

Glyphosate: “Growth for a Better World”

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Imagine being able to satisfy your sweet tooth by almost 300 times the regular amount of sugar, but with no added calories to your diet (Zurlo, 1998, pg. 1). That was the appeal of saccharin, an artificial sweetener commonly known under the brand names of Sweet 'N Low and NectaSweet (Sollid, 2017, pg. 1). First accessible to consumers in 1879, it was used for nearly a century before being investigated for its potential to cause cancer after a study found that male rats developed stomach tumors when exposed to the artificial sweetener (Touyz, 2010, pg. 1). Listed as a “possible” carcinogen in the 1970s by the International Agency for Research on Cancer, the Food and Drug Administration proposed a ban on saccharin-sweetened products, which would be renewed numerous times until President Clinton, through extensive studies and research, finally signed a bill in 2000 to remove the warning label required on all products containing saccharin (Gilman, 2004, pg. 2). Monsanto’s number one selling product, Roundup, is now facing a similar situation.

Glyphosate, the active chemical ingredient in Monsanto’s Roundup, is used in more than 750 agricultural, household, and forestry products around the world (Savage, 2017, pg. 2). As a post-emergent and non-selective herbicide, it has been used for crop protection since 1974 and is effective for a wide range of weed control. This increases the yield and quality of crops, heightens harvesting capability, and reduces soil erosion by minimizing the need for tilling (Sims, 2016, pg. 1). In 1996, Monsanto released “Roundup Ready” genetically engineered glyphosate-tolerant crops, and since then the use of the chemical has risen almost 15-fold from the original 19% global use. Roundup Ready crops benefit farming by allowing the herbicide to be sprayed over the whole field, without harming the crops and eliminating the need to spray individual weeds (Benbrook, 2018, pg. 1). Despite the benefits of glyphosate and the growing popularity of Roundup Ready crops in sustainable farming, more than 13,000 lawsuits have been filed against

Monsanto by clients claiming the glyphosate-based herbicide has the potential to cause cancer after continuous exposure (Bellon, 2018, pg. 2).

As of July 7, 2017, glyphosate is on California's list of chemicals known to cause cancer, under the state's Office of Environmental Health Hazard Assessment Proposition 65. This means Monsanto and all companies with glyphosate listed in the ingredients of their products had one year to relabel them. In 2015 the International Agency for Research on Cancer, or IARC, which is based in Lyon, France, labeled glyphosate as Group 2A, meaning it is probably carcinogenic to humans (Savage, 2017, pg. 1). The IARC found evidence of glyphosate causing cancer in experimental animals, such as male mice, but minuscule data on it being harmful to humans. However, the Environmental Protection Agency, or EPA, declared that glyphosate has "low acute toxicity", meaning after 14 days of administering the chemical, no adverse effects occurred (Savage, 2017, pg. 2). Adam Taveras, Monsanto's Northern Region Chemical Account Manager, revealed as of now, the IARC is the only organization to support California's decision of labeling glyphosate carcinogenic and on April 30th, 2019 Robert Arnason, a reporter for the *Western Producer*, stated that the EPA found Roundup safe when used according to the pesticide label (A. Taveras, personal communication, March 4, 2019).

Philip Miller, Monsanto's senior vice president of global regulatory affairs, released a statement questioning the IARC's data because it contradicts the findings "reached by all regulatory agencies around the globe" (Savage, 2017, pg.1). Monsanto also claimed testing for glyphosate remnants in food would be a "misuse of valuable resources" because the IARC has labeled several everyday items in Group 2A, such as coffee and cell phones (Cressey, 2015, pg. 2). Nonetheless, the lawsuits against Monsanto have been proliferating in the United States District Court in San Francisco, California. These proceedings were filed by citizens claiming exposure to Roundup causes the development of non-Hodgkin's Lymphoma, and that Monsanto

continued to cover up the risks (Ruskin, 2018, pg. 1). However, the IARC is now under scrutiny after “converging evidence points to skew its glyphosate report to reach a desired conclusion” (Kabat, 2017, pg. 1). Aaron Blair, a lead scientist on the IARC’s glyphosate panel knew “the unpublished research found no evidence of a link between glyphosate and cancer”. Blair admitted the IARC withheld this information (legally since the data was yet to be published) because glyphosate would have been less likely to meet the agency’s criteria of being labeled “possibly carcinogenic” (Butler, 2017, pg. 2).

Many tests, including the IARC’s, have been performed in order to evaluate the side effects of working closely with glyphosate, to question if certain doses can cause the development of non-Hodgkin's Lymphoma to occur. According to Monsanto, “no other pesticide has been more extensively tested than glyphosate” and conclusions reached worldwide by regulatory organizations, such as the EPA, state with full confidence glyphosate is safe. (Mulligan, 2018, pg. 2). United States Government agencies, such as the National Cancer Institute, have been working since 1993 on their Agricultural Health Study to test the impacts glyphosate can have on the typical farmer (Adams, 2018, pg. 1). In 2017, the results of the study were released, which concluded out of 54,251 applicators, 82.8% of which used glyphosate, the results between non-Hodgkin's Lymphoma and the 44,932 users were not statistically higher (Adams, 2018, pg. 1). As of August 8, 2019, the EPA announced it will “not approve labels on products containing glyphosate that link the chemical to cancer” because California's program of dictating federal policies would mislead consumers (Smith-Schoenwalder, 2019, pg. 1).

Despite the accusations made against Monsanto, it has not affected the sales of Roundup. In fact, glyphosate use surged in the past 20 years with approximately 300 million pounds a year being applied, which is four times more than the second-leading chemical atrazine (Brooks, 2017, pg. 1). In 2012, the global glyphosate revenue was at \$5.4 billion with the market for glyphosate-

based herbicides increasing by an annual rate of 7.2% (Benbrook, 2016, pg. 1). Monsanto sells to more than 325,000 United States' farmers annually and refers to glyphosate as the most sold agrichemical of all time (Santisi, 2019, pg. 1).

Monsanto has been making history since its beginning. The company began selling saccharin in 1901 and after discovering glyphosate, it became known for selling the most effective herbicide throughout several countries, despite the negativity being published about its product. Monsanto stopped producing saccharin in the 1970s, the same decade glyphosate was discovered and they first produced Roundup. Saccharin was officially redeemed when President Clinton signed a bill removing its warning label, so when is Monsanto's vindication? The mistake of banning saccharin under false pretenses cannot be repeated with glyphosate.

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