Hexane, a dangerous solvent, is used to process soybeans by Paris Reidhead

Soybeans are the world’s largest source of vegetable protein for both humans and animals. The most common method of removing the soybean’s oil from its protein is by solvent processing, the use of a chemical that has been proven to be toxic to lab animals and humans.

This liquid solvent, hexane, has been red-flagged as a carcinogen by the American Cancer Society.

Since 1972, hexane has been the backbone of the U.S. soybean processing industry. This cancer-causing solvent is used in more than 95% of soybeans processed into oil and meal in the U.S.

Soybean milling processes haven’t changed much over the years. The equipment has become significantly larger and highly computerized, but three basic mechanical methods remain for removing oil from soybeans, and other oil-rich seeds for that matter. (The raw, ripe, soybean contains 15-20% of its weight as oil.) These methods are referred to as the hydraulic process, the expeller process, and the solvent process.

The hydraulic process crushes the whole soy seed into flakes, and then thoroughly cooks the mass by steam. The resulting mass is formed into cakes, which are then placed in hydraulic presses where enormous pressure is exerted as the material passes through the expeller under such great pressure. The friction cooks the meal thoroughly. In soybeans, the heating process eliminates the trypsin inhibitor factor, which is detrimental to protein digestion, particularly for non-ruminants. The oil-free residue, which is in flake form, is ground into meal or may be pelletized.

In the solvent process, the seeds are cracked, dried, and then heated in a steam-jacketed apparatus. The oil is separated by expellers, or screw presses, where enormous pressure is exerted by a worm shaft revolving in a horizontal barrel. Considerable heat is produced, and the oil is forced out as the material passes through the expeller under such great pressure. The friction cooks the meal thoroughly. In soybeans, the heating process eliminates the trypsin inhibitor factor, which is detrimental to protein digestion, particularly for non-ruminants. The oil-free residue, which is in flake form, is ground into meal or may be pelletized.

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The solvent process removes the oil more completely than the hydraulic process or expeller processes. The first two processes may leave up to five percent oil in the soy bean meal, while the solvent process can reduce the amount of oil in the meal to as low as 2.5 tons of solvent must be removed by distillation. In a fire involving hexane, NFPA recommends the affected area be isolated with a half-mile radius cordon, and that unexposed containers of hexane may explode in the heat of the fire, and should be removed from the fire area, if it is possible to do so safely.”

According to the Occupational Safety and Health Administration, hexane is a neurotoxin, a narcotic, and an irritant to eyes, skin, and mucous membranes. Hexane’s toxicity to the human nervous system is cytotoxic (poisonous at cellular levels) in mammalian and human test systems.

Mice exposed to concentrations of 1000-2000 ppm for 24 hours/day for six days/week for one year have developed atrophy and degeneration of hind leg muscle fibers. Mice exposed to hexane at 2500-3000 ppm for four days have developed liver enlargement within 24 hours of exposure onset. Offspring of rats and mice exposed to hexane during gestation showed depressed weight after birth. Hexane also harms reproductive capacity of both genders.

With humans, hexane is both a narcotic agent and an irritant to eyes, the upper respiratory tract, and skin. Hexane is also a neurotoxin. Exposing humans to 5000 ppm for ten minutes brings about marked vertigo. Exposure to 1500 ppm causes headache and light-headedness. Exposure to an entire ventricle of sojbean meal? 3) What tests are performed (and by whom) to verify that solvent residues have been reduced to acceptable levels in both oil and meal?

ADM’s switchboard sent me to the office of Carla Miller, ADM’s chief of public relations. I got to talk to Miller’s assistant, Angela Shaw. I posed my questions to Shaw, who said she would give them to her boss, who would return my call immediately. After three attempts to reach her, as of early October I still awaited Miller’s call.

Frustrated with ADM, I contacted AgPro, a soybean processor in Massena, New York. I knew AgPro processes some soybeans using hexane. I knew the vast majority of their work was with conventional soybeans. Daniel McDonald, AgPro’s processing manager, told me that the company does not use the solvent process for separating the oil from soybean meal. They use the expeller process, so there’s no solvent like hexane on the premises. AgPro’s owners don’t like the solvent process. McDonald said that the expeller process leaves about 5% of the soybean oil in the mash that becomes meal, which is acceptable to them. He also said, “probably 99% of vegetable oil in the grocery store is solvent-processed.” Although he didn’t know the exact procedure for testing hexane residue, he said there certainly be such a test.

Guebert details ADM’s shady background

Displeased with the chemical and medical traits of hexane, I was even more upset with a company using this solvent in its soybean processing. So I tried to learn more about ADM. This challenge sparked a phone conversation with Alan Guebert, an investigative agricultural journalist and columnist in Delavan, Illinois. Guebert’s syndicated column, “Farmed and Fooded,” is published in 200 newspapers nationally. He welcomed my questions on ADM, as he considers ADM the classic cockroach that scurries at any sign of light. Guebert said that ADM is the world’s largest exporter and buyer of commodity grains. Quoting Alan, “they want to achieve a monopoly as the world’s grocery store. They operate at the edge of the law, if not outside the law, although they have become slightly less illegal than they were.” They are the largest owner of rail cars in the world, owning 20,000. They also own a barge fleet. They are a power player in (Washington DC), they call the shots.” He said that in 1995, ADM paid $100 million in fines because of price-fixing and restraint of trade activities. Again quoting him, “I don’t know why they didn’t get barred from doing business with the Federal government.”

Guebert added that ADM has been named in almost every criminal investigation involving grain market- ing. During the 1990s he strove to get a press pass from Carla Miller to attend corporate board meetings, and was consistently denied except on one occasion. He attempted to get a phone interview, however requested another press pass. Guebert was emphatic to me: “No, Carla Miller will not return your phone call.”
Dairy on Collision Course With Deficits, Free Trade

by The Milkweed staff

As Washington politicians, fiddle, U.S. farmers are drifting on a dangerous collision course featuring pending, deep USDA budget cuts on one side, and potentially harmful agricultural policy changes forced by the World Trade Organization (WTO) on the other.

The nation’s leadership vacuum means deep farm program cuts are certain—at a time of natural disasters and economic turmoil, when farmers need strong safety nets more than ever. The spending cuts come as the federal budget deficit explodes under the combined costs of the Iraq war, recovery from two major hurricanes in the Gulf Coast region, and tax cuts for the rich.

Those pending USDA budget cuts may be, they'll be peanuts compared to the long-term policy changes to be discussed at the next ministerial conference of the WTO Doha Development Round set for this December in Hong Kong.

So far, U.S. Agriculture Secretary Mike Johanns has taken no specific steps to garner the attention of Congress for farm programs. The WTO should be the top priority for Congress, with the Bush administration’s free trade agenda, in what should be a “Red Alert” situation.

Agriculture is vulnerable

The economic shocks of hurricanes Katrina and Rita came at a bad time for U.S. agriculture. Two other Midwest reporters were already vulnerable. Fuel prices (along with fertilizer, cement and other inputs) had gone through the roof earlier this year due to rising demand for oil in China, India and other developing nations now joining the global economy. The soybean and feed commodity prices were depressed in September, as hurricanes crippled oil production and refining capacity in the Gulf region.

Crop prices sagged further as the hurricanes damaged Mississippi River shipping infrastructure at harvest time. Some of the Midwest, their soybean and corn yields combined with drought losses in the Corn Belt and depressed farm commodity markets, will further increase federal farm program costs.

The budget cutting begins

With commodity program costs on the rise, the U.S. Senate Agriculture Committee in early October began considering $3 billion in cuts to food stamps, conservation and other farm spending, with more cuts to follow.

The Milk Income Loss Contract (MILC) program expired September 30 and, despite some progress in the U.S. Senate to renew it, at press time it was not certain whether the effort would succeed. MILC already was one of the counter-cyclical payment programs that U.S. trading partners had targeted for extinction at the WTO for several years.

“Free Trade” proponents had earlier assured farmers that U.S. farm policies have been carefully written to withstand a WTO challenge. The Bush administration, the WTO dispute settlement body last year ruled against the U.S. cotton program, declaring it to be illegal, trade-distorting subsidy.

The WTO’s ongoing earthquake has shaken the bedrock of U.S. agriculture, leaving farmers vulnerable, and sending the Washington farm policy establishment running for cover.

Pressure builds for Hong Kong deal

The latest farm economic shocks coincide with mounting pressure at the WTO to reach an agricultural agreement. President George W. Bush and other free trade ideologues can’t risk having the Hong Kong talks falter as the WTO talks have if other countries agree to offer greater access to their markets.

President Bush repeatedly called for the elimination of all forms of international agricultural support, and trade negotiations are demanding deep cuts in U.S. counter-cyclical payment programs, including MILC, for major commodities that allegedly distort trade because subsidies are linked to production.

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The WTO has raised new and significant issues which U.S. negotiators are demanding deep cuts in U.S. counter-cyclical payment programs, including MILC, for major commodities that allegedly distort trade because subsidies are linked to production.

The clear and present danger: U.S. negotiators will trade off farmers’ interests at the Hong Kong WTO negotiations. As trade discussions continued in recent months, the Bush administration has maintained its emphasis on farm exports even as the U.S. is becoming a net food-importing nation. U.S. negotiators have offered to make deep cuts in domestic farm programs if other countries agree to offer greater access to their markets.

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