



# Chemically Speaking

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## Controversial Study Retracted

The journal *Food and Chemical Toxicology* has retracted the article "Long term toxicity of a Roundup herbicide and a Roundup-tolerant genetically modified maize," which was published in the journal in November 2012. The retraction comes after a thorough and time-consuming analysis of the published article and the data it reports, along with an investigation into the peer-review behind the article. The Editor in-Chief deferred making any public statements regarding this article until this investigation was complete, and the authors were notified of the findings.

Very shortly after the publication of the article, the journal received Letters to the Editor expressing concerns about the validity of the findings it described, the proper use of animals, and even allegations of fraud. Many of these letters called upon the editors of the journal to retract the paper. According to the journal's standard practice, these letters, as well as the letters in support of the

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findings, were published along with a response from the authors. Due to the nature of the concerns raised about this paper, the Editor-in-Chief examined all aspects of the peer-review process and requested permission from the corresponding author to review the raw data. The request to view raw data is not often made; however, it is in accordance with the journal's policy that authors of submitted manuscripts must be willing to provide the original data if so requested. The corresponding author agreed and supplied all material that was requested by the Editor-in-Chief.

The Editor-in-Chief found no evidence of fraud or intentional misrepresentation of the data. However, there is a legitimate cause for concern regarding both the number of animals in each study group and the particular strain selected. The low number of animals had been identified as a cause for concern during the initial review process, but the peer-review decision ultimately weighed that the work still had merit despite this limitation. A more in-depth look at the raw data revealed that no definitive conclusions can be reached with this small sample size regarding the role of either NK603 or glyphosate in regards to overall mortality or tumor incidence. Given the known high incidence of tumors in the Sprague-Dawley rat, normal variability cannot be excluded as the cause of the higher mortality and incidence observed in the treated groups. (*PRNewswire*, 11/28/13).

## **Cultivar Mixes to Manage Disease**

European researchers have used modeling techniques to demonstrate how mixing different cultivars of the same crop species can be a useful

tactic in managing multiple diseases. The theoretical study on the deployment of quantitatively resistant wheat varieties in cultivar mixtures provides insights into the effects of using quantitative plant resistance on pathogen dynamics. It also provides guidance on desirable associations of cultivars and on optimized diversification strategies.

The study, published in *New Phytologist*, clarifies the principles for the successful use of quantitative wheat resistance in management of wheat yellow rust. In the paper, researchers provide the conditions under which cultivar mixtures that divide the pathogen population into non-specialized pathotypes can result in both an acceptable degree of disease severity and a positive absolute disease reduction.

They built a parsimonious host-pathogen model describing the dynamics of competing pathogen strains spreading over a genetically diversified host population distributed in a two-dimensional environment. Using a model for a wheat-yellow rust system, the authors studied the effectiveness of two- and three-component random cultivar mixtures in which the degrees of susceptibility and proportions of mixture components were varied.

The group found that the judicious deployment of the quantitative resistance in two- or three-component mixtures makes it possible to reduce disease severity using only small proportions of the highly resistant cultivar. The results also provide insights into the effects on pathogen dynamics of deploying quantitative plant resistance, and can provide guidance for choosing appropriate associations of cultivars and optimizing diversification strategies.

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The hope of that of the group is to contribute to the development of a general framework of mixture theory that could allow the design of diversified agroecosystems that exert low selective pressure on the pathogen populations. The model can be used in multi-disease control by inter-cropping and provides theoretical support for future experimental research intended to develop disease control strategies based on diversified host populations. (*SeedQuest*, 12/5/13).

## Record Chinese Corn Rejections

China has blocked an unprecedented amount of U.S. corn imports this year for violating its ban on certain types of genetically modified food with some analysts saying the refusals are a result of stepped-up vigilance by Chinese authorities - made easier to implement thanks to a healthy increase in domestic corn supplies this year. China said that it has repatriated 545,000 metric tons of U.S. corn so far this year in cargoes that contained MIR162, an insect-resistant strain (VIP 3A) that is permitted in the U.S., Japan and Europe but not approved by China's agriculture ministry.

Syngenta, which makes MIR162, called on China to update its laws to allow the strain. "The solution is with the Chinese authorities," a spokeswoman said. "If they want to import corn from the major corn-producing areas of the world, they should synchronize their regulatory process so that they can accept the corn being grown in those regions." Increasing demand has propelled China from being a net corn exporter to the world's fifth-largest buyer.

Analysts say this year's rejected cargoes add up to a record-high volume of grain turned away. No corn shipments were rejected last year, and only a negligible amount was sent away over the past three years said an analyst with an intelligence firm.

Researchers say China's corn harvest this year of an estimated 215 million tons was likely a 5 percent increase compared with 2012, though the government hasn't disclosed the exact volume. Official data say China's total grain harvest, which includes corn, is up 2 percent on year. Senior government officials have warned that the country may face a rising corn supply deficit in coming years due to increasing demand from food-processing industries. In recent months, the agriculture ministry has defended a trend of rising corn imports by arguing in a series of public statements that using a combination of domestic and foreign resources is "an inevitable choice for China." With U.S. shipments currently accounting for 94% of China's corn imports, it is moving to diversify. In recent months, it has made corn-import deals with Argentina and Brazil, including approval of genetically modified strains for animal consumption. Some military strategists have warned that Western nations could use genetically modified organisms as a strategy to undermine China's food security. (NASDAQ, 12/19/13).

## EU Annuls Withdrawn Registration

In a seemingly pointless case the General Court of the European Union said in December that the EU Commission had failed to follow the bloc's rules when approving the Amflora® potato, which is genetically modified to produce extra starch for use

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in the paper industry, and annulled the registration. While Amflora® is no longer grown in Europe - BASF withdrew the product in 2012, citing opposition to the technology - the ruling may raise new concerns about the EU's complex and much-criticized approval system for GMO crops.

The Commission first proposed the cultivation and sale of Amflora® in 2007, following a positive scientific assessment by the European Food Safety Authority (EFSA). Following the failure of EU government ministers and officials to approve or reject the proposal, the Commission exercised its power to grant approval unilaterally in 2010. But in its judgment, the General Court said that following the publication of an updated scientific opinion by EFSA in 2009, the Commission should have submitted new proposals for approval by EU governments rather than simply adopting its 2007 version. "The Commission infringed the procedural rules of the systems for authorising GMOs in the European Union," the court concluded.

A BASF statement said the ruling vindicated its decision two years ago to move the BASF Plant Science headquarters to the United States and stop the development of genetically modified seeds for commercialization in Europe. "The ruling underscores that it was the right decision in January 2012 to focus our plant biotechnology activities on markets with future relevance." BASF added the potato was deemed safe by the EFSA and that the court ruling was about procedures and not about the scientific appraisal of the product. (*Reuters*, 12/13/13).

## ***Pesticide Registrations and Actions***

### ***Food Related Actions***

- Based on a request by IR-4, tolerances have been granted for residues of the fungicide mandipropamid (Revus®) in snap bean and basil. (*Federal Register*, 12/20/13).
- Based on requests by IR-4 and ISK Biosciences Corp., tolerances have been granted for residues of the insecticide flonicamid (Beleaf®). Tolerances of interest to the region include pecan and spear/peppermint tops. (*Federal Register*, 12/11/13).
- Based on requests by IR-4, tolerances have been granted for residues of the insecticide indoxacarb (Avaunt®). Tolerances of interest to the region include snap bean and cowpea hay/forage. (*Federal Register*, 12/27/13).

### ***Other Actions***

- The U.S. Department of Agriculture (USDA) announced the creation of a new, unified emergency response framework in December to address Huanglongbing (HLB), a serious disease of citrus that affects several U.S. states and territories. The new framework will bring together USDA's Animal and Plant Health Inspection Service (APHIS), Agricultural Research Service (ARS) and National Institute of Food and Agriculture (NIFA), along with state departments of agriculture and the citrus industry into a Multi-Agency Coordination

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(MAC) Group for HLB. It will provide industry with a single contact for all the federal and state entities that work on citrus issues and better enable the collective to collaborate on policy decisions, establish priorities, allocate critical resources, and collect, analyze, and disseminate information. The HLB MAC Group will also help coordinate Federal research with industry's efforts to complement and fill research gaps, reduce unnecessary duplication, speed progress and more quickly provide practical tools for citrus growers to use. (USDA, 12/12/13).

- The outcome of September meetings held by the Florida Department of Agriculture and Consumer Services regarding citrus grove spraying and non-target effects on honey bees has been promulgation of guidelines that serve to inform affected parties of planned spray schedules. The four-page voluntary guidelines were released recently and serve to increase cooperation between beekeepers and citrus growers over issues such as dates and locations of hive placements, pesticide spraying schedules and liability. (*TheLedger.com*, 12/6/13).
- In what may be viewed as a test case for the growing use of nanotechnology in consumer products, the United States Court of Appeals for the Ninth Circuit ruled in November that the U.S. Environmental Protection Agency (EPA) improperly approved the use of nanosilver by Swiss textile manufacturer HeiQ Materials AG (“HeiQ”) in *Natural Resources Defense Council v. United States Environmental Protection Agency*, No. 12-70268. Under the Federal Insecticide, Fungicide, and Rodenticide Act, EPA must

determine that pesticides sold in the United States will not cause “unreasonable adverse effects” on human health or the environment. After receiving public comments, EPA conducted a risk assessment and determined that AGS-20 satisfied the standard for conditional registration, permitting the manufacturer to sell the product for the next four years while requiring it to provide data on toxicity for human health and aquatic organisms. Natural Resources Defense Council (NRDC) filed a lawsuit against EPA in early 2012 contending the agency erred in determining that the use of the pesticide would not cause unreasonable adverse effects on human health or the environment while HeiQ collected the data requested by EPA and seeking its suspension from the market. NRDC’s challenge focused on the effects of the pesticides on consumers. The NRDC argued unsuccessfully that the EPA’s risk assessment improperly assumed a three-year-old consumer because it determined toddlers to be the subpopulation most vulnerable to the possible harmful effects of the product, when in fact infants are the most likely subset of children to chew or suck on fabrics that could contain the pesticide. The court deferred to the agency on this issue, as the decision to use the characteristics of toddlers was found to be consistent with the EPA’s general approach to evaluating the risk of dermal and oral exposure to pesticides applied to textiles. The court was, however, persuaded by the argument that EPA failed to follow its own rule in concluding that there was no “risk concern requiring mitigation” for short- and intermediate-term aggregate oral and dermal exposure to textiles that are surface-coated

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with AGS-20. Specifically, EPA's risk assessment set out a rule whereby a risk concern exists if the "margin of exposure" to AGS-20 in the short- or intermediate-term is less than or equal to 1,000. In one of the exposure scenarios considered by EPA, where a consumer experiences both dermal and oral contact with AGS-20 applied to a textile as a surface coating, EPA calculated a margin of exposure of 1,000. Given that this result constitutes a risk concern requiring mitigation pursuant to EPA's own rule, the court found the EPA's conclusion to the contrary was not supported by substantial evidence and should be remanded to the agency for reconsideration. (*Lexology*, 11/26/13).

- Activists bringing legal suits must clarify their claims about pesticide oversight a federal judge ruled in late November. The Center for Biological Diversity (CBD) previously sued the EPA under the Endangered Species Act for allegedly failing to "consult with respect to its oversight of 382 pesticide ingredients," as well as pesticides discussed in biological opinions from 1989 and 1993, according to the ruling. The court dismissed this first complaint on the grounds that the center failed to show that the EPA had a duty to consult about the matter. It also found that the center's claims were too vague and ordered the group to plead "for a specific pesticide, that the agency had prior consultation, and facts showing that one [or] more of the triggering events occurred." In a 437-page amended complaint, the center advanced 74 claims alleging that the EPA either failed to consult or failed to reinstate consultation with regard to 50 specific pesticide ingredients.

Claims about trifluralin, a synthetic chemical used as an herbicide on grass and to control broadleaf weeds in crops like cotton and soybeans, accounted for the bulk of the amended complaint. Animal studies performed on rats and dogs have indicated that prolonged exposure to trifluralin can cause weight loss, skeletal abnormalities and tumor growth. Little information is available on the chemical's effects on humans, but the EPA has determined that it may cause cancer and set the safety threshold at 0.0075 milligrams per kilogram a day over a lifetime. The EPA authorized the use of trifluralin in pesticides in a 2004 reregistration eligibility decision, and began another reregistration review for the chemical in 2012. The center argued that, given the EPA's long-term discretionary control over trifluralin regulation and the potential for the chemical to harm protected species, the agency's registration of the chemical is subject to consultation with the National Marine Fisheries Service under the Endangered Species Act. Regulators nevertheless moved for a more definitive statement, arguing that CBD failed to specify which of its actions regarding trifluralin triggers its duty to consult or reinstate consultation on the chemical. The judge wrote: "If it is too difficult even for plaintiffs to identify the particular product reregistrations with allegedly trigger the duty to consult - much less assert the facts giving rise to standing, jurisdiction and timeliness, then it is unreasonable for the federal defendants and intervenors to prepare a response with respect to such product reregistrations." He ordered the center to "provide an exhaustive list of every affirmative act that triggered the duty to

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consult," and the date of each act, for each failure-to-consult claim in another amended complaint. (*Courthouse News Service*, 11/27/13).

## Pesticide Potpourri

- Three Chinese nationals have been charged in two separate cases of trying to steal seed-technology, trade secrets under development in the United States. After a two-year investigation, a man working for a Chinese conglomerate was arrested on charges of stealing inbred corn seed from production fields in Iowa and Illinois and trying to smuggle it into China, U.S. Attorney for the Southern District of Iowa Nicholas Klinefeldt said. The man, Mo Hailong, director of the international business of the Beijing Dabeinong Technology Group Co, a part of DBN Group, was in the United States legally. Prosecutors said Mo and others who were not named conspired to steal from several U.S. seed companies between September 2011 and October 2012. The others included employees at U.S. seed companies who provided locations where experiments with genetically altered seeds took place; or they provided gene sequencing information for the bio-engineered seeds, according to documents filed in U.S. District Court in the Southern

District of Iowa. The investigation began after DuPont Pioneer security staff detected suspicious activity in fields where the company was testing new types of seed, and notified authorities. In a second case, two agricultural scientists from China were charged with trying to steal samples of a variety of seeds from a biopharmaceutical company's research facility in Kansas. U.S. Customs and Border Protection agents found stolen seeds in the luggage of a group of visitors from China who were about to return home on August 7, according to papers filed in the U.S. District Court in Kansas City, KS. The group had visited various agricultural facilities and universities in the Midwest, as well as the Dale Bumpers National Rice Research Center in Stuttgart, AR. (*Reuters*, 12/12/13).



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