandy and Dambulla, Sri Lanka, Emphasizing Composting Technologies." Proceedings of the International Solid Waste Association (ISWA), World Congress 2005, Buenos Aires, Argentina. Ref. Number 206.
- 2000 C. M. Zehner, A. DiCostanzo, K. Thate, R. Gilland, M. J. Murphy, and T. R. Halbach, Health and Environmental Implications of using Composted Household and Yard Waste Bedding in a Cattle Feedlot, *Journal of Animal Science* 2000. 78:495-503, 9 pages.
- 1999 Mamo, M., C. J. Rosen, and T. R. Halbach, Nitrogen Availability and Leaching from Soil Amended with Municipal Solid Waste Compost, *J. Env. Quality*, Vol 28, No. 4, 1074-1082, 1999, 8 pages.
- 1998 Mamo, M., J. A. E. Molina, C. J. Rosen, and T. R. Halbach, A Nitrogen and Carbon Mineralization in Soil Amended with Municipal Solid Waste Compost, *Canadian Journal of Soil Science*. 79: 535-542. 1998, 8 pages.
- Mamo, M., C. J. Rosen, T. R. Halbach, Corn Yield and Nitrogen Uptake in Sandy Soils Amended with Municipal Solid Waste Compost, *J. Prod. Agric.* 11:469-475 (1998). 7 pages.
- 1997 Cook, Bruce D., Paul R. Bloom, and Thomas R. Halbach, Fate of a Polyacrylate Polymer during Composting of Simulated Municipal Solid Waste, *J. Env. Quality*, Vol. 26 No 3, 1997, 8 pages.
- 1995 Carr, L.E., B. Smith, T.L. Richard, and T. Halbach. 1995. Commercial and On-Farm Production and Marketing of Animal Waste Compost Products. In: *Animal Waste and the Land-Water Interface*. Edited by K. Steele. CRC Press, Boca Raton, FL. pp. 485-492.
- 1994 Cook, B. D., P. R. Bloom, and T. R. Halbach. 1994. A method for determining the ultimate fate of synthetic chemicals during composting. *Compost Science and Utilization* 2(1):42-50.
- Cook, B.D., T. R. Halbach, C.J. Rosen and J. F. Moncrief. 1994. Effect of a waste stream component on the agronomic properties of MSW Compost. *Compost Science and Utilization* 2(2):75-87.
- 1993 Olson, W., T. Halbach, S. Gahring. 1993. Current issues relating to the selection of infant diapers and adult incontinence products. In *Selected Papers from the Sixth*

Conference of the Society for Human Ecology, Society for Human Ecology (eds. Wright, S., T. Dietz, R. Borden, G. Young and G. Guadagno) 476-485.

Rosen, C. J., T. R. Halbach, and B. T. Swanson. 1993. Horticultural uses of municipal solid waste composts. *HortTechnology* 3:167-173.

- 1991 Barak, Philip, Yves Coquet, Thomas R. Halbach, and J.A. E. Molina. "Biodegradability of Polyhydroxybutyrate (co-hydroxyvalerate) and Starch-Incorporated Polyethylene Plastic Films in Soils" Journal of Environmental Quality 20:173-179 (1991), Madison, WI 53711.

B. Non-refereed:

- 2011 Changirath, Seena, Thomas R. Halbach and Rebecca Dorff, Media and Media Mix Evaluation for Dairy Barn Compost Bedding Systems, Project No. 00013063, April 29, 2011, Final Report, University of Minnesota, Department of Soil, Water and Climate, 1991 Upper Buford Circle, St. Paul, MN 55108, USA. 80 pages.

- 2007 Stephanie Widmer, Thomas R. Halbach, José A. Hernández and Andrew Weithe, Media Evaluation for Composting Dairy Bedded Pack Systems, Project No. 2005-078, March 30, 2007 Final Report, Department of Soil, Water and Climate, 1991 Upper Buford Circle, St. Paul, MN 55108, 53 pages.

- 2002 Molly A. Cavaleri, Daniel W. Gilmore, Morteza Mozaffari, Carl J. Rosen, Thomas R. Halbach, Russell D. Mathison, and Timothy C. O'Brien, Aspen Response to Forest Soils Amended with Municipal and Industrial By-products on Two Northern Minnesota Sites: Experimental Design and Preliminary Results, Staff Paper Series 162, October 2002, Staff Paper Series 153, Department of Forest Resources, College of Natural Resources, University of Minnesota, St. Paul, MN. 18 pages.

- 2001 Molly A. Matysik, Daniel W. Gilmore, Morteza Mozaffari, Carl J. Rosen and Thomas R. Halbach. Application of Wood Ash, Biosolids and Papermill Residuals to Forest Soils. Staff Paper Series 153, Department of Forest Resources, College of Natural Resources, University of Minnesota, St. Paul, MN. 14 pages.

- 2000 Rosen, Carl J., Thomas R. Halbach, and Robert Mugas. Composting and Mulching: A Guide to Managing Organic Yard Wastes, FO-3296 Revised 2000. University of Minnesota Extension Service, St. Paul, MN. 8 pages.

Wegner, Thomas D. and Thomas R. Halbach. Manure and Pasture Management for Recreational Horse Owners, BU-7540-S 2000, University of Minnesota Extension Service, St. Paul, MN. 17 pages.

1999 Carl Rosen, Tom Halbach, Matt McNearney and Glenn Titrud. Evaluation of Cardboard Sludge as a Soil Amendment for Crop Production. Field Research in Soil Science. Minnesota Agricultural Experiment Station. Miscellaneous Publication. 103-1999. pp. 41-54.

1998 Mamo, M., T. R. Halbach, and C. J. Rosen. Utilization of Municipal Solid Waste Compost For Crop Production, FO-7083-D 1998 University of Minnesota Extension Service, St. Paul, MN. 8 pages.

Carl Rosen, Dave Birong, Tom Halbach, and Glenn Titrud. Evaluation of Cardboard Sludge as a Soil Amendment for Crop Production. Field Research in Soil Science. Minnesota Agricultural Experiment Station. Miscellaneous Publication. 95-1998. pp. 28-32.

Thomas R. Halbach, INFO-U scripts on Disposing of Paint and Paint Thinners (#310) and Disposal of Gasoline and Motor Oil (#308). April 23, 1998. Minnesota Extension Service, St. Paul, MN. 2 pages.

Zehnder, C. M., A. DiCostanzo, K. Thate, R. Gilland, M.J. Murphy and T. R. Halbach. Utilization of Municipal Solid Waste Compost As Bedding Material for Cattle Feedlots. FO-7082-D 1998. University of Minnesota Extension Service, St. Paul, MN. 8 pages

1996 Sue Thomas and Thomas R. Halbach, Safe Home. Clean Earth, Minnesota Extension service, College of Agricultural, Food and Environmental Science, University of Minnesota, St. Paul, MN 1996. MES PC-6680-S 3/96. 34 pages.

Mamo, M., C. J. Rosen, T. R. Halbach, and J. F. Moncrief. Municipal Solid Waste Compost use on Irrigated Coarse Textured Soils. Field Research in Soil Science. Minnesota Agricultural Experiment Station. Miscellaneous Publication. 90-1996. pp. 111-117.

Carl Rosen, Thomas Halbach, Dave Birong and Wenshan Wang. Land Spreading of Yard Waste: Residual Effects - 1995. Field Research in Soil Science. Minnesota Agricultural Experiment Station. Miscellaneous Publication. 90-1996. pp. 118-125.

1995 Mamo, M., C. J. Rosen, T. R. Halbach, and J. F. Moncrief. Municipal Solid Waste Compost use on Irrigated Coarse Textured Soils. Field Research in Soil Science. Minnesota Agricultural Experiment Station. Miscellaneous Publication. 88-1995. pp. 143-150.

Carl Rosen, Thomas Halbach, Dave Birong and Wenshan Wang. Land Spreading of Yard Waste: 1994. Field Research in Soil Science. Minnesota Agricultural Experiment Station. Miscellaneous Publication. 88-1995. pp. 126-133.

- 1994 Halbach, T. R., P. R. Bloom, and H. H. Cheng, Soil Remediation Research: Opportunities and Expertise. Department of Soil Science, University of Minnesota, St. Paul, MN. 2 pages.
- Hansen, David L., Tom Halbach, Carl Rosen and Bert Swanson. "Minnesota Leads U. S. in Composting." MINNESOTA Science, Volume 48, Number 1, page 3.
- Mamo, M., C. J. Rosen, T. R. Halbach, and J. F. Moncrief. Municipal Solid Waste Compost use on Agricultural Soils. Field Research in Soil Science. Minnesota Agricultural Experiment Station. Miscellaneous Publication. 83-1994. pp. 191-200.
- Matt McNearney, Carl Rosen, Thomas Halbach, David Birong, and Jennifer Weiszal. Land Spreading of Yard Waste. Field Research in Soil Science. Minnesota Agricultural Experiment Station. Miscellaneous Publication. 83-1994. pp. 201-209.
- Clapp, C. E., R. H. Dowdy, W. E. Larson, D.R. Linden, C. M. Horman, K. E. Smith, R.C. Polta, T. R. Halbach, and H. H. Cheng. Long Term Effects on crop, soil and water Quality of sewage Sludge Applied to an Agricultural Watershed in Minnesota. 7th International Meeting of the International Humic Substances Society, Port of Spain, Trinidad. July 3-8 1994.
- 1993 Thomas, Sue, Thomas Halbach, Robert Paolino, Julie Shortridge, Municipal Solid Waste Composting: Is It Right for Your Community?, NR-BU-6179-S-1993, Minnesota Extension Service, University of Minnesota, St. Paul, MN 55108. 17 pages.
- Rosen, Carl J., Thomas R. Halbach, and Bert T. Swanson, "Horticultural Uses of Municipal Solid Waste Composts," HortTechnology, Vol. 3 (2), April/June 1993, pages 167-173. A publication of the American Society for Horticultural Science, Alexandria, VA 22314. 7 pp.
- Herzfeld, Dean, Thomas R. Halbach, Rick Hansen, and Larry Palmer, Rinsing Pesticide Containers. AG-FS-3771-A Revised 1993, Minnesota Extension Service, University of Minnesota, St. Paul, MN 55108. 2 pages.
- Du Bois, M., M. Martindale, N. Schumacher, C. E. Clapp, J. A. E. Molina, W. E. Larson, D. B. White, and T. R. Halbach, Composition of Municipal Solid Waste Composts from the United States, Canada and Europe. Soil Series 139, June 1993, Department of Soil Science, University of Minnesota, St. Paul, MN 55108. 34 pages.
- 1992 Halbach, Thomas R., "Small-Scale Fish Composting Trails," February 1992, BioCycle.

Clapp, C. E., R. H. Dowdy, D. R. Linden, W. E. Larson, R. C. Polta, and Thomas R. Halbach. "Utilization of Municipal Sewage Sludge on Agricultural Land In Minnesota," proceedings of Utilization of Sewage Wastes on Land, Jan. 1992, Birmingham University, UK.

Gahring, Sherri A., Thomas R. Halbach, and Wanda W. Olson. Infant Diapers and Incontinence Products: Choices for Families and Communities. Minnesota Extension Service NR-FO 5960E 1992. St. Paul, MN. 11 pages.

- 1991 Cook, B. D., T. R. Halbach, C. J. Rosen and J. F. Moncrief. "The impact of soiled, disposable diapers on the agronomic utilization of municipal solid waste compost." Final report submitted to The Proctor and Gamble Company. 95 pages.

Grants and Research Projects

Soil Science Department, Tom Halbach, Ed Clapp, William Larson, Dennis Linden, Sue Thomas, Bob Polta, et. al., from: Metropolitan Waste Control Commission (MWCC), **Rosemount Sewage Sludge Project (1973-2002) \$2.2 million**. After 28 years of growing crops no significant difference in yields between treatments with sewage sludge as the primary source of fertilizers, and the control receiving conventional fertilizers, has been found. No significant difference in the heavy metal content of the grain in either treatment has been found. Heavy metals have not moved significantly below the tillage zone. Annual reports were written and distributed. 1993 was the twentieth crop year of this project. A national sludge utilization conference was held here on August 11 - 13, 1993, including a tour of the site. The Twenty Year report has been published.

Soil Science Department, Tom Halbach, Carl Rosen, John Moncrief, Jean Molina, to: Minnesota Office of Waste Management (MOWM), **MSW Compost Utilization in Minnesota Soils (1992-1994) \$149,508**, including: Pot Studies, Small Plots (corn), and a Soybean Demonstration Plot.

Minnesota Extension Service (MES), Tom Halbach, Carl Rosen, John Moncrief, Jean Molina, Jack True, and Barry Ryan from: Legislative Commission on Minnesota Resources, **Soil Application Rates of Yard Wastes (1991-1993) \$100,000**. Field work and computer development was conducted to find appropriate application rates of direct incorporation of yard waste into common soils to produce corn. The field plots were established. Data has been collected and analyzed and the final report has been submitted.

MES, Tom Halbach, Sue White, et. al., from: MWCC, **N-VIRO SOIL Study (1991-1995) \$250,000**. The use of cement kiln dust as a wastewater treatment method is new to Minnesota. In this study, N mineralization rates have been established with material produced here in Minnesota and application rates have been adjusted accordingly. The effect of this material on crop yields and soils over the three-year time period will be reported in a final report, April 1995.

LCMR: Woodchip Biofilter Treatment of Feedlot Runoff, July 1, 2005 – June 30, 2007. \$270,000. Stearns County Soil and Water Conservation District, the University of Minnesota and GES, Inc. Dennis Fuchs, Craig Peterson, Tom Halbach, Stephine Widmer, Satish Gupta, Chuck Clanton, Greg Cuomo, Bob Guthrie, Rob Jensen, and Kevin Lienau

Chemical Inventory and Data Base Development for Evaluation of the use of Recycled Material Substitutes for Natural Aggregate and use of Power Plant Fly Ash in Unbound Paving Materials. For Mn/DOT Infrastructure Projects. Center for Transportation Studies (MnDOT funds) \$98,000, Sept. 2003 to Aug. 2006. Paul Bloom, Kim Grosenheider and Thomas Halbach.

Fly Ash Screening Tool Investigation 795 Implementation. Feb. 16, 2005 to May 31, 2006. \$14,000. Paul Bloom, Kim Grosenheider and Thomas Halbach.

Fly Ash Soil Stabilization Synthesis and Training, Minnesota Department of Transportation. Oct. 21, 2005 to Nov. 30, 2006. \$18,000. Paul Bloom, Kim Grosenheider and Thomas Halbach.

Legislative Commission on Minnesota Resources, **Soil Application Rates of Yard Wastes** (1991-1993) \$100,000.

N-VIRO SOIL Study (1991-1995) \$250,000. The use of cement kiln dust as a wastewater treatment method is new to Minnesota. In this study, N mineralization rates have been established with material produced here in Minnesota and application rates have been adjusted accordingly.

Simulation Modeling in Department of Soil, Water, and Climate, University of Minnesota (with Jean Molina and Tom Halbach) October 1991 to September 1994.

"Nitrogen Mass Balance Report: Simulation Modeling Results of Potato Crop Management at Becker, Managing Agricultural Environments of North-Central Sandy Soils," report to Legislative Commission on Minnesota Resources, January 1994.

"Development of the Simulation Model NCSWAP," working paper, April 1993.

Current Research:

April 1, 2010 – March 31, 2011. \$90,000. **Media Evaluation for Composting Dairy Bedded Pack Systems Part 2**, Thomas R. Halbach, Department of Soil, Water and Climate, 1991 Upper Buford Circle, St. Paul, MN 55108, Funded by AURI, underway.

July 1, 2007 – November 30, 2009. \$270,000. Stearns County Dairy Bio-filter Project **Woodchip Biofilter Treatment of Feedlot Runoff Phase II**, Stearns County Soil and Water Conservation District, the University of Minnesota and GES, Inc. Dennis Fuchs, Craig Peterson, Tom Halbach, and Bob Guthrie. Final report completed.

Courses Taught:

Soils 5600/ Soils 5601/ ES5601, 1992 - 2013 4/ 3 credits, Principles of Waste Management, University of Minnesota,
Soils 4093/ Soils 8195 3 credits, May inter-session 2001, Argentine
The Soils, Agriculture and People of Argentina.
Soils 5114, 1992 - 1999 1 to 3 credits, Special Problems in Waste Management.
SoW 5007, 1994 - 1999 2 credits, Solid Waste Management Capstone Course,
NRES 1001, 1990 - 1992 3 credits, Introduction to Natural Resources.
ID 5526-5527, 1995-1997 3 credits, Garbage, Government, and the Globe.
IAP 5600, 1995 4 credits, International Agricultural Program on Waste Management:
Thailand
AH 1000, 1994 3 credits, Agricultural Honors Course: Bioremediation,

Presentations:

I was invited by **Dr. Aijun Ma**, Jiangsu, Polytechnic College of Agriculture and Forestry in Huayang Town, Jiangsu Province and **Prof. Changhe Chen** Post-Doctorate Advisor and Head of the Department of Power Engineering and Engineering Thermo physics Unit, Department of Thermal Engineering at Tsinghua University, Beijing, China. To present 3 different lectures to 6 different Universities over the 18 days during November 2009.

The titles were: (1) Municipal Solid Waste Technologies & Policy Tools; (2) An Introduction to the Composting Process; and (3) An Introduction to the University of Minnesota.

Planning committee, and teaching faculty Midwest Extension Compost School June 8-11, 2009, U of MN Landscape Arboretum, Chanhassen, MN. 47 participants from seven different states. Identified and secured thirteen presenters, three equipment manufactures and five composting demonstrations. I gave 5 lectures given during the school; 25 hours of contact time with students I chaired the planning committee from November 2008 through August 2009. 142 hours in planning. The post school evaluations averaged 4.5 on a five point scale.

Halbach, T. R. (2006) "Compost, Soils and Restoration" Nong Lam University Linh Trung Ward, Thu Duc District, Ho Chi Minh City, Viet Nam. December 4, 2006.

Halbach, T. R. (2006) "An Introduction to Waste Management" ESPM 4601, 375 Borlaug Hall, University of Minnesota, St. Paul MN. Nov. 17, 2006.

Halbach, T.R. (2003) "Composting of Municipal Solid Waste and Its Uses" Organized by: Environment and Management Lanka Limited; Burns Environmental and Technologies Limited; In Association with USAID/US-Asia Environmental Partnership Program (US-AEP) Date: 9th January 2003 Time: 3.00 pm – 6.00 pm, ICTAD Auditorium, Savsiripaya, 123, Wijerama Mawatha, Colombo 7, Sri Lanka.

Halbach, T. R. (2000) 5 lectures at the University of Buenos Aires from Aug. 21 - Aug. 25. Rosemount Project History; Metals and Metal Uptake; NPK utilization; Regulations; Future Research Opportunities; Buenos Aires, Argentina.

Halbach, T. R. (2000) 10 lectures Presentado en la Universidad Nacional de Tucumán, entre el 28 de Agosto y el 8 de Septiembre del 2000. "Proyecto Rosemount 1973 - 2000: Utilizacion de lodos de plantas de tratamientos de aguas residuales en la agricultura; historia, usos, resultados y perspectivas futuras." Tucumán, Argentina.

"Issues in Composting" at the Designing and Managing Soils for the Landscape Conference at The American Phytopathological Society: June 13, 2000 St. Paul, MN.

SPECIAL CONTRIBUTIONS:

University College, University of Minnesota, **Distinguished Teaching Award**. 1998.
University of Minnesota Waste Abatement Committee, 1989 - 2002, Minneapolis, MN.
MES 1989-1994 Water Quality Implementation Team, St. Paul, MN.
Chair, University of Minnesota, University College Grievance Committee, 1990-1993.
Chair, MES 1991-94 Waste Management, Federal Plan of Work Initiative.
MES Academic Professional Standing Committee 1993-1995, Chair 1994-1995.