

Corn Gluten Meal Research Site

Dr. Nick Christians

Welcome to the corn gluten meal research page. Here you will find information regarding the use of corn gluten meal as a natural herbicide for use on turf and organic crop production.



Background: It was found that a byproduct of the corn (*Zea mays* L.) wet-milling process, corn gluten meal, has potential as a natural preemergence herbicide. U.S. Patent 5,030,268 on the use of corn gluten meal as a natural herbicide was issued in 1991. The patent was reissued in 1993 with broader claims that cover the use of corn gluten meal on field crops and home gardens. Two additional patents were also issued in 1993 on the technology. The first is on the use of hydrolyzed proteins from corn and other grains that were shown to have higher levels of herbicidal activity than the corn gluten meal. These materials are water soluble and can be sprayed on the soils surface. The second patent was on 5 dipeptides extracted from the hydrolyzed corn gluten meal. These dipeptides were shown to have the same type of biological activity observed when the corn gluten meal and the hydrolyzed meal are applied to the soil.

The sprayable materials have been found to be less stable than the corn gluten meal in field studies. Current research is being directed at methods of stabilizing these soluble materials to improve their efficacy.

Where to Buy: The corn gluten meal is the only material that is being marketed at this time. It is available from [these licensees](#).

Corn Gluten Meal Documents: Click on a document below for more information. Most documents are in PDF format. A free PDF viewer may be obtained at <http://www.adobe.com/products/acrobat/readstep.html>

- ✳ [Corn gluten meal and corn gluten hydrolysate for weed control](#), M.S Thesis by Melissa McDade
 - ✳ [Site of Action of Corn Gluten Meal](#), Thesis by Bryan Unruh (PDF file)
 - ✳ [Using biological control strategies for turf - Part III: Weeds, Grounds Maintenance](#)
 - ✳ [Corn Gluten Meal - Byproduct to Wonder Product](#), The Iowa Horticulturist
 - ✳ [The Use of a Natural Product For the Control of Annual Weeds in Turf](#)
 - ✳ [A natural product for the control of annual weeds](#), Golf Course Management, October, 1993.
 - ✳ [The Use of Corn Gluten Meal As A Natural Preemergence Weed Control in Turf](#), Published as Journal Paper no. J-14957 of the Iowa Agric. and Home Econ. Exp. Stn., Ames. Project No. 2231.
 - ✳ [Controlling Turf Weeds With a Natural Product](#)
 - ✳ [Herbicidal Activity of Hydrolyzed Corn Gluten Meal on Three Grass Species under Controlled Environments](#), Journal Paper No. J-15609 of Iowa Agriculture and Home Economics Experiment Station, Ames, IA Project No. 3149
 - ✳ [Cherry Valley Club article](#)
 - ✳ [Bioactivity of a Pentapeptide Isolated from Corn GlutenHydrolysate on *Lolium perenne* L.](#), J Plant Growth Regul (1996) 15:13-17.
 - ✳ [Isolation and Identification of Root-Inhibiting Compounds from Corn Gluten Hydrolysate](#), J Plant Growth Regul (1994) 13:227-230.
 - ✳ [Patents: 5,290,749; 5,290,757; Re34.594](#)
 - ✳ [EPA Exemption from Pesticide Regulation](#)
 - ✳ [Greenhouse Screening of Corn Gluten Meal as a Natural Control Product for Broadleaf and Grass Weeds](#)
 - ✳ [New York Times: In the Garden](#)
 - ✳ [ISU Daily Article](#)
 - ✳ [High School Project I](#)
-

[Corn Gluten Meal Links](#) - go here for links to information about corn gluten meal.

Corn Gluten Meal -- Byproduct to Wonder Product

by Viveka Ransom, Reporter for *The Iowa Horticulturist* and
Student in the Department of Horticulture, Iowa State University, 4915 Todd Drive #24 Ames, Iowa 50014

Does corn gluten meal kills weeds? Yes. This natural byproduct of the wet-milling process of corn represents a big step in the continuing effort by scientists to find alternatives to synthetic pesticides. The development began in 1986 when researchers at Iowa State University were studying the effects of *Pythium* (fungus disease organism) on the growth of grass.

The researchers used food-grade corn meal as a growth media for the *Pythium*. The experiment included test plots inoculated with corn meal cultures, plots that only had corn meal and no *Pythium*, and controls. Although the attempt to establish *Pythium* in the treated plots failed, the researchers observed reduced growth of bentgrass in the test plots that received fresh cornmeal.

"The reason for this inhibition was uncertain," said Dr. Christians, professor of Horticulture, who headed the project. "One possible explanation was that there was some type of organic compound contained in the fresh cornmeal that was destroyed by the activity of the fungal organism."

Research into the use of cornmeal began in earnest. All parts of the processed corn grain were tested. The results of the tests confirmed that corn gluten meal has the ability to stop root formation. With no roots, the plants died. The key to this was timing. The meal stopped root formation at the time of germination. After germination, it had no effect. However, the nitrogen contained in the material continued to spur growth. Dr. Christians had discovered a natural "weed-and-feed" product. Further field trials demonstrated the merits of this material. It was granted a patent in 1991.

Corn gluten meal is used in cattle and poultry feed and in fish and dog food. It is a sixty-percent corn protein material that contains ten-percent nitrogen. Though produced as a fine, yellow powder, it can be pelletized for easier application to the soil. It offers pre-emergent control of weeds like



Christians Recognized As Inventor of the Year

The Iowa Intellectual Property Law Association chose Dr. Nick Christians as the 1998 Iowa Inventor of the Year. At the association's annual banquet on October 30, 1998, he was presented an award in recognition of his discovery of the properties and uses for corn gluten meal as a natural environmentally friendly lawn herbicide.

dandelions, pigweed, crabgrass, plantain, lambs quarters, and curly dock.

Timing, as mentioned previously, is important. The corn gluten meal must be applied before the seed of the target weeds emerges above the soil. "The application should be made close to the time of weed germination. Moisture is necessary to activate the material, but extended wet periods can reduce its effectiveness," warns Dr. Christians. While the lawn is the prime site for many weeds, corn gluten meal can be used in flowerbeds and vegetable plots.

Because the product contains nitrogen, it also acts as an excellent fertilizer to plants that have gone beyond the germination stage. "Later work has repeatedly shown that corn gluten meal compares to the best commercially-available natural fertilizers," says Dr. Christians. The current recommended rate of application is 20 pounds of product per 1,000 square feet. At 10 percent nitrogen by weight, this equates to a nitrogen application of 2 pounds per 1,000 square feet. However, always read and follow application rates provided on the package labels.

Where to Buy Corn Gluten Meal in Iowa and Nearby:

Corn gluten meal is available at garden centers and hardware stores or by mail order as the following brand name products.

- Corn Gluten Meal Herbicide -- Arlyn Hofland, 403 36th Street Place, Sioux City, IA 51104, phone 712-258-2375
- Corn Gluten Meal Herbicide -- Grain Processing Co., 1600 Oregon Street, Muscatine, IA 52761, phone 319-264-4211
- DynaWeed -- Soil Technologies Corp, 2103 185th Street, Fairfield, IA 52556, phone 515-472-3963 or 800-221-7645
- Earth Friendly -- Cereal Byproducts, Inc., P.O. Box 575, Mount Prospect, IL 60050, phone 847-818-1550
- ProPac -- Manning Agricultural Center, Inc., 619 Julia Street, Manning, IA 51455, phone 712-653-2981 or 800-248-4409
- Safe Earth Natural Weed Control -- Safe Earth Lawn and Garden, 900 52nd Street, West Des Moines, IA 50265, phone 515-222-1997
- W.O.W! -- Gardens Alive!, 5100 Schenley Place, Lawrenceburg, IN 47025, phone 812-537-8651 (the name 'A-MAIZING LAWN' was discontinued and the product has now been renamed and is now available as W.O.W!).

Corn Gluten Meal is Patented

Corn gluten meal was patented as a natural weed control in 1991 and was registered with the Environmental Protection Agency as a herbicide in August 1994. It was marketed under the name 'A-MAIZING LAWN' in 1995 and 1996. Sales went well. Researchers continue to evaluate other items related to the material. Two other patents on the use of natural products for weed control were issued in 1994 and were under evaluation in 1995. Further research with turfgrass and strawberries are presently being conducted.