An Investigation into All -Purpose Cleaner

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APSC 262

April 09, 2015

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By

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APSC 262: Technology and Society II

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Thursday, April 9th, 2015

ABSTRACT

UBC is striving to become more sustainable and would like to guide the staff and students to make smart decisions while purchasing all-purpose cleaners. This report investigates the sustainability of all-purpose cleaners that staff and students can easily purchase on or near campus. In order to conduct this investigation a triple bottom line analysis of each product was used to compare toxicity level, cost, and social impact. In addition to store bought all-purpose cleaners, two homemade cleaning agents were tested and assessed. It is recommended to make your own all-purpose cleaner but for many people this is inconvenient, the commercial product recommended is Seventh Generation followed closely behind by Green Works, by Clorox.

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LIST OF ILLUSTRATIONS

GLOSSARY

mL – Milliliter

pH – Acidity level

LIST OF ABBREVIATIONS

ADBAC – alkyl dimethyl benzyl ammonium chloride

AE – Alcohol ethoxylates

EPA – Environmental Protection Agency

HDPE – High Density Polyethylene

MSDS – Material Safety Data Sheet

TBL – Tripple Bottom Line

UBC – University of British Columbia

USDA – United States Department of Agriculture

SECTION 1.0 INTRODUCTION

UBC is striving to be a more sustainably university but in order to reach their goals students and staffs have to do their part. Every step may it be large or small makes an impact and leads to a better future for UBC and our beautiful surroundings. Choosing a sustainable cleaning product is a small step in reaching our goal but with over a population of over 60,000 staff and students, a large impact will be made.

Our research began with surveying the population of UBC, what all-purpose cleaning products are used, where people buy them, and their opinions on buying or making more sustainable cleaning agents. This set a framework on what stores and products we should guide our research to. The four all-purpose cleaners that were available in stores near campus and where either advertises as 'green' products or were popular among students were: Mr. Clean, Clorox – Green Works, Fantastik, and Seventh Generation. In addition to those four commercial cleaners, we also found two homemade formulas that were easy and inexpensive to make, with good results. We evaluated these cleaners using a triple bottom line assessment in order to determine which one is the most sustainable option for UBC staff and students.

SECTION 2.0 HOMEMADE ALL-PURPOSE CLEANER

One option to conventional all-purpose cleaners is to use homemade formulas, which are generally non-toxic. Two major options are to use either sodium bicarbonate (baking soda) aqueous solutions or vinegar. Both are powerful deodorizers and stain removers. They also contain anti-bacterial properties. One drawback however is that baking soda is mildly abrasive. In comparison, vinegar is not. Sodium bicarbonate can be dissolved in water, or mixed with regular liquid dish soap. Vinegar can be either used pure or mixed with baking soda. There are various other recipes and formulas available on the Internet and can be made at home as well.

Three of the biggest concerns when people think of making all-purpose cleaners at home are:

1. Is my office/kitchen/bathroom going to smell as good as if I were using conventional cleaners?
2. Is it not going to be too time consuming?
3. Do they really clean?

Our purpose here was to answer these questions by experimenting with different formulas, and testing them for a couple of weeks.

2.1 TESTS PERFORMED AND RESULTS

In this project, two recipes of homemade cleaners were tested, one with sodium bicarbonate and one with vinegar. 500 mL of each homemade all-purpose cleaner were made following recipes 1 and 2:

Recipe	Ingredients	Directions
(01) Baking soda	500 mL of water 2 lemons cut in half 1 tablespoon of clove 1 tablespoon of sodium bicarbonate Rosemary	Pour water in a pan. Add lemon, clove and rosemary. (You can squeeze the lemon and let the juice mix to the water) Boil the mixture for 5 minutes. Turn off the stove and cover the mixture. Wait for 15 minutes, and then strain the mixture. Add the sodium bicarbonate. Wait until it gets colder. Store.
(02) Vinegar	500 mL of white vinegar Peel of citric fruits	Put some peel of any citric fruits you want in a glass container. Fill the container with vinegar. Store.

Recipes 1 and 2 were tested for 3 weeks on kitchen surfaces. No other cleaning products were used in this specific kitchen during these 3 weeks.

Both recipes showed good results. The smell and appearance of the surfaces after being cleaned were very pleasant. Comparing deodorizing and stain remover properties, both showed similar performances. Smelly areas in the kitchen, where organic waste and garbage can are located, were cleaned and no bad smell was left. The recipes were also used on the top of the stove and kitchen countertops resulting in clean, white, deodorized surfaces.

The deodorizer power, antibacterial properties and stain remover character of sodium bicarbonate and vinegar can be explained based on chemistry. Vinegar is a 5% acetic acid solution, while sodium bicarbonate is an amphoteric substance. It means that these ingredients can neutralize a series of smelly or colored substances. Additionally, they can denature proteins in membranes of bacteria, killing germs and pathogens such as salmonella.

From our experience, it takes less than two minutes to prepare 1 bottle of vinegar cleaning product, and takes about 30 minutes to make 1 bottle of sodium bicarbonate all-purpose cleaner. Although making sodium bicarbonate based cleaner was more time consuming than preparing vinegar all-purpose cleaner, the sodium bicarbonate recipe was better than vinegar in two aspects. First, the smell of vinegar is a little strong. After drying, it leaves no smell. However, the odor while the surface is still wet can cause some discomfort to those who are more sensitive. Second, sodium bicarbonate can clean little amounts of grease. One explanation to this is that baking soda can react with fatty acids in a process called saponification, which facilitates removing grease from surfaces.

2.2 TRIPLE BOTTOME LINE ASSESSMENT AND DISCUSSION

To investigate better the advantages and drawbacks of homemade all-purpose cleaners, social, environmental and economic aspects were considered.

2.2.1 SOCIAL ASPECTS

From our survey, we discovered that more than 50% of people are not willing to make their own cleaning products. One of the reasons is that making your own can be time consuming, and it is more convenient for some people to just buy one from the supermarket.

From our experiment, we discovered that they are not as time consuming as people might believe, taking from 30 to even 2 minutes to be made. They are easy to make, and the ingredients can be found in any supermarket around UBC, which is very convenient for students living on campus.

An interesting result from our survey was that more than 43% of the surveyed say they would prepare their own. To those who are willing to take some time to make all-purpose cleaners at home, we recommend trying recipes (01) and (02) previously discussed. If anyone wants an even more powerful all-purpose cleaner (degreaser and disinfectant), a good option is to mix a sodium bicarbonate aqueous solution to liquid soap.

2.2.2 ENVIRONMENTAL ASPECTS

As mentioned before, baking soda and vinegar are non-toxic. Therefore, baking soda/vinegar based homemade products are children friendly and impose no health danger if in contact with skin or ingested. According to the MSDS's of sodium bicarbonate and pure acetic acid, the only possible environmental effect caused by disposal of these ingredients is altering the pH of aquatic environments or the soil. But problems would only arise if very high amounts of these products were dumped in the water or in the soil.

Looking at packaging, sodium bicarbonate is sold in paper packages, which are recyclable and non-toxic. Paper packages are made of cellulose, a renewable and biodegradable material. Paper is generally considered an environmentally friendly material. White vinegar is sold in high-density polyethylene bottles (HDPE), which are recyclable and non-toxic as well. HDPE does not leave toxic residues while in contact with liquids. It is also a thermoplastic, meaning that it can be recycled. Nevertheless, it is a petrochemical based material, staying for a long time in the environment before decomposing.

2.2.3 ECONOMICAL ASPECTS

Homemade all-purpose cleaners are usually non expensive. Based on the amounts used to prepare recipes (1) and (2), the prices per ml of products were calculated:

1L Bottle of pure white vinegar (no name): $1.00 (0.1 cent per ml of cleaning product)

500 g Box of baking soda (no name): $1.00 (0.01 cents per ml of cleaning product)

SECTION 3.0 FANTASTIK® ORIGINAL DISINFECTANT ALL-PURPOSE CLEANER

The Fantastik all-purpose cleaner is composed of two chemical ingredients: 2- Butoxyethanol (or Propylene glycol monobutyl ether), and ADBAC (Alkyl dimethyl benzyl ammonium chloride, and Alkyl dimethyl ethyl benzyl ammonium chloride) according to the MSDS from SC Johnson Canada (SC Johnson Canada, 2013). The datasheet also shows that both chemical ingredients comprised of only less than 7% of the entire product (SC Johnson Canada, 2013). Therefore, it is safely to assume that the concentration of the chemical ingredients in this product is low.

Based on our research on the chemical ingredients, both chemical ingredients share similar properties in terms of biodegradability, bioaccumulation, and toxicity. 2-Butoxyethanol is highly degradable in soil and water with a half-life of 1-4 weeks in aquatic environments (Health Canada, 2002). It is also not expected to bioaccumulate in living organisms since animals can rapidly eliminate this substance by excreting it in forms of metabolites in urine or exhaling it as carbon dioxide (Health Canada, 2002). However, it is extremely toxic in high concentration. Research shows rats that are exposed to high concentration of 2-butoxyethanol can lead to a significant loss in maternal body weight (Wess, Ms. J et al., n.d.) and a decrease in physical coordination (Olivia Harris et al., 1998). Similarly, ADBAC also has a high biodegradability, Research has observed that ADBAC can degrade into 60% carbon dioxide in only 13 days (United States Environmental Protection Agency, 2006). It is also unlikely to bioaccumulate in aquatic organisms because it has generally degrades down into non-toxic substances before it reaches the aquatic ecosystems (United States Environmental Protection Agency, 2006). Lastly, It is also highly toxic to fish and aquatic invertebrates on an acute exposure basis (United States Environmental Protection Agency, 2006).

3.1 TRIPLE BOTTOM LINE ANALYSIS OF FANTASTIK® ORIGINAL

In this section, we will assess the social, environmental, and economic aspects of Fantastik all-purpose cleaner using the triple bottom line guidelines and the data gathered from various sources including our survey, articles, and the price of the product.

3.1.1 SOCIAL ASPECTS

The participants in our survey generally ask two questions regarding to the commercial all-purpose cleaners:

1. How easy is it for them to buy the cleaning product?
2. The performance of the cleaning product.

After visiting to grocery stores around UBC, we discover that Fantastik all-purpose cleaner is available in all of the stores we visited. Since our survey indicates that about 70% of the participants go to No frills, Safeway, and Save-on Foods, it is clear that Fantastic all-purpose cleaner is easily accessible. In terms of performance, it cleans very well when it is used to clean kitchen tables, sink, appliances and bathtubs.

3.1.2 ENVIRONMENTAL ASPECTS

If we simply evaluate the environmental impact of the Fantastik all-purpose cleaner based on its chemical composition, it is quite environmental friendly since the two chemical ingredients are highly biodegradable and unlikely to bioaccumulate in living organisms, and non-toxic in low concentrations. However, each chemical is highly toxic in high concentration. Therefore, an accidental spill of the chemicals during transportation or factory disposal of the chemical without proper treatment might cause a severe environmental damage.

By looking at the packaging of the Fantastik all-purpose cleaner, we discover that the type of plastic used to make the bottle is HDPE (High-Density Polyethylene) according to the recycling label printed on the bottle. HDPE plastic is accepted by most of the recycling programs and it is also relatively easy to process the recycled HDPE plastic for secondary use.

3.1.3 ECONOMICAL ASPECTS

The cost of a Fantastik all-purpose cleaner is around 0.66 cent/ml, which is not the most expensive option compared to other commercial cleaning product. Nonetheless, it is still at least 6 times more expensive than the homemade all-purpose cleaner.

SECTION 4.0 MR.CLEAN® MULTI-PURPOSE CLEANER

Being one of P&G's headline products, Mr. Clean has been a household name in cleaning since 1958. It's reputation for cleanliness and having the appropriate mascot to accompany such brand, Mr. Clean has made a name for itself as a top brand in household cleaning. How sustainable is this product? The following pages investigate the sustainability of Mr. Clean, specifically the all-purpose cleaner brand, through TBL analysis.

4.1 TRIPPLE BOTTOM LINE ANALYSIS

4.1.1 SOCIAL ASPECTS

The target demographic for Mr. Clean products are women, varying from ages 25-55. An interesting statistic that Mr. Clean has noticed is that Facebook and Pinterest have a user base that is female dominant. They take advantage of this by posting on such social media sites saying, "Like us on Facebook and we'll donate, $1 to the Healthy Mother, Healthy Baby Coalition", which other products do not usually do. This helps Mr. Clean be accepted by the general public, as a product that is socially aware. At the moment, Mr. Clean has 1,017,873 likes on Facebook, and approximately 70% of female Pinterest users are within their age demographic, so Mr. Clean has a big social platform, in which they could use to speak their mind or influence decisions, highly unlikely, but still a possibility. In our survey, we found out that 24% of staff and students from UBC who participated use Mr. Clean, the second most popular. This proves that Mr. Clean is one of the most socially known brands out there.

4.1.2 ENVIRONMENTAL ASPECTS

According to the material safety data sheet from P&G, Mr. Clean contains a hazardous material with the chemical name alcohol ethoxylates, commonly known as nonionic surfactant. According to the same document, the method of disposal of this product advised for household use is via sewage. Based on the Federal Environmental Quality Guidelines from Environment Canada, the degree of toxicity of alcohol ethoxylates is a function of their chemical structure.

The formula is as follows:

$$normalized\ EC_{env} = reported\ EC_{test} \times (predicted\ EC_{env} / predicted\ EC_{test})$$

where,

normalized EC_{env} = normalized effect concentration for environmental distribution
reported EC_{test} = effect concentration from a toxicity test on a commercial distribution
predicted EC_{env} = effect concentration from a QSAR based on environmental distribution
predicted EC_{test} = effect concentration from a QSAR based on a commercial distribution

Due to the waste disposal being via sewage, different aquatic species have been affected by this chemical. The most affected species by AE is an invertebrate species, bivalve, closely followed by the water flea.

4.1.3 ECONOMICAL ASPECTS

My group decided to visit super markets around UBC, but also around our homes to compare prices between all-purpose cleaners. Two out of the four markets we visited, Mr. Clean was the most expensive compared to the other cleaning products. On average, Mr. Clean costs approximately $4.00 for 946 mL bottle. In terms of waste management, Mr. Clean is approved to be disposed through the sewer, much like every other liquid so there are no extra costs to using Mr. Clean.

SECTION 5.0 SEVENTH GENERATION

Seventh Generation's all-purpose cleaner was not the most popular from the survey results or the easiest to find in shops near campus but it does advertise as a natural cleaning product. Just how friendly is it on the environment, green packaging aside? Will students be able to afford and be willing to buy a more sustainable product? These questions and more are answered in the triple bottom line assessment of Seventh Generation's all-purpose cleaner.

5.1 TRIPPLE BOTTOM LINE ANALYSIS

5.1.1 SOCIAL ASPECTS

Having all the items on your grocery list available to purchase at one store is expected from most Canadian when they go into a large grocery store. Unfortunately Seventh Generation is not easily found and the closest store selling it close to campus was IGA Market Place. IGA is known to be a fancier grocery store say than No-Frills or Safeway, containing more expensive, organic, or natural products. For students this isn't the most ideal place to shop (also indicated through our survey).

Seventh Generation does not conduct animal testing and has high reviews as a company. GoodGuides gave Seventh Generation brand an average score of 7.5 out of ten on an environmentally friendly standpoint. These high ratings along with being B Corporation certified give Seventh Generation more credibility as a company. Increasing numbers of consumers are being more aware when shopping for natural/ sustainable products, companies are trying to match the raise in awareness by changing packaging to fit expectations of a 'green' product. Seventh Generation has the credentials of being a sustainable product.

5.1.2 ENVIRONMENTAL ASPECTS

Seven Generation has very few ingredients and makes it very clear what each ingredient does.

Water, caprylyl/myristyl glucoside (plant-derived cleaning agent), lauramine oxide (plant-based cleaning agent), sodium gluconate (plant-derived water softener), sodium carbonate (mineral-based alkalinity builder), benzisothiazolinone and methylisothiazolinone (synthetic preservatives)

The only chemicals of concern are Benzisothiazolinone and methylisothiazolinone, they can cause acute aquatic toxicity. This is even less of a concern because most of the time an all-purpose cleaner will end up going down the drain into a waste water treatment facility before entering back into the environment.

Seventh Generation also uses recyclable and refillable bottles. The bottle can be reused with a homemade cleaning product, diluted with water if one may choose or bought in bulk and refilled as needed. In addition to the certifications mentioned above, Seventh Generation also is biodegradable and USDA certified biobased product (91%), recognized by the U.S. EPA's Design for Environment Program of safer chemistry, and gold level Green America Seal of Approval.

5.1.3 ECONOMICAL ASPECTS

As mentioned above, 5.1.1, Seventh Generation is not readily available in all stores. At IGA Seventh Generation's all-purpose cleaner is $5.29 for a 946 mL bottle, which works out to .55 cents per mL. .55 cents per mL is more expensive than most cleaning agents but the consumer is paying for the quality and company practices when paying slightly more. Another result from our survey showed that 60% would pay slightly more for an environmentally friendly all-purpose cleaner.

SECTION 6.0 CLOROX - GREEN WORKS ALL-PURPOSE CLEANER

Green Works is one of the main brand line that's created by the Clorox company, which it placed them in "first" major consumer brand to join the green marketplace (DeBare, 2008). The all-purpose cleaning product from Green Works, shown in Figure 1, is comprised of 97% ~ 99%, naturally derived, plant- and mineral-based ingredients and is acknowledged by the EPA's Design for the Environment program (DeBare, 2008). As an "all-purpose" cleaner, it cleans major areas at home or at office, including: counters, appliances, stainless steel, sealed granite, chrome, cook top hoods, sinks, and toilets (Green Works®All-Purpose Cleaner, n.d.) This product is not 100% "green" all-purpose cleaner but it well-promotes "eco-friendly" properties to consumers.

Figure 1 - Green Works All-Purpose Cleaner (Save-On Foods).

Further information will be discussed in next section using TBL analysis.

6.1 TRIPPLE BOTTOM LINE ANALYSIS

This section of the report provides further and deeper information about Green Works All-Purpose Cleaner using three aspects of TBL: Social, Environmental, and Economical.

6.1.1 SOCIAL ASPECTS

From the online survey we conducted using surveymonkey.com, it showed that this product was third popular choice among students. Please see Appendix A for survey results.

Since this product is from internationally well-known cleaning product company, the Clorox, ratings on the internet heavily favored "Recommended" and many posted positive comments but some showed disappointment to this product, mainly due to no disinfection ability (Aquirre, n.d.; Clorox Green Works Natural All-Purpose Cleaner Reviews, n.d.)

6.1.2 ENVIRONMENTAL ASPECTS

Figure 2 presents the ingredients used to produce Green Works All-Purpose Cleaner. As shown in Figure 2, major of ingredients, that consists of 97% ~ 99% of the product, are naturally derived; plant- and mineral-based ingredients. For example, Alkyl Polyglucoside, Ethanol and Glycerine mainly comes from coconut oil and corn oil, respectively (Dunn, 2008). Rest of ingredients, that consists of 1% ~ 3% of the product, are comprised of preservatives and colorants, derived from petroleum, for longer life-span and aesthetics of the product but

preservatives, such as Kathon, are known to biodegrade within 28 days (Dunn, 2008). This product might be able to help consumer to release less man-made chemicals to the environment but it might bring concerns with rainforest habitat destruction from harvesting coconuts and corns (Dunn, 2008).

Main ingredients:

- Water
- C10-16 Alkyl Polyglucoside – Mild surfactant, known for its foam boosting ability, lack of streaking and easy rinsing
- Caprylyl/Capryl Glucoside - Mild surfactant, known for its foam boosting ability, lack of streaking and easy rinsing
- Ethanol SDA-3C – Dissolves other cleaning product additives, such as fragrances. Anti-microbal additive
- Fragrance – essential oil – to add a particular scent
- Colorant - Liquitint Blue HP Dye – added to improve aesthetic appeal
- Colorant - Liquitint Bright Yellow Dye – added to improve aesthetic appeal
- Methylisothiazolinone – Kathon – preservative, to maximize shelf-life and ensuring efficacy and safety. Inhibits the growth of bacteria or mold. Biodegrades within 28 days
- Potassium Carbonate – salt used in the production of soap
- Potassium Citrate – used in hard surface cleaners to help remove soap scum and stains
- Sodium Gluconate – sodium salt of gluconic acid, natural chelating agent, it can remove discoloration, soap scum and mineral scale deposits
- Sodium Hydroxide – known as caustic soda or lye, pH adjuster. Helps to remove soils that are fatty, oily, or acidic

Figure 2 - Ingredients of Green Works All-Purpose Cleaner (Green Works®Naturally Derived All-Purpose Cleaner, n.d.).

For packaging, it uses recyclable HDPE bottle. (Figure 3 shows bottom-side of the product)

Figure 3 - Bottom-side of Green Works All-Purpose Cleaner.

Although this is "green" product, there are some health risks involved with it. Please read Appendix B for more information.

6.1.3 ECONOMICAL ASPECTS

From products presented in this report, the Green Works All-Purpose Cleaner scored relatively low price per mL. For 946 mL of this product costs $4.39 at Save-On Foods, which calculates to $0.46 per mL.

SECTION 7.0 CONCLUSION

After analyzing the TBL for each all-purpose cleaner including homemade agents, our recommendation is that homemade recipes are the most sustainable and economical option. For the social side it does take some time and effort, which can be a deterrent. For those who want to simply buy a product and be done, Seventh Generation is the best option with Green Works by Clorox following as a less expensive and more available option. Both of these products are great but what sets Seventh Generation higher that Green Works by Clorox is the company standards. Seventh Generation has higher sustainability standards across the entire company than Clorox.

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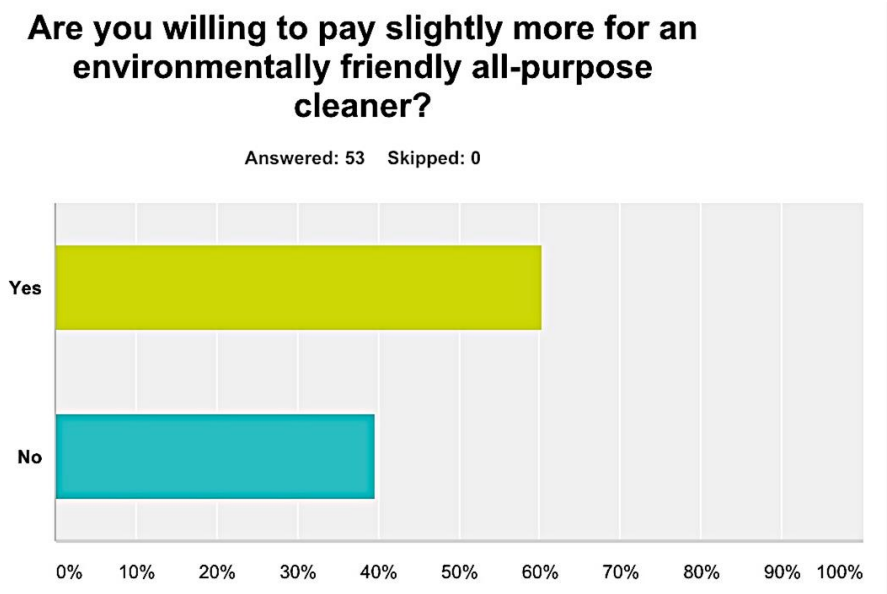
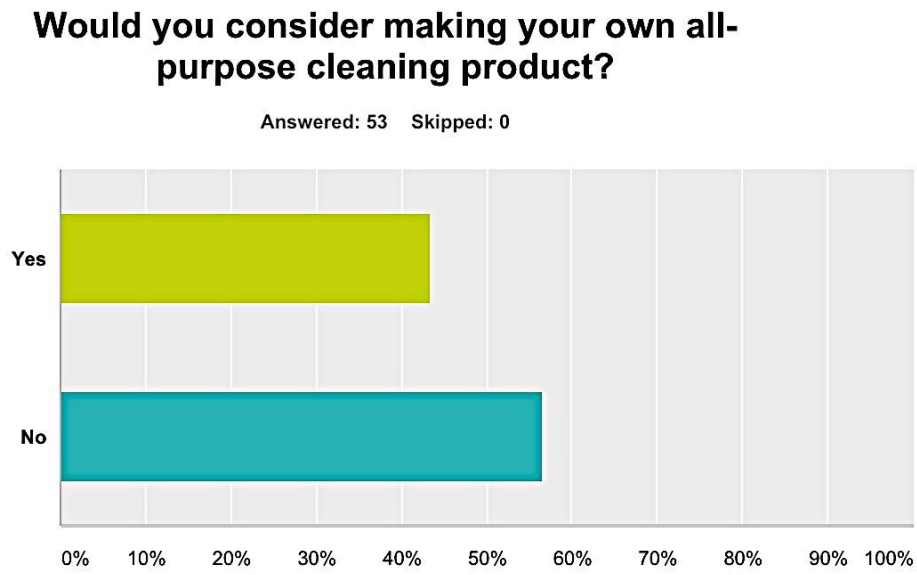
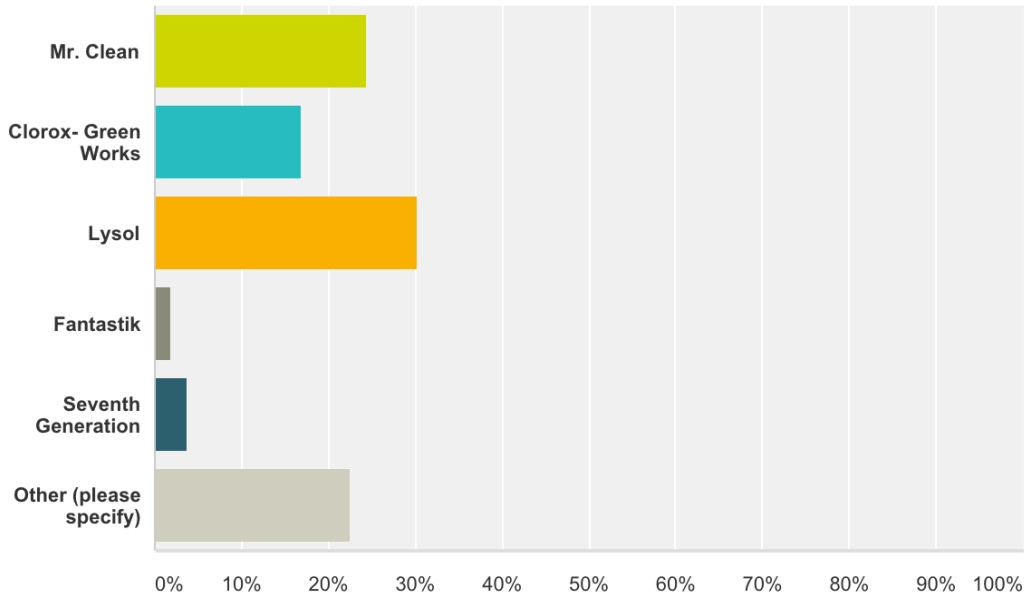
APPENDIX A – SURVEY RESULTS





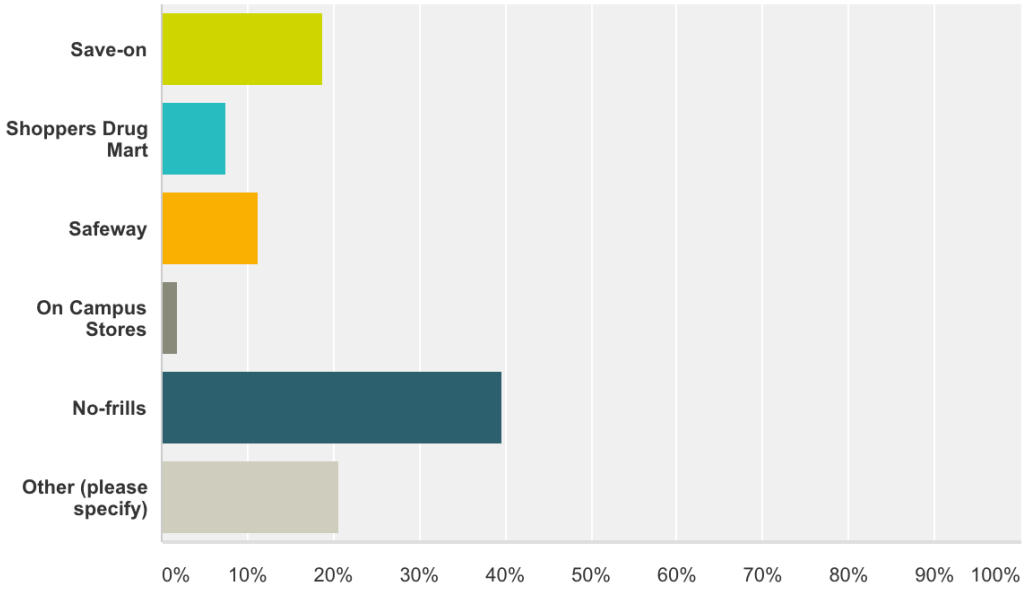
What brand of all-purpose cleaner do you use?

Answered: 53 Skipped: 0

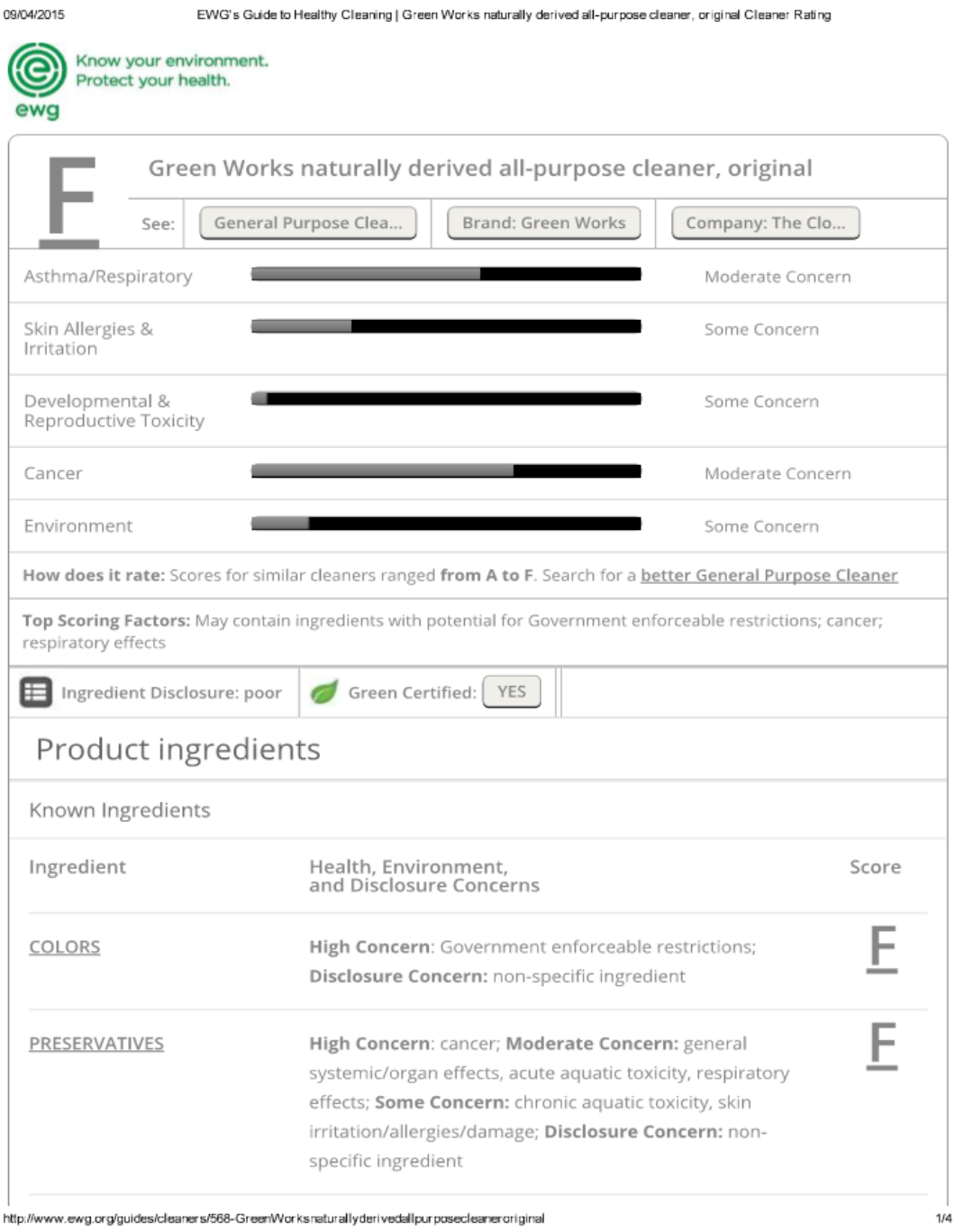


Where do you buy your cleaning products?

Answered: 53 Skipped: 0



APPENDIX B – CLOROX GREEN WORKS ALL-PURPOSE CLEANER EWG HEALTH INDEX



09/04/2015 EWG's Guide to Healthy Cleaning | Green Works naturally derived all-purpose cleaner, original Cleaner Rating

Know your environment. Protect your health.

ewg

F

Green Works naturally derived all-purpose cleaner, original

See: General Purpose Clea... | Brand: Green Works | Company: The Clo...

Asthma/Respiratory	Moderate Concern
Skin Allergies & Irritation	Some Concern
Developmental & Reproductive Toxicity	Some Concern
Cancer	Moderate Concern
Environment	Some Concern

How does it rate: Scores for similar cleaners ranged **from A to F**. Search for a better General Purpose Cleaner

Top Scoring Factors: May contain ingredients with potential for Government enforceable restrictions; cancer; respiratory effects

Ingredient Disclosure: poor | Green Certified: YES

Product ingredients

Known Ingredients

Ingredient	Health, Environment, and Disclosure Concerns	Score
COLORS	**High Concern**: Government enforceable restrictions; **Disclosure Concern:** non-specific ingredient	F
PRESERVATIVES	**High Concern**: cancer; **Moderate Concern:** general systemic/organ effects, acute aquatic toxicity, respiratory effects; **Some Concern:** chronic aquatic toxicity, skin irritation/allergies/damage; **Disclosure Concern:** non-specific ingredient	F

http://www.ewg.org/guides/cleaners/568-GreenWorksnaturallyderivedallpurposecleaneroriginal 1/4

FRAGRANCE	**Some Concern:** skin irritation/allergies/damage, acute aquatic toxicity, nervous system effects, respiratory effects, biodegradation	D
ALKYL POLYGLUCOSIDE	**Disclosure Concern:** non-specific ingredient	
ALKYL POLYGLUCOSIDE (C8-10)		B
ETHANOL		A
ALCOHOL DENATURED		A
WATER		A
POTASSIUM CARBONATE		A
POTASSIUM CITRATE		A

Health concerns

Health Concern	Level of Concern
cancer	High Concern
developmental/endocrine/reproductive effects	Low Concern
general systemic/organ effects	Moderate Concern
Government enforceable restrictions	High Concern
nervous system effects	Some Concern

respiratory effects	Moderate Concern
skin irritation/allergies/damage	Some Concern

Environmental concerns

Environmental Concern	Level of Concern
acute aquatic toxicity	Moderate Concern
chronic aquatic toxicity	Some Concern

Warnings & Directions

Directions for Use:

Turn nozzle to "Spray." Spray soiled areas and wipe with paper towel or cloth. For painted surfaces, wall coverings or any surfaces about your you are unsure, test on a small, inconspicuous area. For heavily soiled areas, repeat if necessary.

Caution:

Eye irritant. Avoid contact with eyes. First Aid: Eyes - Flush with water for at least 15 minutes. Call a doctor or poison control center if irritation persists. Keep out of reach of children.

Green Certifications

Design for the Environment

Design for the Environment is a voluntary program overseen by the U.S. Environmental Protection Agency that works with manufacturers to make products that are safer for people and the environment. Companies may carry the Design for the Environment Seal if they formulate products with ingredients that meet standards developed through the program. Acceptable ingredients receive a green circle (low concern based on experimental and modeled data), a green half-circle (low concern based on

experimental and modeled data, but with some data gaps), or a yellow triangle (some hazard concern).

Web:
http://www.epa.gov/dfe/pubs/projects/formulat/saferproductlabeling.htm

Animal Testing

Unknown:

Leading international certifiers PETA and Leaping Bunny have no information concerning this company's use of animal testing.