Gensberger, Sabrina, et al. "Identification And Quantification Of Six

Major Α-Dicarbonyl Process Contaminants In High-Fructose Corn Syrup."

*Analytical & Bioanalytical Chemistry* 403.10 (2012): 2923-2931. *Academic*

*Search Premier*. Web. 24 June 2014.

The "Identification And Quantification Of Six Major Α-Dicarbonyl (α-DCs) Process Contaminants In High-Fructose Corn Syrup (HFCS)” research paper was written by Sabrina Gensberger in the area of Analytical and Bioanalytical Chemistry, published by Springer Science and Business Media in the Netherlands. She states in her research of HFCS “Thus, several α-DCs have been identified in sugar solutions heated in the presence and absence of amines (Amines are organic compounds and functional groups that contain a basic nitrogen atom with a lone pair). α-DCs are very reactive components that easily modify proteins, thus leading to the formation of advanced glycation end products. Moreover, it was reported that α-DCs are cytotoxic and may interfere with cell signaling (2924).” Advanced glycation end products, known as AGEs, are substances that can be a factor in the development of or worsening of many degenerative diseases.

In summary, she discovered in the developmental process of HFCS certain components are formed that easily modify the human body proteins which lead to many diseases. These components are toxic to living cells and affect the human body’s ability to correctly repair tissues. This supports my belief why HFCS is unhealthy for the body because in human nutrition and biology AGEs are harmful compounds that affect nearly every type of cell and molecule in the body and are thought to be one factor in aging and in some age-related chronic diseases. They are also believed to play a causative role in the [blood-vessel](http://en.wikipedia.org/wiki/Vascular_system) complications of diabetes. AGEs speed up the [oxidative damage](http://en.wikipedia.org/wiki/Reactive_oxygen_species) to cells and alters their normal behavior.

I believe Gensberger is a credible source for my research because she is a scientist at The University of Erlangen-Nuremberg, Germany. She also has research to prove her discovery in the effect of HFCS on the human body.

Rizkalla, Salwa W. "Health Implications Of Fructose Consumption: A Review Of Recent Data." *Nutrition & Metabolism* 7.(2010): 82-98. *Academic Search Premier*. Web. 29 June 2014.

The "Health Implications Of Fructose Consumption: A Review Of Recent Data" was researched by Salwa Rizkalla. She is a credible source because she is a scientist at the University Pierre and Marie-Curie in Paris, France. The fact that she did the study on animals is logic proof of what HFCS can have on the human body. She discusses how fructose is consumed in significant amounts in Western diets. In America HFCS is replaced with natural sugar cane because it is easier to obtain and has a sweeter taste, HFCS is commonly used as a bulk sweetener. Rizkalla researched high fructose consumption on animals to show an example of the effects it may have on humans.

Rizkalla states in her research “An increase in high fructose corn syrup, as well as total fructose, consumption over the past 10 to 20 years has been linked to a rise in obesity and metabolic disorders (1).” Her research results in that fructose itself is not the cause of the obesity epidemic, but there is evidence supporting the possibility that refined carbohydrates in general may play a major rule in weight gain. Fructose intake as well as HFCS may be a contributor, but it’s not the sole problem. The obese population consumes too many calories for their activity level, including too much fat, protein and sugar. Other factors of overweight and obesity are influenced by environmental factors such as: addressing specific eating patterns and efforts to reduce fast food portion size.

Evidence of fructose induced Lipogenesis (the stage in metabolism of simple sugars, such as glucose, a source of energy of living organisms) comes mainly from studies in rodents. Her results of the experiment support existing evidence that consuming large amounts of fructose leads to the development of a complete metabolic syndrome in rodents meaning it could also affect humans. Subjects who drink two or more servings of HFCS sweetened beverages per day may increase their risk of heart disease. This research supports my beliefs that HFCS has long term effects on the body without proper exercise. The experiment results proved though animals, that high fructose intake slows the metabolism, causes heart disease, and is stored in the body instead of digested, meaning it's not properly broken down like natural sugar.

Sievenpiper, John L., et al. "Effect Of Fructose On Body Weight In Controlled Feeding Trials." *Annals Of Internal Medicine* 156.4 (2012): 291-W-83. *Academic Search Premier*. Web. 24 June 2014.

John Sievenpipers research on "Effect Of Fructose On Body Weight In Controlled Feeding Trials.” did not include HFCS however, he did insinuate the reason of this experiment was to see if fructose alone would affect the human body. His research relates to my studies because HFCS type 55 (mostly used in soft drinks), contains approximately 55% fructose and 42% glucose. When a subject consumes HFCS they are receiving a higher amount of fructose than natural cane sugar. He discusses how much attention the western health care systems have got with the dramatic increase of overweight, obesity and type 2 diabetes. Animal studies demonstrate that a diet that consists of 60% fructose can influence obesity, insulin resistance, and high blood pressure (291).

Sievenpiper states “Evidence from observational studies and controlled feeding trials also suggest a positive association between the consumption of sugar-sweetened beverages, in which high-fructose corn syrup is the main sweetener, and increased energy consumption and weight gain in both pediatric and adult populations, but not all meta-analyses have supported this conclusion (291).” The information I have received through his research provides evidence of other countries recognizing the rapid increase of unhealthy Americans. The United States in one of the only countries in the world that allows HFCS to be substituted in food and beverage instead of natural sugar.

The ethos I feel Sievenpiper has is he graduated from the University in Toronto and is now a scientist at Li Ka Shing Knowledge Institute, St. Michael's Hospital in Toronto, Canada. The experiment he has conducted in high fructose consumption contributes to HFCS having a high amount of fructose that can potentially lead to weight gain. His research doesn’t specifically apply to my topic but the results with certainly help me convince my audience that HFCS in bad for the human body.

Hyman, Mark. "5 Reasons High Fructose Corn Syrup Will Kill You." Dr. Mark Hyman. (2012). Web. 24 June 2014

I know Mark Hyman, MD is a credible source because he is a family physician, eight-time New York Times bestselling author, and an international leader in his field. He graduated from [Cornell University](http://en.wikipedia.org/wiki/Cornell_University) with a bachelor’s in Asian Studies. Received his [doctor of medicine](http://en.wikipedia.org/wiki/Doctor_of_medicine) from the [University of Ottawa](http://en.wikipedia.org/wiki/University_of_Ottawa) and completed his postgraduate training at the [University of California, San Francisco](http://en.wikipedia.org/wiki/University_of_California,_San_Francisco). I have briefly summarized the five reasons why HFCS will kill you: Any type of sugar causes obesity and disease when consumed in large amounts. A 20oz beverage that contains HFCS has 17 tablespoons of sugar; the average teenager consumes two drinks a day. For the average person on a healthy diet this is more than one should ever be consuming on a daily basis. HFCS and natural sugars are not processed the same way by the body. Hyman states “It is extracted from corn stalks through a process so secret that Archer Daniels Midland and Carghill would not allow the investigative journalist, Michael Pollan to observe it for his book, *The Omnivore's Dilemma.”* HFCS contains contaminates including mercury that is not regulated or measured by the FDA.

When corn syrup is tested through a chemical analyzer its results don't even show that it contains fructose and glucose. Medical and nutrition experts don't support HFCS in one’s diet. I believe the HFCS industry is afraid that we will find the truth of this deadly product because they won’t even let a journalist come observe the way it’s made. If they were not hiding anything the HFCS industry wouldn't have a problem showing the world how is made in the factories. This information supports all of my thoughts and reasoning on why HFCS in harmful to the humans health. It has been shown through many different research papers that corn sugar does have effects if consumed in a high amounts.

Primary Research

I did a survey of 50 people and asked them a series of the same four questions. The group of people I leaned towards in my research was people who work in the food industry. By sticking to this specific group of people I felt I would get the best results. Listed below are the predetermined yes or no questions I asked each participant and each questions result in percentage.

Question One

*In general, do you know what high fructose corn syrup is?*

Answered yes- 80% Answered no- 20%

Question Two

*Do you believe that high fructose corn syrup is harmful to the human health?*

Answered yes- 92% Answered no- 8%

Question Three

*Do you avoid foods that contain high fructose corn syrup?*

Answered yes- 56% Answered no- 44%

Question Four

*Did you know that the United States is the leading country in providing food products that contain high fructose corn syrup?*

Answered yes- 68% Answered no- 32%

Having the opportunity to go out and get statistics of my own and determining my own results really helped me have a better understand of high fructose corn syrup. I will use this data I have received to show what people really know about HFCS. I was personally impressed by all the knowledge most people I asked actually had.