High-Fructose Corn Syrup: Health and Economic Effects

Educating Students of the Difference between HFCS and Sugar and Providing An Alternative To Regular Pepsi In Rutgers Vending Machines

Tag Words: High fructose corn syrup; Obesity; Farm Bill; Corn Subsidies; Pepsi

Authors: Lynn Ma and Eliza Ahmed with Julie Fagan, Ph.D

Summary

High fructose corn syrup (HFCS) is present in nearly every American beverage because it is a cheap substitute for the domestically high prices of cane sugar. Corn subsidies render the prices of corn byproducts like HFCS cheap, leading to its addition to many of our food products as well. Studies show that HFCS may be more detrimental than sugar, so we aim to provide the all-sugar Pepsi Throwback in our vending machines as an alternative to regular Pepsi and educate the Rutgers community about the health effects of HFCS and how it differs from sugar.

The “Truth” About High-Fructose Corn Syrup

Introduction

High fructose corn syrup (HFCS) has lately been the focus of many nationwide television ad campaigns. Some commercials claim that it’s harmful to our health, and that consumers would do best to avoid it. Other commercials claim that it’s no different from refined sugar. This paper will attempt to reconcile these two conflicting statements and find the “truth” behind HFCS by exploring the economic and health effects of HFCS in the US.

Behind the Claims (EA)

The Corn Refiners Association (CRA) claims that HFCS is the same as regular sugar. After all, both are composed of roughly equal amounts of glucose and fructose. They’re both sweeteners, they’re both produced from (subsidized) crops, and they even have the same amount of calories. Despite all of these similarities, this paper will prove that HFCS is nutritionally and economically different from sugar. Recall your last trip to the grocery store. With such a variety of food available to choose from, what did you check for first? Price? Brand? Nutrition label? Chances are you did one of the three. If the only difference between two food products is whether they contain HFCS or refined sugar, then the number of calories they both have will be
the same. However, it’s likely the product containing HFCS is cheaper than the one containing refined sugar. Faced with two products similar in calorie and taste, it is not unreasonable to think that the consumer would choose the lower priced one. But that choice is a short-sighted one, and fails to take into account the external cost of HFCS to health and environment.

The CRA asserts that HFCS and sugar are metabolized in exactly the same way. Let’s examine this claim. Sugar—otherwise known as table sugar, beet sugar, cane sugar, or sucrose—is made of a 1:1 ratio of glucose and fructose linked together with glycosidic bonds. This polysaccharide is digested in the small intestine, where it is broken down into equal numbers of fructose and glucose which are then absorbed into the bloodstream. High fructose corn syrup is also digested in the small intestine and made up of a mixture of fructose and glucose molecules—however, in HFCS-55 (the variation of HFCS most commonly used in sodas) there is, as the name suggests, a slightly higher proportion of fructose to glucose.

Though fructose and glucose are both monosaccharides, their metabolism in the body is very different. Glucose is vital to the body as it provides the materials for synthesizing ATP via certain metabolic pathways performed in muscle tissue throughout the body. In excess, glucose is converted into glycogen and stored in the liver. On the other hand, fructose metabolism occurs almost entirely in the liver, where it is used to replenish liver glycogen and synthesize triglycerides (which are used in fat synthesis). Excess fructose consumption increases hepatic de novo lipogenesis and causes increased blood triglyceride levels, both of which are markers for obesity. Fructose also reduces insulin secretion, an important hormone that detects the level of glucose in the blood and regulates the storage of glucose, especially after meals. Insulin also triggers other hormones involved in the feeling of satiety, which means that excess fructose consumption allows people to eat more before they feel full.

According to the CRA, HFCS-55 contains 55% fructose, 42% glucose, and 3% higher saccharides. The question still under debate is whether this slight difference in proportion between 50:50 and 55:42 matters. Can 5% more fructose really do so much harm to our health?

Studies That Don’t Link Obesity to HFCS (LM)

White (2008) certainly claims that it is not a problem. However, his assertion that the 55:42 fructose-glucose ratio results in no real increase in dietary fructose is not connected back to health or backed up by any experimental data, and seems to be based only on the fact that 55 is a number close to 50. He makes more compelling arguments later with statistical analyses. Even though recently there has been a downtick in the consumption of HFCS--no doubt due to its bad press--obesity rates are still as high as ever. The world is also by-and-large a sugar-sweetened world, and despite the fact that HFCS is not widely used in countries other than the U.S., obesity rates have increased in foreign countries as well. From this we can conclude that HFCS is not the sole contributor to the global and domestic obesity trend. This isn’t surprising. The most obvious causes for obesity are the most likely: 1) the overall increased caloric intake through higher consumption of fats and sugars and 2) decreased activity levels. We’ve already
established that fructose is the “bad” sugar. Frankly, every added sugar in our food products, whether it’s refined sugar, HFCS, honey, or fruit concentrate contains fructose. However, we’ve focused on HFCS because it is the main contributor of fructose in our diets due to its prevalence in soft drinks and processed foods. So while replacing HFCS with refined sugar in sodas or avoiding food products that contain it probably won’t result with an end to obesity…it’s definitely a good place to start. The studies below enforce that idea.

**Studies That Link Obesity to High Fructose Corn Syrup (EA & LM)**

There have been several studies that demonstrate that HFCS does seem to be more detrimental to health than sugar. In Bocarsly et al. (2010), experiments showed that male rats given water sweetened with HFCS (along with a standard diet of rat chow) gained more weight than male rats that were given water sweetened with table sugar (along with the standard diet). The study had both short term and long term experiments. The long-term effects of high fructose corn syrup in a six-month period were measured in weight gain, body fat, and ultimate triglyceride levels. There were two groups of rats—a control group with a standard rat chow diet and the other with a diet rich in HFCS. The latter showed various characteristic signs of metabolic syndrome, which includes abnormal weight gain, augmented fat deposition, and significant increases in circulating triglycerides. The animals consuming the high fructose corn syrup gained forty eight percent more weight than those on the normal diet. Professor Bart Hoebel, the principal investigator of the study, discussed the results of these rats: "*When rats are drinking high-fructose corn syrup at levels well below those in soda pop, they're becoming obese -- every single one, across the board. Even when rats are fed a high-fat diet, you don't see this; they don't all gain extra weight.*"

About 30% of our consumption of HFCS comes from soda alone. According to Ventura et al. (2010), it seems that these sodas contain even more fructose than the assumed 55:42 fructose-glucose ratio. A high-performance liquid chromatography of various beverages for their fructose, glucose, and sucrose levels revealed that the three most popular sodas—Coca-Cola, Sprite, and Pepsi—actually contain 64-65% fructose; not what anyone would call a near 1:1 ratio with glucose anymore. Bocarsly et al. (2010) used the standard HFCS-55 solution in their experiments and still received significant negative results in weight gain and triglyceride levels. How much worse would the rats have been if they had tested using a solution with 65% fructose?

To put this fructose amount in sodas into perspective, consider the following: a 20 fl. oz. bottle of Pepsi contains 7.4 g/mL of fructose, which means that you’re drinking down around 43.7 grams of fructose per bottle. If we were eating small apples instead (weighing 100 grams each), we’d have to eat 5 apples in a row to equal that amount of fructose (Britell, 2013). Pepsi however, lacks many of the vitamins and minerals that make an apple nutritious, and most heavy soda drinkers don’t just drink one bottle a day.

The Bocarsly et al. (2010) study indicates that long term consumption of HFCS results in higher adiposity and blood triglyceride levels, which are both markers for obesity. Other studies
observing the long term consumption of sucrose did not show such drastically negative health effects. So it seems that HFCS is indeed nutritionally different from sugar. However, the CRA refutes this study by claiming that rats are not humans. While it’s true that these rats are simply animal models, such across-the-board increases in weight gain makes it clear that there is something off about the metabolism of HFCS. So why use HFCS when it appears to be riskier to our health? Because it is cheaper than sugar.

**Breakdown of the Sweetener Market in the US (LM)**

But the reason why HFCS is often substituted for sugar is not so much that HFCS is cheap--it’s that sugar in the U.S. is expensive. Now here’s the million-dollar question: why is the price of domestic sugar so high? The federal sugar program has a long history (beginning from 1789!), setting up various mechanisms like tariffs, import quotas, and loan and purchase programs to insulate domestic producers of sugar from the fluctuations of the world market (Schmitz & Christian, 1993). These policies, instead of a free market, dictate U.S. sugar prices, which do remain relatively stable compared to global prices but always at higher rates. At the end of 2013, refined sugar in the U.S. was 66.02 cents/pound but only 22.84 cents/pound globally (USDA ERS, 2014). This significant inflation of prices at taxpayers’ cost is one of the reasons why the U.S. sugar program has received so much criticism over the years (Schmitz & Christian, 1993). Other reasons include the negative impact domestic production has on the environment (as the climate in the U.S. is not well-suited for sugarcane) and on third-world exporters. It was due to these high prices that food producers in the U.S. sought a more economical sweetener to use, and began to substitute sugar for HFCS.

The end of the 1970s saw a dramatic increase in the demand for HFCS: in 1975, HFCS took up only 5% of the sweetener market, but rose to 44% by 1989 (Schmitz & Christian, 1993). Since then consumption of HFCS has hovered between 40-50% of the sweetener market, replacing refined sugar in many products like soda and salad dressing. One reason for this dramatic increase in demand is that HFCS-42 and HFCS-55 has been able to consistently out-compete beet sugar and cane sugar on price (Korves, 2011). The price in cents per pound (dry weight) for HFCS-42 for 2013’s fiscal year was 38.64 while for refined sugar it was 66.02 cents/pound (USDA ERS, 2014). Note that the price for HFCS is comparable to the global price for refined sugar. This economic relationship is what has locked “Big Sugar” and the Corn Refiners Association together into an eternal struggle over the U.S. sweetener market. With the sugar policies in place, the domestic sugar industry is not put out of business by foreign markets whose climates are able to produce sugarcane more cheaply. Because of high domestic sugar prices, the CRA is given half of the sweetener market instead of a marginal percent of it. While there is no doubt that the sugar program has had a positive impact on the HFCS industry, this demand for HFCS may have naturally arisen anyways, simply due to its low, stable prices ensured by the subsidization of corn-a staple American crop.

**History of Corn Subsidies (LM)**
Around the 1920s, many improvements in agricultural techniques and technology resulted in record yields for corn and wheat. Unfortunately the Great Depression soon followed in the 1930s, creating a market that was flooded with corn and wheat that people were too poor to actually buy. Roosevelt dealt with this problem of overproduction by passing the first farm bill, which established a tradition of government relief for farmers. The government either paid farmers for their crops or paid farmers to keep their crops off the market, thereby keeping prices high (Yale Sustainable Food Project, 2008). The farm bill was intended to be temporary, until the market recovered (Woolf et al., 2008).

Then Earl Butz, head of the USDA during the Nixon administration, drastically reengineered the purpose of the farm bill in the 1970s (Woolf et al., 2008). In order to reduce the price of food—which was soaring at the time of his instatement in the USDA—he abolished production limits on farms and encouraged farmers to “get big or get out” and to grow from “fencerow to fencerow” (Pollan, 2006). He did this by guaranteeing a minimum price for their harvest, regardless of what the market was like, and similar price support programs for corn and other staple crops in the U.S. remains an integral part of the Farm Bill today (Yale Sustainable Food Project, 2008). Though Butz’s goal was admirable—to make it so that every American family could afford to eat—these support programs have long since bloated into a taxpayer’s nightmare. According to the Congressional Budget Office (CBO), the latest Farm Bill passed in 2014 is projected to cost $58.7 billion in commodity support programs and an additional $84.1 billion in crop insurance (Chite, 2014). At this point, with the overproduction encouraged by large subsidies and advancements in agricultural technology, American families can not only afford to eat, they can afford to eat too much.

Tracing the Money (LM)

What’s even more astounding than the enormous price tag for the Farm Bill is that the large majority of the subsidies provided by the bill goes to only a few types of crops. The top three recipients of subsidies were corn, wheat, and cotton; corn alone received $84.4 billion between 1995 and 2012 (EWG Farm Subsidies, 2012). On the other hand, apple subsidies, the first fruit to appear on the list, fall at a distant 19th place with $261 million received between 1995 and 2012 (EWG Farm Subsidies, 2012). Critics of the Farm Bill point to this commodity support disparity between the staple crops like corn, wheat, and rice, and specialty crops like fruits and vegetables as one reason for the high rates of obesity in the U.S (Fields, 2004).

Providing more money for a more commonly used staple like corn does make practical sense—especially since corn grows efficiently in the Midwest and Great Plains and can be manufactured into many different products. However, the market is already so flooded with corn that if farmers were acting under free market rules, they would lose more money growing corn than they would gain. Because of these subsidies, many farmers are protected from such supply and demand relationships; they are incentivized to plant the more easily profitable corn over the riskier specialty crops, even though the consumer demand for fruits and vegetables might be greater. It results in a vicious cycle: farmers motivated by subsidies plant more corn, which reduces the price of the already overproduced corn when it enters the market, which leads to
higher subsidy payouts, which keeps farmers growing more corn (Bakst & Katz, 2013). This is ultimately reflected in the grocery store with higher prices for the healthier vegetables and lower prices for processed, less nutritious foods that contain many of the staple grains or byproducts formed from corn.

Furthermore, the prospect of billion-bushel harvests that can net high profits with little personal risk encouraged a shift in farm structure from smaller, family-owned farms to larger, more industrialized farms. In 1935, there were around 6.8 million farms but this number fell to 2.2 million by 2010, even though the amount of land in farms only declined by 13% (Bakst & Katz, 2013). This indicates that though there are fewer farms in total, farms are increasing in size to make up for it. Though larger farms (farms that exceed $250,000 in annual sales) account for only 12% of all farms, they produce 84% of total agricultural output (Bakst & Katz, 2013). This is no surprise as industrialized farms tend to have better equipment and research to help improve their harvests. Correspondingly, 10% of (large) farms received 75% of all subsidies—an amount that adds up to $178.5 billion over the past 18 years—while 62% of (small) farms did not receive subsidies at all (EWG Farm Subsidies, 2012). Putting this all together, it’s no wonder small farms have been disappearing.

The Farm Bill was intended to provide a safety net for farmers, allowing them to grow crops and provide food for the nation without worrying about the vagrancies of the weather or harvest. In practice however, commodity payouts have become the real stock and trade of agribusinesses, and whether or not they need these subsidies is less of an issue than the question “how much?” In order not to lose these subsidies, agribusinesses and crop production interest groups lobby Congress whenever the Farm Bill comes up to vote, and many representatives involved in agricultural committees or from major agricultural states receive campaign donations from the same associations. The top five clients for such lobbying are the US Beet Sugar Association, Cargill Inc, Ohio Farm Bureau Federation, American Sugar Alliance, each spending well over $1 million on lobbyists (Open Secrets). With this in mind, it is no wonder that sugar reform has failed so far to pass, or that any attempts to reduce the deficit on the Farm Bill is marginal at best, and that taxes against sugar, soda, or HFCS are only good in theory.

**What’s the Link Between Subsidies and Obesity? (LM)**

Corn subsidies and large-scale farming harvests have resulted in huge annual surpluses of corn. So the question is where is all of that corn going? Roughly 40% of U.S. corn is used for ethanol biofuel and 36% goes towards animal feed (Foley, 2013). Much of the rest is exported: the U.S. is the world’s largest corn producer and accounts for 20% of global annual production (USDA ERS, 2013). Only a small proportion of the corn harvest is actually used in food products, but most of that goes towards the HFCS industry (Foley, 2013). Other byproducts include corn starch, corn meal, corn oil, and corn whiskey (USDA ERS, 2013). HFCS’s prevalence in processed foods can be explained by its dual role as a preservative and sweetener, and nearly all processed foods that uses caloric sweeteners contain HFCS—notably carbonated and fruit beverages (Bray et al. 2004).
Much of the argument behind the link between HFCS and obesity trends relies on their temporal relation with each other: from the 1970s to 2000s obesity rose to unprecedented heights just as the prevalence of HFCS in our food industry has increased and American consumption of HFCS increased. However, it should be noted that overall caloric intake (of fats and sweets) has also increased during that same period of time; obesity rates are more likely following that trend rather than HFCS. While HFCS consumption might not be the sole contributor to obesity, it is an important aspect of it considering its ubiquity as a sweetener. If we regard fructose overconsumption as the culprit behind obesity, then HFCS would be a major source of that.

Additionally, advances in food technology lead to the development of convenience food, otherwise known as processed food, which have now become a staple of our modern food industry. Processed food is essentially food prepared for ease of consumption—whether that be short preparation times, travel-ready packaging, or long shelf-life. Examples include TV dinners, cake mixes, cup ramen, fast food, and even bags of salad. And while pre-cut carrots and celery sticks are indeed convenient to eat and healthy to boot, the vast majority of processed foods are fairly lacking in nutrition. There’s no better example for processed food than fast food restaurants, which pride themselves on providing a lot of “bang for your buck.” Over the past few decades, portion sizes in fast food restaurants have dramatically increased, which likely contributed to the increased caloric intake of the average consumer in the past few decades. Why? A consumers’ judgement of food value is based on the balance between food portion and food price. Food portions currently being sold at restaurants are at sizes far larger than is necessary to achieve satiety.

People are pretty terrible at judging serving sizes, so in general they try to “clean their plate”, regardless of their hunger. Accordingly, when they purchase food, what factors in their decision most is not how much they need to eat for satiety, but on how great they think the value of the meal is. Max Cooper, who helped to create many of McDonald’s early campaigns, used this principle of “bang for your buck” to raise the profits of the franchise. He said that “by taking the high-profit drink and fry and then packaging it with the low-profit burger…you could get [customers] to buy three items for what they perceived as less” (Critser, 2004). The reason why the “drink and fry” are high profit is because of the low cost of HFCS used in fountain sodas and corn oil used for the fries.

Thus, a “supersized” portion of food at only slightly increased prices will actually sell better than a small portion of food at a regular price—even if you only need the small portion to achieve fullness. These “value meals” also brought in repeat customers and more walk-ins, until fast-food restaurants became increasingly relied upon to provide cheap and convenient food. Thus, people pay more in order to eat more than they actually should or need to eat, and in many cases, more than they can eat. (Critser, 2004) Energy intake has increased, food waste has increased, and obesity rates have increased.
However, analyses show that even if subsides on major crops like corn or soybeans were removed entirely, the price of food would go up by only 5-7% (Fields, 2004), leading to a very negligible effect on consumer choices. Farmers actually see very little of the consumer’s food dollar (Fields, 2004), so even if by some miracle these subsidies were reduced or removed, the top-bottom effect of this would only impact the farmers, not the consumers. The clear solution to this is to affect consumption at the level of consumers. For example, school administrators who only provide healthy snacks in their vending machines and ban sodas from their cafeterias. Or communities that create farmer’s markets and joint organic farms to provide an alternative market and increased availability to fruits and vegetables. This is the reason why we are not attempting to petition for any sort of tax on HFCS for our service project—we know that approach will likely fail (because of the lobbyists supporting agribusiness interests), and even if it were successful, it would actually have a very limited effect on consumption--limited enough not to impact obesity rates.

In summary, taxpayers are essentially footing the bill for the very subsidies that’s helping to make them fat. Right now, HFCS is so pervasively in so many of our food products--despite many health reasons for why it should not be--that it’s hard to avoid consuming it.

**The Manufacture and Supply of HFCS (EA & LM)**

Corn is the highest produced crop in the U.S. and HFCS the most common corn byproduct. To make high fructose corn syrup, corn is milled to produce cornstarch. Cornstarch consists of long chains of pure glucose. To make corn syrup, cornstarch is mixed with water and a bacterial enzyme. This enzyme breaks the long glucose chains in the starch to smaller chains of glucose. An additional enzyme (derived from a fungus) further breaks down the shortened chains into separate glucose molecules. At this step, corn syrup is produced. The glucose molecules are then turned to fructose molecules in order to increase the sweetness of the syrup since fructose is 72% sweeter than glucose. This is done by exposing the corn syrup to yet another bacterial enzyme, which transforms the glucose molecules into fructose so that the end mixture consists of free fructose (55%) and glucose (42%) molecules. This is why it is named “high-fructose” corn syrup, in order to differentiate it from the pure glucose corn syrup produced in an earlier step in the manufacturing process.

Common complaints about the manufacture of HFCS are often about the GMO corn and GMO bacterial enzymes frequently used in this process. Even worse, however, is the likely mercury contamination of HFCS. The nonprofit Institute for Agriculture and Trade Policy tested 55 food products that contained high levels of HFCS and found detectable levels of mercury in 17 of them. Considering how toxic mercury is in even small doses, especially for small children, this is an extremely worrisome finding. The CRA asserts that the mercury did not come from HFCS and that there is no direct proof in the study linking the mercury to HFCS. These contaminated food products all had HFCS in common, however, and there are no other likely culprits for this contamination.
Despite all of these criticisms, HFCS remains a popular sweetener amongst food producers for a multitude of reasons. Its low and stable price due to subsidies has already been explained, but it also has many other attractive qualities in addition to that. The added fructose makes the syrup more able to retain moisture, which delays molding and staling in cereals and breads and leads to a longer shelf life. The fructose also ensures brown glazing, softer baked goods, enhanced spice and fruit flavors, improved effectiveness of yeast, and more controllable freezing points in products. It’s also cheaper to store and transport since it can be shipped in liquid form in tankers and pumped to storage units more easily than refined sugar. All of these benefits together allow food producers that use it to maximize productivity, product quality, and profit margins. (White, 2011)

Consumption of High Fructose Corn Syrup (EA)

If you’re like most Americans, you probably grew up drinking soda. Coca-Cola is practically an iconic symbol for American prosperity. But it must be kept in mind that soda is incredibly detrimental to health with respect to obesity and diabetes, simply because it is packed with sweeteners. A cola beverage in 1963 was 39-kcal/100 g, whereas a cola beverage in 2003 was 41-kcal/100g (Watt & Merrill, 1964). The average American, greater than the age of two, consumes about 132 kcal of high fructose corn syrup per day, and in the United States, most of the HFCS that people consume stems from soda. Most people are aware that soda is unhealthy. In fact, a Yale University Rudd Center for Food Policy and Obesity study found that a majority of Americans understand that soda is bad for them. However, despite this acknowledgement, a survey of Americans revealed that nearly half of the population (about 48 percent) still drinks soda on a daily basis. The average person consumes about 2.6 glasses per day.

We advise you to avoid HFCS, as that will cut down on the amount of non-nutritious, processed foods that you eat. This also means cutting back on soda. However, it seems that people still want to drink it despite knowing that it’s unhealthy for them, and so that is why we tried to provide a better alternative to regular Pepsi to the Rutgers students for our service project. We also educated them of the difference between HFCS and sugar at the same time.

Community Action: Getting Pepsi Throwback into Rutgers Vending Machines (LM & EA)

In 2009, Pepsi-Co released a limited edition, 1970s retro-themed Pepsi and Mountain Dew that used 100% pure cane sugar instead of HFCS. These products were called Pepsi Throwback and Mountain Dew Throwback. By popular demand Pepsi-Co brought back these two products after their release was done, and by 2011, they were permanently added to the Pepsi-Co product line. Consumers participating in a taste test between regular Pepsi and Pepsi Throwback preferred the Throwback version, with the opinion that it had a cleaner and less chemical taste. And as the recent dip in HFCS consumption indicates, Americans are also more wary of the health effects of HFCS, making it out to be the new “trans-fat.” Altogether, it seems that consumer demand would vastly prefer to have Pepsi-Co use sugar cane in their products
instead of HFCS. That’s why we decided to tackle this from a bottoms-up perspective, focusing on the consumers instead of attempting to petition for a tax on sugar or HFCS.

Though we do not have any guarantees if this plan will work, we have acknowledged that this has worked in the past. In the past few years, Yoplait Yogurt had been subjected to criticism as people pointed out that they used high fructose corn syrup in their products. It created a bad reputation for Yoplait, and the consumer demand for the yogurt decreased dramatically. Just tweeting about it did this. Yoplait acknowledged the problem and realized they needed to eliminate high fructose corn syrup so the consumer demand would increase. They did just that, advertised that they no longer used high fructose corn syrup, and their consumer demand did increase. Now, Yoplait Yogurt advertises the fact they do not use high fructose corn syrup:

“We heard you love Yoplait, but don’t love High Fructose Corn Syrup–so we’ve taken it out of all our Yoplait Original and Yoplait Light flavors!”

Thus, we originally proposed using social media to change consumer demand, as it seemed to work well with Yoplait. We were going to try to popularize the Pepsi Throwback as it seems to have only a cult following. However, this failed because we lacked the necessary contacts to make it a trending topic and the time needed to generate enough social buzz.

Instead, we decided to educate the Rutgers students in a fun and accessible way, by offering a blind taste test comparison between regular Pepsi and Pepsi Throwback. We conducted the taste test in the LSC around lunchtime. The Throwback was in the cups to the right of the table and the regular Pepsi in the cups to the left, but the students were unaware of this fact. We asked them which they preferred: the Pepsi to the left or right? We found a rough 60-40 preference in favor of regular Pepsi, but we think that a preference towards the more familiar flavor of regular Pepsi might have biased these results. In any case, the taste of the two was pretty much comparable to each other.

At the same time, we conducted short poll that asked them: 1) Do you know the difference between high fructose corn syrup and table sugar? 2) Where have you heard about HFCS? 3) What have you heard about HFCS? Many of the students did not know the difference between HFCS and sugar, but only knew through various media that HFCS was “bad for them.” So at the same time that we conducted the taste test, we also informed the students of this difference between HFCS and sugar (and also cautioned them of the dangers of fructose and soda in general). Those who preferred the taste of Pepsi Throwback signed a petition to get it made more available in the vending machines or dining halls.

During the Vice Chancellor of Student Affairs, Felicia McGinty’s office hours, we described our service project to her and asked if it would be possible to replace regular Pepsi in our dining halls with Pepsi Throwback. Unfortunately, she said that whatever was stocked in the soda fountains was actually determined through contract, and that the earliest beverage
contractual meeting wouldn’t happen until 2016. However, she did seem amenable to providing Pepsi Throwback in our vending machines. We reason that if people are going to drink soda anyways, despite knowing that it’s unhealthy for them, we might as well give them a better alternative to HFCS-containing soda. Of course, it’s not like an all-sugar soda is going to be all that much healthier, even with the lower fructose content. But this is really just the first, easiest step on the long road to a HFCS-free world. We hope that through more extensive education programs on these sweeteners that people will begin to avoid HFCS in not just soda, but in all of their food products. And that will definitely lead to a healthier lifestyle.
References


To the Editor of the Greenprint,

I write this letter to you in order to explain the political and economic forces behind the recent popularity of high fructose corn syrup (HFCS) in the media. Right now, it’s the new “trans-fat,” and consumption of HFCS has dipped for the first time in 40 years since its widespread integration into the food industry. There are many people that lay the rise in obesity rates in the U.S. at the feet of HFCS. Is this true? The trends are certainly compelling: in the late 1970s, domestic sugar prices were highly inflated, causing food producers to look for alternative sweeteners. As a corn byproduct, HFCS was especially low-priced and convenient to manufacture, and it quickly replaced cane sugar in soda, cereal, salad dressing, and many other processed foods. The rise in obesity levels also began to rise in the 1970s, making it appear to be correlated to this shift in the food industry.

At the same time, saying that HFCS is the sole cause for this trend is misleading. Since obesity levels are on the rise in other countries where HFCS is not as ubiquitous, it is likely that are many other factors that could have contributed. We lead more sedentary lifestyles, we consume more fats and sugars than we did before, and we eat out more. The advent of canned soda, more food available to us that’s more convenient to prepare, chain restaurants with oversized portions (i.e. McDonald’s Supersize Me!), and basic genetics are likely other important influences on our diet and health. Though at the level of policy there have been many attempts in the past to pass a soda tax, a sugar tax, a HFCS tax…none of them have ever gotten off the ground. Most recently, the Sugar Reform Act failed to pass in the House (206 to 221 against), and the amount of sugar subsidies remained largely unchanged in the latest renewal of the Farm Bill in 2014. Clearly, the causes of obesity are complex and an effective health policy to deal with this issue would have to be multileveled and start, not with taxes, but with consumers, school administrators, food producers, and growers.

Many schools have banned soda from their vending machines and made their cafeteria lunches healthier. Farmer’s markets and joint community farms have been making vegetables and fruits even more accessible. With the latest health fad against HFCS, it seems that consumer demand alone will accomplish what the anti-HFCS taxes attempted to do. For example, Yoplait recently switched from using HFCS to refined sugar because of the tweets and Facebook messages that they’ve been getting from their customers. It’s uncertain how effective all of these measures are, but recently, the CDC have reported that obesity rates in children between 2-5 years of age have been declining. Only time will tell if this trend will continue, but it’s a hopeful sign that decades of health education and nutrition programs might finally be working.

This is also the first time in years that soda consumption has fallen, and beverage companies that have saturated the market are releasing “natural” and “retro” themed products in response. Pepsi Throwback and Mountain Dew Throwback (which attempt to tap into the nostalgia for the 70s) boast that they contain “real sugar,” not HFCS. It’s gotten a positive
response from those who’ve tried it, claiming that it has a “less chemical” taste. However, a can of regular Pepsi and a can of Pepsi Throwback both contain around 40 grams of sugar (12 fl oz), which already exceeds the American Medical Association’s recommendation of only 32 grams of sugar a day. Though many customers seem to prefer the Throwback because it contains the more “natural” sweetener, it should be kept in mind that sugar is still sugar, and should be consumed in moderation.

So both sugar-sweetened and HFCS-sweetened soda is bad for you. But is one worse than the other? That is still under debate. A controversial study from Princeton showed that rats with access to HFCS ended up with higher levels of fat accrue (a marker for obesity) and blood triglycerides (which can lead to heart problems) than rats with access to table sugar, even if their overall caloric intake was the same. It might indeed be the case that refined sugar is the lesser of two evils as far as health is concerned. However, I think the real impact of the Throwback is that it alters the current relationship between the sugar industry, HFCS manufacturers, and corporations like the Pepsi Bottling Company (PBG). High domestic prices of sugar are a large burden on soda and candy manufacturers, but because of HFCS, PBG was able to substitute for it in their sodas and maintain profits. Now that public opinion and consumer demand has turned away from HFCS, this may not be an option for much longer.

Right now, the Throwback is a niche product and seems to be going steadily out of stock in stores, despite immense popularity amongst those who’ve tried it. However Bevnet.com reports that in the summer the PBG will launch a new line of “real sugar” sodas to replace it, and soon after that, a low-calorie soda containing a novel sweetener. Two things might result from this. Domestic sugar will get the soda industry returned to them, and they’ll have even more funds for lobbying in later years to maintain their subsidies. Or the real sugar sodas will be so popular (and the low calorie soda not) that Pepsi-Co is galvanized to even more action for sugar reform. Recall that the Bipartisan Sugar Reform Act failed by only a narrow margin, as many critics of our sugar policies claim that it’s an antiquated program has been negatively affecting the environment, food producers, and taxpayers for decades. We might soon reach a tipping point that could finally end those billion dollar subsidies. In any case, give the Throwback sodas a try, as that might be the flavor of the next decade. Refined sugar is certainly less questionable than HFCS is. But, even better for your health would be to avoid soda altogether.

From,

Lynn Ma
Dear Ms. Meier,

My name is Eliza Ahmed and I am writing to you regarding a crucial topic that affects our University, as well as most of the nation. Enclosed is my article, based on extensive research that targets the existence of high fructose corn syrup and corn subsidies in general. The purpose of the article, with the intention of publishing it to The Daily Targum, is to inform students on how high fructose corn syrup affects them. In the article, we attack Pepsi Co. because it is prevalent in the University and harmful to our health because of the large amounts of high fructose corn syrup present. Our resolution is to bring back Pepsi Throwback, which uses real cane sugar. There is a resolution and I believe, that as a united force, we can do something about this.

I hope it is an interesting read and something that will be able to be published. If you have any questions, I would be more than delighted to answer them. You can choose to either email or call me. Thank you for your time and consideration.

Sincerely,

Eliza Ahmed

Throwback!

The refreshing, bubbly taste of pop soda is satisfying and perfect to go with a great lunch or dinner. But before you fill that glass up with that carbonated drink at the dining hall or in the comforts of your home, stop and imagine the taste. Sweet, right? You have probably heard that the contents of soda are extremely unhealthy to your health. Of course we know the gist of it—carbonated water, high fructose corn syrup, citric acid, sugar, artificial flavors, etc. But take a close look at that label. Soda is filled with massive amounts of high fructose corn syrup—the reason for that extra sweet taste.
Fructose goes through a process called de novo lipogenesis, which converts carbs that were digested into fat. De novo lipogenesis causes increases fat stores in your body, raises your triglyceride levels and causes obesity. It also inhibits insulin secretion, an important hormone that detects when you have enough glucose and stops the storage of glucose in the body. That is a double negative, causing long-term effects. This happens, even if you consume one glass of soda. It is extremely unhealthy and leads to heart problems, high cholesterol, and obesity.

As college students, many students do not think twice about consuming a glass of soda with a burger and fries. That “meal” is infected with high fructose corn syrup and the best way to a healthier lifestyle is to avoid it. However, we do know that it can be a little hard seeing that soda is so prevalent. Pepsi is a popular drink, presented all over our campus at Rutgers University. The supply comes as the demand for it increases. As a united force, if the students of Rutgers University petition to eliminate the use of Pepsi and bring back Pepsi Throwback, the 1970s original recipe of Pepsi, which uses real cane sugar, it will be a tremendous step towards making a change!

Recently, we performed a blind taste test between Pepsi Throwback and the regular Pepsi used today, at Rutgers University Livingston Student Center. Results showed that 18 out of 31 students could not tell the difference between the two versions. Moreover, Pepsi Throwback does not leave an aftertaste, providing a more refreshing taste. There is nothing wrong in bringing back Pepsi Throwback to our dining halls and all Rutgers-affiliated facilities. Many students have already signed the petition to bring back Pepsi Throwback, and you should too. Please contact elizanj92@yahoo.com to be part of this change. If enough students sign the petition towards making a better alternative to the highly high fructose corn syrup infected soda product, we will start to see a change. We cannot stop people from drinking soda, but we can affect what we use in that soda. Be part of this effort to a better alternative for college students like you!