

GEORGE R. ALTHER

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Mr. Alther has become a world-wide authority on the use of organoclays in water purification, with 7 patents to his name, and has published approximately 140 articles, with 70 of them peer-reviewed. An assortment of these papers is listed on the web site www.BiominInc.com under "Articles". Mr. Alther was also chosen to write a chapter about organoclays for a book on groundwater, published by John Wiley & Sons.

EDUCATION

Studies in Business Administration
Siena Heights College, 1980-1988

MSC, Geology
University of Toledo, 1975

Bachelor of Science, Geology
Brock University, St. Catherines, Ontario, 1973

EXPERIENCE

1986 to Present

BIOMIN, INC.

Organically modified clay manufacturer
Business Owner/Operator

- Manufactures absorbents for contaminant removal in waste water and for the fixation of chemicals in sediments as well as thickeners for industrial applications
- Experienced with all aspects of setting up and running a small business, including marketing, sales, advertising, production, supervision, hiring, payroll, legal, setting up international distributors. Proficient with exporting.

1986 to Present

Minerals and Environmental Consultant to various firms

1978 to 1986

International Minerals and Chemicals Co.

Laboratory Manager, Bentonite Group
Technical Manager, Technical Representative

- Involved in all aspects of mining, production, laboratory testing, and product development of Bentonites. Heavy emphasis on environmental application of Bentonites, particularly landfill liners and slurry walls.

1977 to 1978

Consultant on landfill studies and other environmental applications

1974 to 1977 Nalco Chemical Co.
Associate Scientist
Supervised oceanographic study of the fate of disposed dredged
sediments for the Army Corps of Engineers.

1972 Geophysical Exploration
Summer job with Texas Gulf Sulphur

PUBLICATIONS 140

PATENTS 7

PUBLICATIONS

Alther, G. R., 2007 – “No Foul, No Harm” Experiments test the sorptive capacity of organoclays. *Water & Wastewater Products*, March/April 2007

Alther, G. R. 2004 - Can economic recycling of wastewater help reduce water shortages? By Peter Cartwright, PE, and George Alther. *Water & Wastewater Products*, Sept./Oct. 2004

Alther, G. R., 2004 - Some practical observations on the use of Bentonite. *Environmental & Engineering Geoscience*, Vol. X, No. 4, November 2004, pp. 347-359

Alther, G. R., 2002 - Removing oils from water with organoclays, *Journal American Water Works Association*, Vol. 94, No. 7, pp. 115-121

Alther, G. R., 2002 - Using organoclays to enhance carbon filtration, In *Waste Management*, Vol. 22: Pergamon Press (Elsevier), New York, pp. 507-513

Alther, G. R., 2001 - Organoclays remove Humic substances from water. In Ghabbour, E. A. and Davis, G. (Edition), *Humic Substances*: Royal Society of Chemistry, Cambridge, UK, pp. 277-288

Alther, G. R., 2000 - Organoclay cleans oily storm water. *Arab Water World*, pp. 8-9, Chatila Pub., Beirut, Lebanon

Alther, G. R., 2000 - Treating wastewater with clay based flocculants. *Proceedings, Cleantech 2000*, Witter, Pub.

Alther, G. R., 2000 - Wastewater cleanup with clay based flocculants. *AESF Sur/Fin Proceedings Orlando, FL*. pp. 17-22

Alther, G. R., 2000 - Recycling wastewater with organoclay. Water & Wastewater International, PenWell Pub., Tulsa, OK pp. 17-19

Alther, G. R., 2000 - Organoclays remove Humic Substances from Water. In "Humic Substances" Ghabbour, A. A., and G. Davis. Royal Society of Chemistry, Cambridge, UK. Pg. 341

Alther, G. R., 2000 - Removal of emulsified oil from wastewater. Fluid/Particle Separation Journal. AFS Vol. 13, No. 2, August 2000, pp. 146-151

Alther, G. R., 2000 - Using organoclays to enhance filtration. 2000 WEFTEC and Purdue University Industrial Wastes Technical Conference, St. Louis, MO. May 21-24 Proceedings, WEFTEC, Alexandria, VA

Alther, G. R., 2000 - Hydrostatic testing water and pipeline cleanup. Soil & Groundwater Cleanup, April/May 2000 issue, Soils Inc. Stanley, KS. pp. 28-29

Alther, G. R., 2000 - A case for clays. Parts Cleaning Magazine, pg. 39, Witter Pub. Flemington, NJ

Alther, G. R., 2000 - Preventing Resin and Membrane Fouling with Clay Pre-polish. The Analyst, pp. 17-21. Winter issue, 2000. Vol. 11, Issue No. 1, Assoc. of Water Tech, McLean, VA

Alther, G. R., 2000 - Maximize water cleanup performance. Environmental Protection, pp. 37-41, Feb. issue, Stevens Pub., Dallas, TX

Alther, G. R., 2000 - Improve Performance of Pump & Treat Systems, Part 1 & 2. Wateronline.com, Feature Articles, Feb. 2000, Archives

Alther, G. R., 2000 - Organoclays reduce P & T costs. AEPL Conference, Orlando, FL. Proceedings, Jan. 19, 2000

Alther, G. R., 2000 - Organoclay keeps activated carbon working. Pollutiononline.com.

Alther, G. R., 2000 - Removal of emulsified oil from wastewater, in American Filtration Society Proceedings, AFS 2000, Myrtle Beach, SC

Alther, G. R., 1999 - Organoclay filtration technology for oil removal. Fluid/Particle Separation Journal Pub. By American Filtration & Separation Society, Vol. 12, No. 2, pp. 96-102.

Alther, G. R., 1999 - Removal of oil from wastewater with organoclay. International Water & Irrigation, Vol. 19, No. 4, pg. 44. P.O. Box 21051, Tel Aviv, Israel. Also published in Spanish in sister publication; Revista Internacional Di Agua Y Riego, Vol. 19, No. 3, pg. 30

Alther, G. R., 1999 - Removal of oil from waste water with organoclay. Manufacturing Magazine, Virginia Edition. Industrial Marketing Services, Richmond, VA Pp. 8-11

Alther, G. R., 1999 - Organoclays remove oil and grease, solvents and surfactants from water. Cleantech 1999 proceedings, pp. 72-80 Witter Publishing, Flemington, NJ

Alther, G. R., 1999 - Organoclays clean up wastewater of edible oil industry. American Oil Chemists Society, Champaign, IL. Annual Conference, Orlando, FL May 11, 1999

Alther, G. R., 1999 - Organic clays prove effective in treating pipeline cleanup water. Pipeline & Gas Industry, Gulf Publishing, Houston, TX. April, pp. 89-93

Alther, G. R., 1999 - Organoclay filtration technology for oil removal. Proceedings, Advanced Filtration & Separation Technology, Vol. 13b. American Filtration & Separation Society, Northport, AL. pp. 945-952

Alther, G. R., 1999 - Recycling wastewater with organoclay. Maintenance Journal, March-April issue, pp. 23-27. International Maintenance Institute, Madison Publishing, Division, Appleton, WI

Alther, G. R., 1999 - Organoclays remove oil, grease, solvents, and surfactants from water, in CleanTech 99 Proceedings: Witter, Flemington, NJ, pp. 72-79

Alther, G. R., 1999 - Organoclays as pre and post polishers, Hazardous Materials Management, CHMM, Inc. Pub., Markham, Ontario, Canada. pp. 51-54, Dec./Jan. Issue

Alther, G. R., 1998 - Organoclay the "Terminator" of oil and grease. Canadian Environmental Protection, Vol. 10, No. 2, pg. 35. Mitchell Press, Baum Publications, Vancouver, BC., Canada

Alther, G. R., 1998 - Put the brakes on wastewater emulsions, feature report, Chemical Engineering, March, pg. 82-88

Alther, G. R., 1998 - Wastewater Treatment: On or off site, Environmental Protection, Jan. 1998, pp. 19-23 Stevens Publishing, Dallas, TX

Alther, G. R., 1998 - Organoclays boost performance of activated carbon and enhance zero discharge option, Environmental Technology, Jan./Feb., pp. 40-43

Alther, G. R., 1998 - The missing link, Industrial Wastewater, Jan./Feb., pp. 27-30 Water Env. Pub. Alexandria, VA

Alther, G. R., 1998 - Organoclay removes oil from produced water efficiently. Proceedings, 8th annual Produced Water Seminar, League City, TX

Alther, G. R., 1998 - Put the brakes on oil and grease. Chemical Engineering, McGraw-Hill, pp. 82-88

Alther, G. R., June 1997 - Organoclay, the “Terminator” of oil and grease. ENFO News, pp. 2-3. Asian Institute of Technology, P.O. Box 4, Khlong Luang, Pathum Thani 12120, Thailand

Alther, G. R., 1997 - Organoclays as pre & post polishers for Biological Wastewater Cleanup Systems. Institute of Gas Technology Proceedings conference on gas, oil, and Environments Biotechnology and Site Remediation Technologies, Orlando, Fla. 8-10, Dec. 1997. IGT, 1700, Mt. Prospect Rd., Des Plaines, IL

Alther, G. R., 1997 - Recycling of water facilitated with organoclay media. Proceedings, Environments Progress in the Petroleum & Petrochemical Industries, Nov. 17-19, Manama, Bahrain. Bahrain Society of Engineers, PO Box 835, Al Manamah, Bahrain. pg. 548

Alther, G. R., and J. Gannon, 1997 - Removal of oil from water with organoclay. Pacific Coast Oil Show & Conference, Proceedings. Petrotech Expos., 1998 University Lane, Lisle, IL. 60532.

Alther, G. R., 1997 - Zero discharge with organoclay, Industrial Environmental Management, Faversham House Group, Faversham House, Surrey, England. Aug. 1997, pg. 30

Alther, G. R., 1997 - Organoclays and water treatment. Middle East Environment, May 1997, pp. 12-14. Red House Marketing, Al Manamah, Bahrain

Alther, G. R., 1997 - Removal of oil from water with organoclays, Pollution Equipment News, pp. 58-60, June 1997, Rimbach Pub., Pittsburgh

Alther, G. R., 1997 - Working hand in hand with carbon for better results. Soil & Groundwater Cleanup, May 1997, pp. 17-19. Group III Communications, Inc. Independence, MO

Alther G. R., 1997 - Organoclays can cut activated carbon costs for water treatment. Water and Wastewater International, Vol. 12, Issue 1, Feb. 1997, pp. 38-42

Alther, G. R., and John McCallion, 1997 - Preventing resin fouling with organoclay pre-polish. Chemical Processing, April 1997, Putman Pub., Chicago, Il. pp. 66-71

Alther, G. R., 1997 - Granular activated carbon gets a boost. International Groundwater Technology, pp. 8-13, National Trade Publications, Latham, NY.

Alther, G. R., 1997 - Working hand in hand with carbon for better results. In Soil and Groundwater Cleanup, Independence, MO: Group III Communications, pp. 17-19

Alther, G. R. and William Ferguson, 1997 - Organoclays lower PCB removal costs by extending the life of activated carbon. REMTEC 97, Toronto, Ontario

Alther G. R., 1997 - Use organically modified clays to extend the life of filter media. Chemical Engineering, Feb. 97, pg. 109, McGraw-Hill Co., NY

Alther, G. R., 1997 - P & T with organoclays, The Military Engineer, The Society of Military Engineers, Alexandria, VA. pp. 69-70

Alther, G.R., 1997 - Organoclays cost effectively remove oil from produced water. Oil & Gas Journal, PennWell Pub., Tulsa, Ok. pp. 54-55. Week of April 14, 1997

Alther, G. R., 1996 - Oil/water separation polishing with organoclays. Water Conditioning and Purification, Vol. 38, No. 10, pp. 84-86, Nov. 1996, Tucson, Arizona

Alther, G. R., 1996 - Pre-polishing water with Organoclays, Water Technology, February Issue, pp. 34-37

Alther, G. R., 1996 - Organically modified clay removes oil from water: Waste Management, Vol. 15, No. 8, pp. 623-628

Alther, G. R., 1996 - Organoclays for treating oily water, The National Environmental Journal, Jan./ Feb. Issue, pp. 38-44

Alther, G. R., 1996 - Organoclays polish oily wastewater. Presented at the invitation of Nalco Chemicals, at National Oil Recyclers Association annual meeting, Feb. 26, 1996 Houston, TX

Alther, G. R., 1996 - Organoclays remove oil and grease. Professional car washing Latham, NY., pg. 31, June 1996

Alther, G. R., 1996 - Emulsified oil removed form water with organically modified clay. The hazardous waste consultant, Elsevier Science, NY. May/June 1996, pp. 1.2-1.3

Alther, G. R., 1996 - Organically modified clay removes oil from water. Waste Management, Vol. 15, No. 8, pp. 623-628, Elsevier Science, NY

Alther, G. R., 1996 - Get a life for your carbon. Hazardous Materials Management, pp. 45-47, CHMM, Markham, Ontario, Canada

Alther, G. R., 1996 - Organoclays lead the way to zero discharge. Environmental Solutions, Vol. 9, No. 8, Sept. 1996, pp. 22-24, Santa Ana, CA

Alther, G. R., 1995 - The use of Organoclay to remove oil from water, published in proceedings of: Federal Environmental Restoration IV and Defense Cleanup Southeast. Hazardous Materials Institute, Silver Springs, MD, March 14 and 15.

Alther, G. R., 1995 - Organically modified clay removes oil from water: Waste Management (London), Vol. 15, No. 8, pp. 641-650

Alther, G. R., 1995 - Organoclay removes oil from water efficiently. Superfund XVI, Washington, DC

Alther, G. R., 1991 - Thermal stability of some industrial Bentonites. Applied Clay Science 5, pp. 469-488

Alther, G. R.; Evans, J. C.; and Tarites, R., 1991 - The use of organoclays for stabilization of hazardous wastes. In Proceedings of Fourth Annual Hazardous Waste Management Conference/Central, Glen Ellyn, IL. pp. 547-552

Alther, G. R., Evans, J. C., and R. Tarites, 1991 - Hazardous waste stabilization using organically modified clays. Geotechnical Engineering Congress 1991, Vol. 11, McLean, Campbell and Harris, Ed. Geotechnical Special Publication No. 27, Pub. by American Society of Civil Engineers, New York, pp. 1149-1162

Alther, G. R., Evans, J. C. and S. Pancoski, 1990 - No Feet of Clay, Civil Engineering, August, 1990, pp. 60-61

Evans, J. C., Pancoski, S. E., and G. R. Alther, 1989 - Organic waste treatment with organically modified clays. International Hazardous Waste Conference, Sept. 1989, Pittsburgh, PA

Alther, G. R.; Evans, J. C.; and Pancoski, S., 1989 - A composite Liner System to Retain Inorganic and Organic Contaminants. In Superfund 89, Hazardous Materials Control Research Institute (HMCRI), Washington, DC

Alther, G. R., 1989 - Organoclays. Presentation at LICA Gen SEM '89. 7th Annual Seminar of Industrial Waste Generators, Dearborn, MI., Sept. 14, 1989

Alther, G. R.; Evans, J. C.; and Pancoski, E. S., 1988 - Organically modified clays for stabilization of organic hazardous waste. 9th National Conference of the HMCRI, Superfund 88, Silver Spring, MD, pp. 440-445

Alther, G. R., Evans, J. C., and E. Andrews, 1988 - The effects of organics upon Bentonite. Proceedings of the 5th National Conference on Hazardous Waste and Hazardous Materials, Las Vegas, April 19-21, 1988. The Hazardous Materials Research Institute, Silver Springs, Md., pp. 210-215

Alther, G. R., 1987 - The qualifications of Bentonite as a soil sealant. Engineering Geology, Intl. (Elsevier), 23, pp. 177-191

Alther, G. R., 1987 - Bentonites in industry, a presentation at the annual conference of the American Society of Clay Mineralogists, by Invitation from the Society.

George R. Alther, 1986 - The effect of exchangeable cations on the physico-chemical properties of Wyoming Bentonites. Published in Applied Clay Science, Elsevier, Amsterdam, pp. 273-284

G. R. Alther, 1984 - Monitoring of descending dredged material plumes. Ohio Journal of Science, Vol. 84, No. 1, pp. 19-28

Alther, G. R.; Evans, J. C. ; Fang, H. Y. and Witmer, K., 1984 - Influence of inorganic permeates upon the permeability of Bentonite. In Johnson A. I.; Froebel, R. K.; Cavalli, N. J.; and Pettersson, C. B. (Editors). Hydraulic Barriers in Soil and Rock, ASTM Special Technical Publication 875, ASTM D-18 Committee, pp. 62-64

G. R. Alther, J. C. Evans, K. A. Witmer, and H. Y. Fang, 1984 - Inorganic permanent effects upon Bentonite. Symposium on impermeable barriers for soil and rock. ASTM Committee D-18 on Soil and Rock, Denver Hilton, June 1984

G. R. Alther, B. Flynn, 1984 - The role of Bentonite on soil sealing applications. In clay barriers for isolation of toxic chemical wastes. International Symposium, May 28-30, 1984, Stockholm, Sweden. Royal Institute of Technology, Dept. of Soil and Rock Mechanics.

G. R. Alther, J. C. Evans, K. A. Witmer, and H. Y. Fang, 1984 - Influence of inorganic permanent upon the permeability of Bentonite, In hydraulic barriers in soil and rock; Ed. Johnson, Froebel, Cavalli, Pettersson: ASTN-STP 874, pp. 64-74

G. R. Alther, 1983 - Low grade Bentonites improved by chemical activation and compaction. Mining Engineering, Sept. 1983

G. R. Alther, 1983 - The function and effect of polymers in polymer-treated Bentonites. Bulletin of Engineering Geology, Feb. 1984

G. R. Alther, 1983 - The Methylene Blue test for Bentonite liner quality control. Geotechnical Testing Journal. Sept. 1983

G. R. Alther, J. Clem, 1983 - A Bentonite mat liner to retain waste. Annual Convention, American Engineering Geologists, San Diego, Sept. 1984

Alther, G. R., 1983 - Bentonite liners and caps for lagoons and landfills. Great Lakes Waste and Pollution Review Magazine, Vol. 1, No. 5, Dec., 1983, pp. 10-15

Alther, G. R. 1983 - Preparation of Organophilic Clay by Compaction. Patent No. 4, 402, 881

Alther G. R., 1982 - The role of Bentonite in soil sealing applications. Engineering Geology Bulletin, Vol. 19, No. 4 pp. 401-409

G. Alther, 1982 - Improvement of drilling mud properties of low grade Bentonites by simultaneous chemical activation and compaction. *Interceram* 31, Vol. 5, pp. 501-503

L. J. Danek, G. R. Alther, 1982 - Wave activity in Lake Erie near Ashtabula, Ohio. *Ohio Journal of Sciences*, Vol. 82, No. 5, pp. 293-298

G. R. Alther and L. J. Danek, 1982 - A two year study of the lake and wind currents on Lake Erie near Ashtabula, Ohio. *Ohio Journal of Science*, Dec., 1983

Alther, G. R. 1982 - The role of Bentonite in soil sealing applications: *Bulletin Association Engineering Geologists*, Vol. 19, No. 4, pp. 401- 409

Alther, G. R. and R. K. Wyeth, 1981 - Application of MANOVA and Discriminant Analysis to grain size data in a study of the distribution of dredged sediments. *Environmental Geology*, 3, pp. 185-193

Alther, G. R., 1981 - Transportation of sediments from a dredging disposal operation in Lake Erie, *Ohio Journal of Science*, Vol. 1 pp. 2-8

Alther, G. R., 1981 - The use of Stream Sediments to infer water quality on a stream in Northwestern Ohio. *Ohio Journal of Sciences*, Vol. 6, pp. 247-252

Alther, G. R., Rudisili, L., Stauber, H., and R. Kollbrunner, 1981 - Glacial melt water, energy resource of the future. *International Journal of Energy Research* (John Wiley), Vol. 5, pp. 183-191. A summary also appeared in the *Northern Miner*.

Alther, G. R., 1981 - The role of Bentonite as a soil sealant. Presented at the International Conference on Clays and Clay Minerals, Italy, Sept., 1981

G. Alther, 1981 - The role of Bentonite as a soil sealant. Annual Conference on Clays and Clay Minerals, Urbana, Ill., Oct., 1981. Presented as a Poster.

Alther, G. R. 1980 - Activation of Clays by Compaction. Patent No. 4, 242, 140 Dec. 1980

Alther, G. R. and R. K. Wyeth, 1980 - A test utilizing sediment traps, survey rods, and radiographs to monitor sediment accumulation from a dredging disposal operation. *Environmental Geology* 3, pp. 97-105

Alther, G. R., 1979 - A statistical sequence applied to routine water quality analysis: A case history, *Ground Water*, Vol. 17, No. 6, 556-561

L. J. Danek, G. R. Alther, et al, 1978 - Monitoring sedimentation at a disposal site. Presented at the Coastal Zone 78 Conference held on March 14-16, 1978, in San Francisco with subsequent publication in *ASCE proceedings*. *Coastal Zone 78*, pp. 1053-63, 1978

L. J. Danek, G. R. Alther, et al, 1977 - Aquatic disposal field investigations Ashtabula River Disposal Site, Ohio, Appendix B: Investigation of the hydraulic regime and physical nature of bottom sedimentation. Dredged Material Research Program, Technical Report D-77-42, Army Engineers Waterways Experiment Station, Vicksburg, MS 39180. 115 pp.

Alther, G. R., 1977 - Geohydrology of the Canon City Basin, Canon City, Colorado. Mountain Geologist, April, 1977

Alther, G. R., 1975 - Geochemical Analysis of Stream Sediments as a tool for environmental monitoring: A Pigyard Case Study. Geological Society of America Bulletin, V. 86, February, 1975

Additional articles are available at www.BiominInc.com under Technical Bulletins.

PATENTS

<u>Patent No. 4, 242, 140</u>	December 1980 Activation of Clays by Compaction
<u>Patent No. 4, 402, 881</u>	1983 Preparation of Organophilic Clays by Compaction
<u>Patent No. 6, 080, 319</u>	June 2000 Chemical Methods for removing Contaminants from Water
<u>Patent No. 6, 093, 241</u>	March 8, 1999 Granular Organoclay for High Temperature Applications
<u>Patent No. 6, 165, 485</u>	July 28, 1998 Biocidal Organoclay
<u>Patent No. 6,534,296 B1</u>	March 18, 2003 Preparing organoclay-enzyme complexes using a quaternary ionic compound and mineral
<u>Patent No. 6,503,740 B1</u>	January 7, 2003 Organically modified mineral materials containing engrafted bacteria for chemical contaminant decomposition