University Of North Carolina Asheville
Journal of Undergraduate Research
Asheville, North Carolina
December 2014

What Companies Market to Children in the Grocery Store: From Food Dyes to Sugars

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Abstract

Companies have long-used artificial food dyes in their products. Food dyes, which include yellow #5, yellow #6, red #40, blue #1, and blue #2, along with others, are derived from petroleum and can have very harmful effects. The harmful effects from artificial food dyes include hyperactivity, cancer, and allergic reactions. In 2008, the Center for Science in the Public Interest petitioned the Food and Drug Administration to ban the use of these dyes. Other countries have taken action to ban the use of artificial food dyes. Scientists also associate sugar overconsumption with numerous health conditions, such as diabetes, cardiovascular disease, and hypertension. America's culture has changed rapidly over the past 30 years, and the food industry plays an important role in American's diets. Many health organizations recommend that a person's daily diet of added sugars should comprise no more than 25% of total calories consumed. The current content analysis research study examines the extent and nature of artificial food dyes and sugar levels in products marketed to children in a grocery store in Asheville, NC. Data were collected over a seven month period during 2014. This paper presents the percentage of food products with artificial food dye among the top five food companies for which data were collected (n=451). The paper also explores the percent of products among the top five food companies that exceeds the recommendation 25% calories from added sugars (n=451). All the food companies contain some products with artificial food dyes, with three of the five companies exceeding more than 25% of their products amongst all artificial food dye groups. All the food companies also had products that exceeded the sugar recommendation. This research supports policy changes and increases in public awareness of these harmful artificial food dyes and the high levels of total sugar in children's products.

1. Introduction

Companies have long been adding dyes to a myriad of products including foods, candies, drinks, toothpastes, and shampoos. Companies use artificial food dyes for the reason that synthetic food dyes are cheaper, more stable, and brighten foods more than most natural food colorings. There is a growing concern, and large debate, over how safe these chemicals are. Only recently have researchers discovered that some of these dyes may be harmful to consumers, especially children.[1] Although these food dyes are regulated by the Food and Drug Administration (FDA), research indicates that artificial food dyes pose a concern for children's behavioral developments and health risks.[1] In 2013, the Center for Science in the Public Interest (CSPI) called for a ban on the continuation of eight artificial food dyes in food products within America.[1] CSPI mainly targeted the U.S. Food and Drug Administration, for the reason that artificial food dyes may be linked to serious health risks.[1] Many artificial food dyes are allowed to contain harmful contaminants such as lead, mercury, and arsenic.[1] These harmful toxins can lead children, as well as adults, to suffer from many illnesses which range from hyperactivity, behavioral problems, cancer, tumors, or nerve-cell development.[1]

Another concern in America is nutrition related obesity. Obesity is an extremely important public health concern within America. According to the National Center for Health Statistics and the Centers for Disease Control and Prevention, nearly 32% of children are considered to be overweight or obese.[2] Obesity is correlated with several medical conditions, which include, but are not limited to; type 2 diabetes, heart disease, high blood pressure, stroke, and certain types of cancer.[3] Obesity is a multidimensional health issue that involves behavioral, biological, and environmental sources. In America, the environment is rapidly changing. This has led the population to shift their eating habits, increasing sugary food choices. Along with this, many Americans are leading more sedentary lifestyles, leading them to eat more calories than expended.

One particular component of food that has been heavily implicated with regard to the increasing rates of obesity is sugar. A growing body of scientific evidence suggests that Americans are consuming too much sugar. The Institute of Medicine, along with other organizations such as the World Health Organization, the American Heart Association, and U.S. Department of Health and Human Services, all recommend that added sugars should comprise no more than 25% of total calories consumed.[3] These recommendations are well below the typical American consumption levels. Since America's environment and culture have drastically changed, both consumers and the food industries play important roles in reducing the rising obesity epidemic. Consumers make individualized decisions about their nutrition. They make specific choices about which foods they eat and how to develop their lifestyles. Consumers are persuaded by nutrition information and the available healthy food choices. Food companies should help consumers make healthy food choices. "Food industries should be committed to giving clear consistent, and honest product claims, as well as, working with retailers and restaurants to offer consumers relevant information about the products they purchase.[4]"

When food industries market their products to consumer they should be helping them make the healthiest choices possible. With America's rapidly changing culture young children are being exposed to multiple types of media, ranging from television to computer screens, or even cellphones every day. "Most children under the age of six cannot distinguish between programming and advertising and children under eight do not understand the persuasiveness of advertising.[5]" Children are able to recall content from advertisements they may be exposed to over time.[5] Some advertisement strategies may include bright colors, bubbly lettering, cartoon characters, or even songs. This kind of advertisement can cause a product preference within children and create a mindset for children to be persuaded to consume a certain company's food product. Since young children are attracted to company's products, companies should be distributing their products with an abundance of healthy ingredients.

The purpose of this content analysis research study was to investigate and compare the proportions of food products marketed to children that contain 1) artificial food dyes levels and 2) of sugars that exceed the recommendation levels, across food companies that market the most grocery store products to children.

2. Methods

This content analysis research study is part of a larger project which investigates artificial food dyes in grocery-store products marketed to children, over a seven month period, concluding in late August 2014. The research group collected, and entered data on products marketed to children in one grocery store in Asheville, North Carolina.

The information collected about each product included: food category, food product name, flavor or variety of products, product type, size of package, shelf number from the floor up, brand, and food company. First the children's food product criteria was determined. For the criteria, each had to meet one of the following requirements to be included in the study: had a cartoon character appear on the packaging, had or contained a prize or incentive with purchase, had a company licensing for the product, had a 'kid' size label or some type indication, had bubbly lettering or bright colors, or had a concept that the products was traditionally known to be a children's product. Data was collected on ingredients within each product; including food dyes, serving size, calories, saturated fat, sodium, and sugar.

The purpose of this part of the study was to look specifically at the information according to a certain food company. This content analysis looked specifically at the top five food companies, which for the purpose of this analysis were the companies that marketed to children the most products, by number, in the grocery store. From there the research team calculated the percentage of products containing artificial food dyes for each company. The research team calculated this percentage for each of the food dyes coded, including, but not limited to, yellow dye, yellow #5, yellow #6, red dye, red dye #40, blue dye, blue dye #1, and blue #2, along with other artificial food dyes. After the calculations for the artificial food dyes were completed, percent of products that exceed 25% of calories from total sugars was calculated. The nutrition facts label only discloses total sugars, instead of both added sugars

and natural sugars. Thus, the percent of products found to exceed the sugar limit in this study is likely higher than the resulting percentage if added sugars information were available.

3. Results

3.1 Number Of Products Across Food Companies

In total, the sample includes 972 products across all categories and companies. The number of products belonging to the top five food companies, Kraft Foods Inc., Kellogg's Co., General Mills Inc., ConAgra Foods Inc., and McKee Foods Corp. is 451 (46.4%). The analysis that follows includes that total of 451 products.

This distribution of products by company is depicted in Figure 1, As shown, Kraft Foods Inc., Kellogg's Co., and General Mills Inc. each represent about one fourth of the sample, while ConAgra Foods Inc. and McKee Foods Corp. represent one eight each. The distribution of products within each food company can be found in Table 1. All five companies held snack foods, which include fruit snacks, Jell-O/pudding, and Little Debbie cakes. Four out of the five companies held packaged products. Three out of the five companies held frozen foods. Kellogg's Co. and General Mills Inc. held cereal products. Kraft Foods Inc. was the only company to contain drink mixes and juices. General Mills Inc. was the only company to contain yogurts. ConAgra Foods Inc. was to only company to contain canned products.

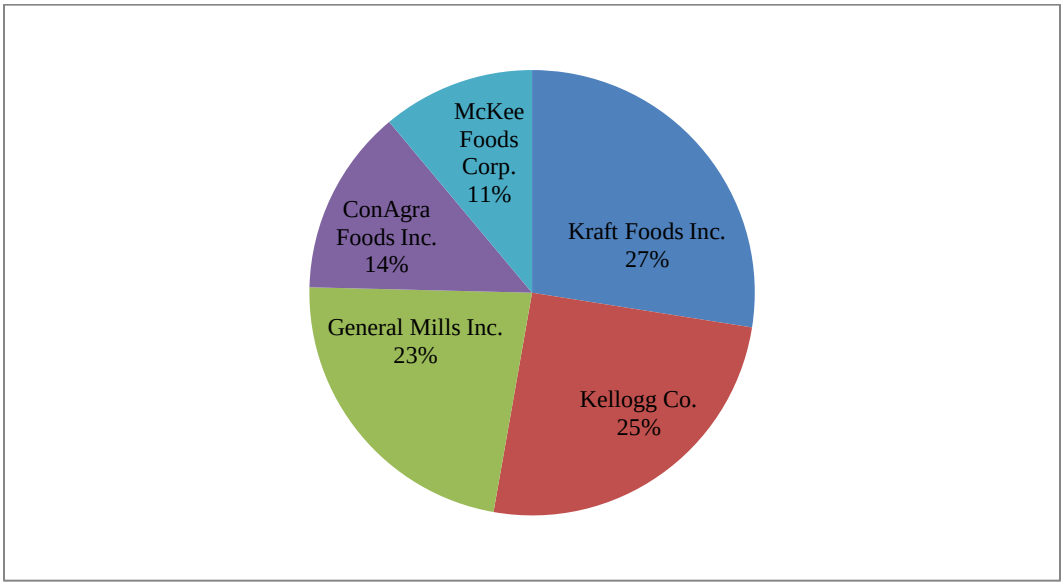

Figure 1 distribution of products by food company (n=451)

Table 1 Types of products by food company (n=451).

	Drink Mixes (n=33)	Packaged Foods (n=121)	Frozen Foods (n=24)	Juice (n=32)	Cereal (n=79)	Yogurt (n=8)	Canned Foods (n=43)	Snack Foods (n=108)	Total (n=451)
Kraft Foods Inc.	26.6%	33.9%	0	25.8%	0	0	0	13.7%	100%
Kellogg's Co.	0	43.9%	7.1%	0	38.6%	0	0	10.5%	100%
General Mills Inc.	0	24.5%	6.9%	0	34.3%	7.8%	0	26.5%	100%
ConAgra Foods Inc.	0	6.5%	14.8%	0	0	0	70.5%	8.2%	100%
McKee Foods Corp.	0	0	0	0	0	0	0	100%	100%

3.2 Proportion Of Products With Any Artificial Food Dye, By Company

In total, Kraft Foods Inc., Kellogg's Co., and General Mills Inc. account for the highest percentages of total food dyes. Over two-thirds of Kraft Foods Inc. (89%) products contain any artificial food dye, while over one-half of Kellogg's Co. (54%) and General Mills Inc. (58%) products contain any artificial food dye. McKee Foods Corp. and ConAgra Foods Inc. account for the lowest percentages of total food dye. One-fifth of McKee Foods Corp. (20%) products contain any artificial food dye, which one-tenth of ConAgra Foods Inc. (10%) products contain any artificial food dye. Kraft Foods Inc. has both the largest percent of food products (27%) and the largest percent of any artificial food dye (89%) among the five companies. ConAgra Foods Inc. also has the smallest percent of products (14%) and the smallest share of any artificial food dyes (10%).

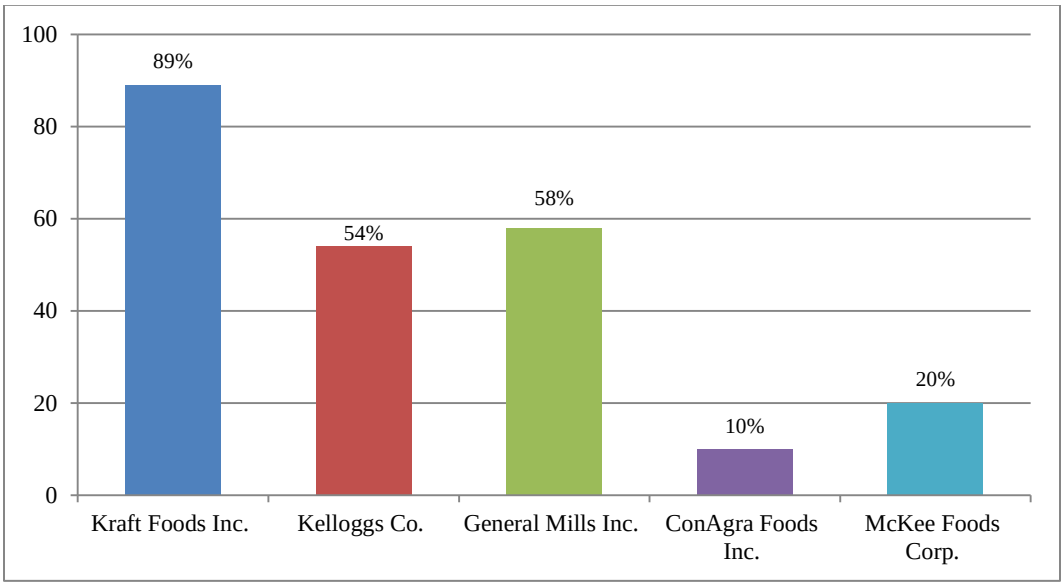

Figure 2 percentage products with artificial food dye by food company

3.3 Distribution Of Specific Artificial Food Dye Groups, By Food Company

As shown in figure 3, none of the food companies exceed more than 50% of artificial food dye within any of the yellow, red, or blue dyes. Kraft Foods Inc., Kellogg's Co., and General Mills Inc. contain a significant amount of artificial food dyes compared to ConAgra Foods Inc. and McKee Foods. Over one-third of the products manufactured by Kraft Foods Inc. contain yellow, red or blue dyes. Kellogg's Co. food dyes groups are all within the same range of numbers. Kellogg's Co. distributes around the same amount of artificial food dyes, regardless of the color. General Mills Inc. holds the most artificial food dyes in both yellow (45.1%) and red (41.2%) dye groups, meaning they distribute the most food dyes for yellow and red dye groups. ConAgra Foods Inc. holds the least amount of food dye across all artificial food dye groups; yellow (13.1%), red (9.8%) and blue (4.9%). McKee Foods Corp. holds a significant amount of red artificial food dye, while the yellow and blue dye groups are less than 15%, red food dye is seen near 40%.

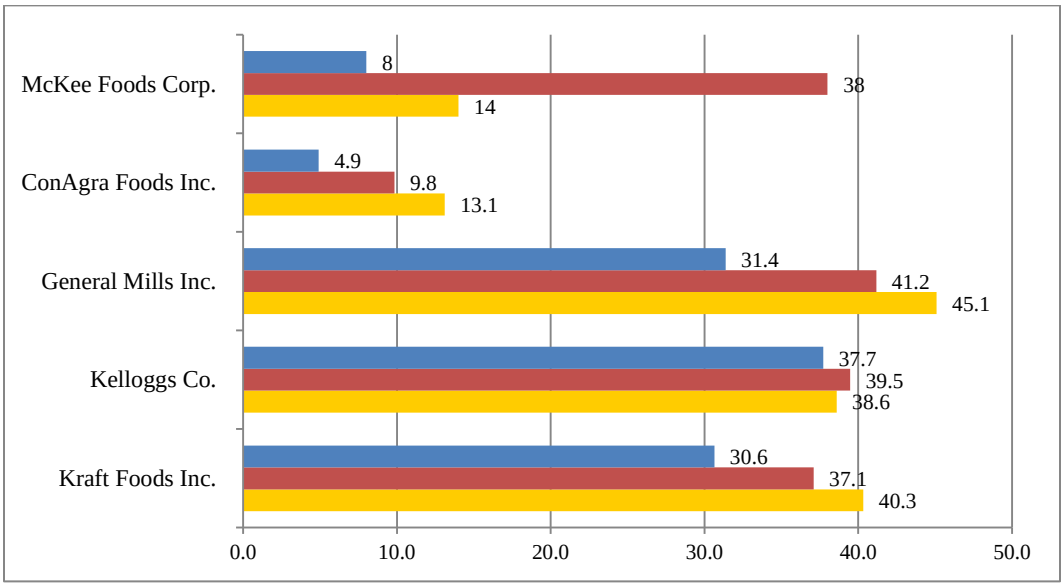

Figure 3 specific food dye groups, by company

3.4 Distribution Of Types Of Artificial Food Dyes

For the content analysis study, our research team looked at five distinct food dye types. These included yellow #5, yellow #6, red #40, red #3, blue #1, and blue #2. Although red #3 dye was coded for, none of the companies held the artificial food dye, therefore red #3 was excluded from figure 4b. Each of these dyes is made up of different material and is included in processed foods for a variety of different reasons.

Within Kraft Foods Inc., Kellogg's Co., and General Mills Inc., the comparison of the two yellow food dyes is only a few percentages away from one another. General Mills Inc. has the highest distribution of both yellow dyes; yellow #5 (41.2%), and yellow #6 (33.3%). ConAgra Foods Inc. has the lowest distribution of yellow dyes; yellow #5 (8.6%), and yellow #6 (8.6%).

Kraft Foods Inc., Kellogg's Co., General Mills Inc., and McKee Foods Corp. has a large distribution of red #40 dye. General Mills Inc. has the largest percent of red #40 dye (40.2%), while Kraft Foods Inc. Kellogg's Co., and McKee Foods Corp. are seen within close percentages to General Mills Inc. ConAgra Foods Inc. contains the lowest percent of red #40 dye (9.8%).

Within Kraft Foods Inc., Kellogg's Co., and General Mills Inc., the comparison of the two blue dyes are extremely different from one another. Blue #1 dye is more prevalent within all five food companies. Kraft Foods Inc., Kellogg's Co. and General Mills Inc. contain large percentages of blue #1 dye, with Kellogg's Co. containing the highest percent. Kellogg's Co. has the highest distribution of both blue dyes; blue #1 (33.3%) and blue #2 (17.5%). ConAgra Foods Inc. has the lowest distribution of both blue dyes; blue #1 (4.9%) and blue #2 (0%).

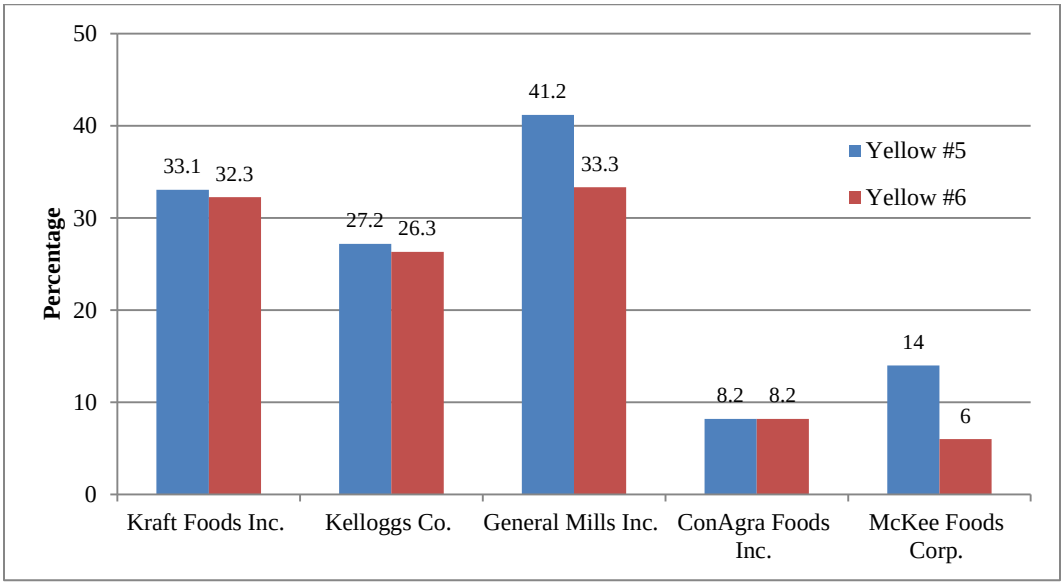

Figure 4a percentage of products with yellow#5 and yellow #6, by company

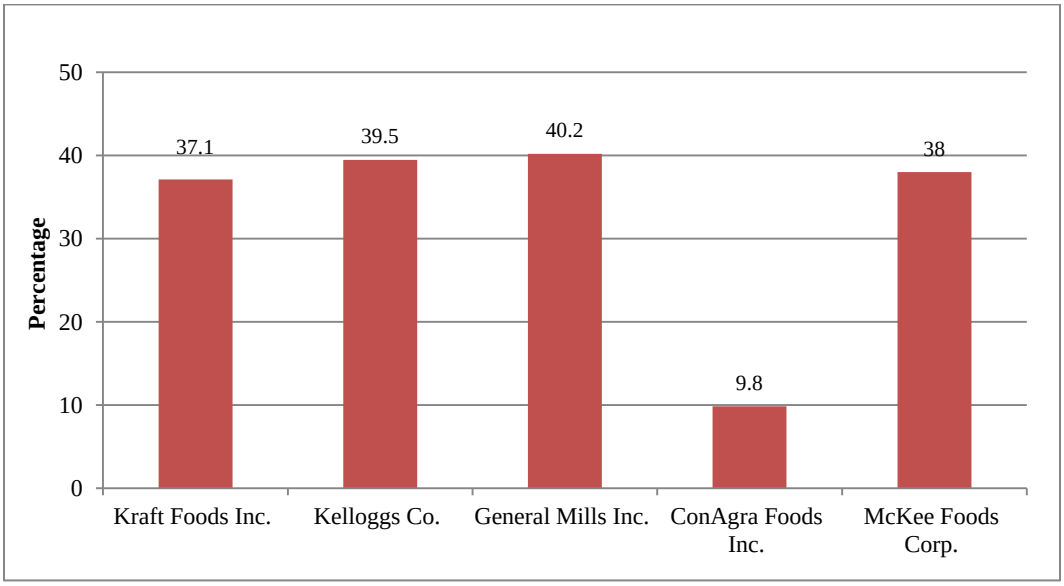

Figure 4b percentage of products with red #40, by company

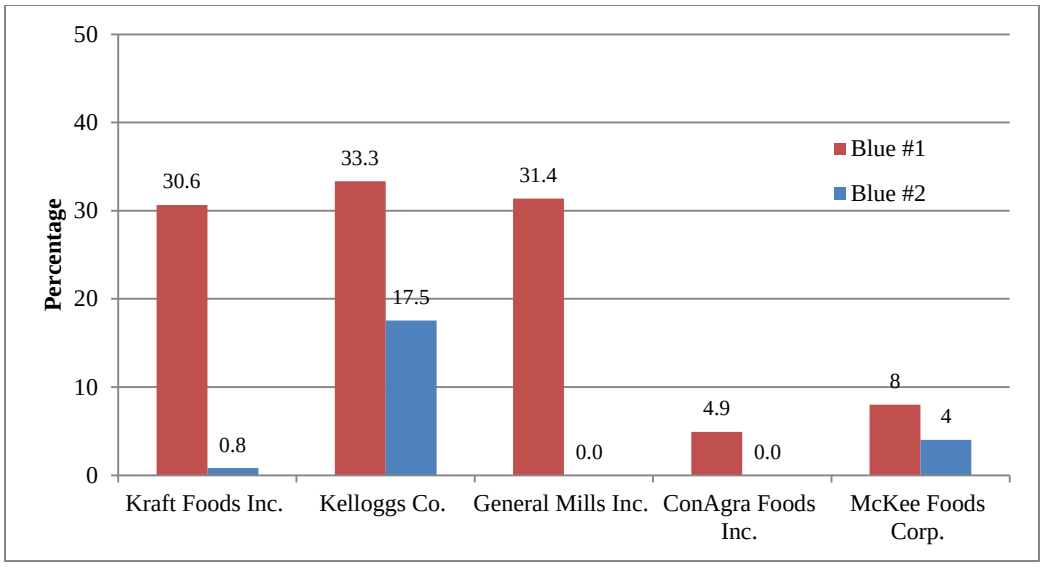

Figure 4c percentage of products with blue #1 and blue #2, by company

3.5 Percent Of Products Exceeding Recommended Sugars, By Food Company

In total, all five food companies manufactured products exceed the Institute of Medicine added sugar recommendation. Ninety-six percent of McKee Foods Corp. products have sugar levels which exceed the recommendation of 25% of calories from added sugars, though total sugars was used in this analysis due to lack of information about added sugars. Compared to all the food companies, McKee Food Corp. has the largest percent of products which exceed the total sugars recommendations, making nearly all of their products have a high amount of sugar in them. ConAgra Foods Inc. has the lowest percent of products which exceed the total sugars recommendations. ConAgra Foods Inc. has 11.5% of their 61 products that surpass 25% of calories from added sugar. Out of the total 61 products, ConAgra Foods Inc. has minimal products that exceed the total sugars recommendation making most of their products have a healthier sugar level.

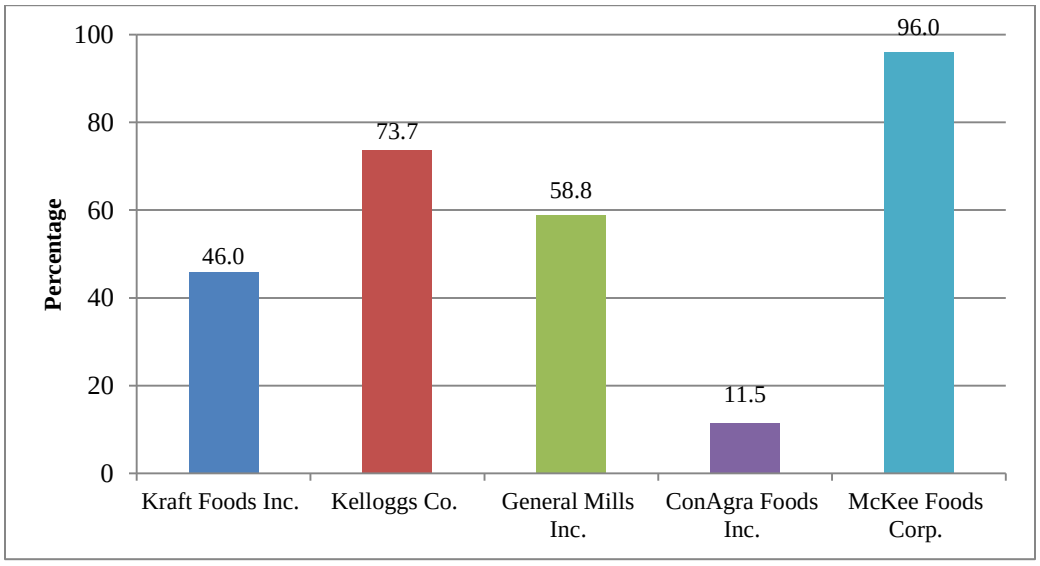

Figure 5 food companies' products that exceeds 25% calories from sugars

4. Discussion

4.1 Artificial Food Dyes In Products Marketed To Children

Results from this study demonstrate that artificial food dyes were prevalent across all five of the food companies that marketed the most products to children in the grocery store. For Kraft Foods Inc., Kellogg's Co., and General Mills Inc., 20% or more of their products contain artificial food dyes. Artificial food dyes are significantly prevalent in Kraft Foods Inc. (39%), in Kellogg's Co. (23%), and 25% in General Mills Inc. (25%). Companies use artificial food dyes for the reason that these dye are cheaper, more stable, and brighten food more than natural food dyes. According to the International Association of Color Manufacturers, artificial food dyes enhance and correct natural food colors and provide a colorful identity to foods that would otherwise be virtually colorless, as well as compensate for natural color loss during storage.[6] In 2013, the Center for Science in the Public Interest (CSPI) in Washington, DC, petitioned the Food and Drug Administration (FDA) to ban artificial food dyes for the reason that the dyes have a strong connection to behavioral problems in children.[7] Roughly two years later a new CSPI report, *Food Dyes: A Rainbow of Risks*, further concluded that the nine artificial dyes approved in the United States likely are carcinogenic, causing hypersensitivity reactions and behavioral problems.[1] Their report also discusses the risks of cancer, genetic damage, and allergic reactions due to artificial food dyes.

Food dye consumption per person has increased nearly fivefold in the United States since 1955, with red #40, yellow #5 and yellow #6 accounting for nearly 90% of the dyes used within food products.[1] Seen within our content analysis research study, Kraft Foods Inc., Kellogg's Co., and General Mills Inc. contain high percentages in all three of these widely used artificial food dyes. General Mills Inc. contain the highest percentages for yellow #5, yellow #6 and red #40 artificial food dyes – with yellow #5 dye (41.2%), yellow #6 dye (33.3%), and red #40 dye (40.2%).

With the rising reports on health risks and behavioral problems, it would be beneficial for the food industries to eliminate their use of artificial food dyes within their products – and this is not an impossible task. The food industries can eliminate food dyes within their products they produce. Some multi-national companies, such as Kraft Foods Inc., Kellogg's Co., and General Mills Inc., sell their products without artificial food dyes within the United Kingdom.[7] Despite this, the food industries still distribute artificial food dyes within their products in the United States. For instance, Kraft has eliminated artificial food dyes and flavors within their Lunchables products in Britain, but has yet to eliminate them in the United States.[7] Kellogg's Co. has also eliminated food dyes within cereals, Pop-Tarts, and fruit snacks in the United Kingdom but not in the United States.[7]

Based on numerous reports which state that artificial food dyes are harmful in the human body, causing hypersensitivity reactions, along with behavioral problems and serious health risks, many researchers, scientists, doctors, and health organizations strongly urge food industries to eliminate the use of artificial food dyes in products. If not to eliminate artificial food dyes, health organizations urge the FDA to have artificial food dyes regularly tested and consider banning the use of artificial food dyes in food products that are widely consumed by children.[7] Investigating the amount of food dyes by company can open the eyes of customers to see exactly how many dyes a food company may include within their products.

4.2 Sugars In Products Marketed To Children

Results from this study revealed that all of the food companies in the analysis have products that exceed recommendations for total sugars. Ninety-six percent of McKee Foods Corp. products, 73.3% of Kellogg's Co. products, 58.8% of General Mills Inc. products, and 46% of Kraft Foods Inc. products have sugar levels exceed the recommendation. Nearly all these percentages are above 50%, meaning that nearly half of the foods distributed by these four companies are exceeding the recommendation that added sugars should not exceed 25% of total calories consumed. The Center for Disease Control and Prevention reports that 16.9% of United States children and adolescents, ages 2 – 19, were considered to be obese in 2009-2010.[3] Nutrition related obesity is associated with several chronic conditions, which include, but is not limited to; type 2 diabetes, heart disease, high blood pressure, stroke, and certain types of cancer. Many Americans have changed their eating habits over the years. They are eating more sugary foods and leading a sedentary lifestyle, where they are becoming less active resulting them to consume more calories than they may expend. The Institute of Medicine, along with other organizations, has recommended that added sugars should comprise no more than 25% of total calories consumed.[3] Many reports show a high percentage of total sugar within certain food company's products.

One cause of concern with sugar is the distribution of added sugars and natural sugars. Naturally occurring sugars are not considered to be added sugars.[8] Naturally occurring sugars are measured as glucose, fructose, and sucrose, while added sugars are measured as corn syrup or high fructose corn syrup. The nutrition label, introduced 20 years ago, helps consumers make informed food choices and maintain healthy dietary practices.[8] On the current nutrition label, usually found on the back of a food product, both added and naturally occurring sugar are listed together and listed in both grams and as a percentage – this is considered total sugar. With the current nutrition label, consumers do not know how to tell if the sugar is natural or added sugars. On the fortunate side, the Food and Drug Administration is investigating a new nutrition label to be packaged on every product. If the FDA decides to accept the new nutritional label, the proposed changes would introduce a greater understanding of nutritional facts, along with updated requirements. In hopes, the FDA wants the label to be refreshed, with key parts of the label such as calories, serving sizes, and percent daily value to be more prominent.[9]

The Food and Drug Administration wants to further improve public health by incorporating a modern nutritional label. One of the proposed changes is requiring a declaration of "Added Sugars" on the label.[9] The FDA wants to make a regulation to include an added sugars row, which will be indented under the total sugars row, so both will be listed on the new nutrition label.[9] After many health organizations released reports that added sugars should not comprise more than 25% of total calories consumed, a large citizen's petition and public comments board came about for a change in the current nutrition label. The FDA is in discussion on how to incorporate the new changes on the nutrition label.

4.3 Limitations

There were some limitations in this content analysis research study. The research group collected products from one grocery store. Many stores sell a variety of different products and many families in today's American culture may shop at a variety of different stores to find the best products or the current sale products. There is an abundance of different children's products produced within many different food and beverage industries. The research analysis looked further into the top five companies of the products coded. Other companies, such as PepsiCo, include food products that children may consume. This analysis also utilized total sugars instead of added sugars, which likely resulted in a misclassification of certain products; particularly those that have high amounts of naturally-occurring sugars, such as milk and fruit concentrate in some fruit snacks. The research group analyzed certain artificial food dyes and reported on the top five most common dyes. Further analysis to determine the total amount of artificial food dyes among the nine artificial foods approved by the FDA is needed. Lastly, some ingredients lists were obtained from third-party websites. They may not be as accurate as manufacturer sites. Data were collected over a three month period in the store, and another four months on-line. Data may have changed over this time period.

5. Conclusion

In conclusion, the content analysis research shows that Kraft Foods Inc., Kellogg's Co., and General Mills Inc. contain a high percentage of artificial food dyes within their products. Kellogg's Co. holds a high percentage of food dye distribution, with all of their products exceeding 30% in each category. General Mills Inc. held the highest percentage of artificial food dye in both yellow and red dye groups, holding over 40% in each category. ConAgra Foods Inc. holds the lowest percent of artificial food dye across all artificial food dye groups, holding less than 14% in yellow, red and blue food dye groups. The research study also shows that ninety-six percent of McKee Foods Corp. products have sugar levels above the recommendation, making most of their products high in total sugar. Seventy-three percent of Kellogg's Co. products and 58.8% of General Mills Inc. products exceed the sugars recommendation making them also have high amounts of sugar. Almost twelve percent of ConAgra Foods Inc. products have sugar levels above the recommendation, making their products relatively low on total sugar content. Overall, Kellogg's Co. has the highest percentages in both artificial food dyes (<35%) and sugar levels (73.7%). ConAgra Foods Inc. has the lowest percentages of in both artificial food dyes (>14%) and sugar levels (11.5%). Based on the results listed above, food companies should limit or eliminate the use of artificial food dyes and the amount of added sugars within their products. Eliminating artificial food dyes could improve children's risk for health diseases, such as cancer, genetic damages, allergic reactions, hypersensitivity reactions and behavioral problems. Limiting the amount of added sugars food companies distribute within their products could help to decrease the growing obesity epidemic within Americans while reducing Americans risks to chronic diseases, such as type 2 diabetes, cancer, high blood pressure, and heart disease.

6. Acknowledgements

Thank you to the research team of Melissa Allen, Kelly Miller, and Hector Kennett Melgar. Thank you to Dr. Ameena Batada for helpful support and guidance throughout the entire study.

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