ESTIMATING THE IMPACT OF RESIDENTIAL DISPOSAL OF FATS, OIL, AND GREASE ON THE REGIONAL WASTEWATER SYSTEM

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Prepared by: Marco A. Vázquez, UBC Sustainability Scholar, 2018

Prepared for: Linda Parkinson, Program Manager, Source Control at Metro Vancouver

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Executive Summary

This project estimates the quantity of fat, oil, and grease (FOG) from food waste from households entering the regional wastewater system of Metro Vancouver. The FOG loadings were calculated using:

a) data from food diaries where the residents of the region registered the food they disposed of 'down the drain' (i.e., through sinks, food grinders, and toilets); and
b) the fat content of the food, using nutritional information databases.

Results of data analyzed show that the residents of Metro Vancouver introduce an estimated 1019 tonnes of FOG per year into the sewers of the region. From that figure, 27% comes from dairy products, mainly milk, cheese, and egg; while cooking oils and animal fats contribute with 20% of the total mass. The food waste disposed of 'down the drain' usually includes a liquid or semi-liquid component, like milk, dressings, sauces, and yogurt. Most than half (56%) of the total FOG loading comes from single-family detached houses. 58% of it is introduced in the wastewater system through the sink. Foods disposed through food grinders contribute 32% of the total FOG mass, although it is noted that residents mostly used food grinders to dispose of fruits and vegetables, i.e., food with low-fat content.

These results indicate that FOG from residents in the region is significant and should continue to be addressed through education and outreach initiatives. A recommended action is to remind the residents not to dispose of certain food categories (like dairy products, eggs, cooking oil, animal fats, condiments, and sauces) 'down the drain.' Also, residents can be advised to store the liquid or semi-liquid food waste in the freezer, then scrape it into a newspaper, paper towel, or paper bag and put it in the green bin on the day of organic waste collection. Another potential initiative, which would imply associated costs, is to provide biodegradable cups to the residents for disposing of their FOG.

Introduction

Nowadays many people are aware of the importance of waste sorting. In the case of food waste, some common disposal options are the green bin, the garbage, and 'down the drain.' The latter includes the sinks, food grinders, and toilets. However, wastewater systems are not explicitly designed to manage food wastes so, in time, these can lead to significant problems.

Most of the by-products of foods and food ingredients contain fats, oils, and grease (FOG) whose main chemical components are free fatty acids (FFAs). Some examples of foods rich in FOG are cooking oil, meat fats, dairy products, tallow, gravy, margarine, food scraps, sauces, lard, butter, dressing, deep-fried food, and cheeses (Husain et al., 2014).

When FOG reach the sewers, it cools down and accumulates until it forms a core fixed to the walls of the sewer. With the continuing flow of wastewater, different debris, dirt, and more FOG aggregates around the initial core until they form a solid deposit that plugs drain lines and eventually block the sewers (He et al., 2013).

Depending on which of the two general types of FFA (saturated or unsaturated) is most abundant in a FOG deposit, it can have different properties. Deposits made with saturated FFA were harder and less viscous than those made with unsaturated FFA under laboratory conditions (He et al., 2013). Also, previous research has shown that a saturated FFA (palmitic acid) is the most common in deposits commonly found in sewers (Benecke et al., 2017; Keener et al., 2008; Williams et al., 2012). These results suggest that deposits with high concentrations of saturated FFA could be more difficult to remove from sewers walls. For more detailed information on FOG accumulation in the sewer system, please see Annex I.

FOG blockages, also known as fatbergs, are a significant concern for local governments all over the world. They contribute to sanitary sewer overflows, which can lead to property flooding and contamination of water bodies with sewage. These types of events can also have adverse effects on human health and the environment (He et al., 2017; Husain et al., 2014; Wallace et al., 2017). Ducoste et al. (2008) reported that FOG deposits cause approximately 40-50% of the sewers blockages in the USA. Similarly, they are responsible for around 12,500 flooding events in the United Kingdom (Williams et al., 2012), 21% of the sanitary sewers overflow in Australia (Marlow et al., 2011) and 70 % in Malaysia (Husain et al., 2014).

Metro Vancouver estimates that the region spends $2.7 million to repair damage in the wastewater system caused by FOG coming from the residential, commercial, and industrial sectors (Metro Vancouver 2018a, 2018b). This is why Metro Vancouver has developed different strategies to tackle this issue. To address FOG discharges from the food services industry, Metro Vancouver has a Food Sector Grease Interceptor Bylaw, while large industrial dischargers are regulated under the Sewer Use Bylaw. For the residential sector, the 'Wipe It, Green Bin It' campaign launched in September 2017, sought to raise awareness among the residents of the region about the detrimental effects of FOG in the wastewater system and how to properly dispose of that kind of waste (Metro Vancouver 2018a; Metro

Vancouver Update, 2017). Similarly, the Metro Vancouver 'Love Food, Hate Waste' campaign, inspired by the United Kingdom's successful campaign of the same name, "provides residents with simple steps they can take to use more of the food they purchase" (Love Food, Hate Waste, 2017). As part of this campaign, Metro Vancouver carried out a Food Waste Study from November 20th to November 26th, 2014. This study provided the residents with food diaries where they registered the food "being disposed of and why it is being wasted instead of consumed, how it was disposed of, and current attitudes related to avoidable food" (Metro Vancouver, 2014).

This project uses the data collected in the Food Waste Study to estimate the FOG loading that residential food waste contributes to the wastewater system using the information collected in the food diaries. This study will inform the FOG loading that food grinders contribute to the regional wastewater system.

Method

Step 1

The data from the Food Waste Study diaries were provided in an Excel file. The first task was to identify the entries where the site of disposal of the food waste was 'down the drain,' i.e., the sink, food grinder, or toilet. There were a total 2278 relevant entries for this study.

The nutritional information of the food was used to estimate the fat content in the food waste. For most of the cases, the data was sourced from the Canadian Nutrient File (CNF, 2018); however, some foods were not in this database, so the USDA Food Composition Databases (USDA, 2018) was used as the first alternative. When the information was not in any of those two sources, others were used (see Annex II). The estimations of the relative masses of total fat, saturated, monounsaturated and polyunsaturated free fatty acids in the food waste use the information of the database for a 100 g portion of the food (Eq. 1):

$$\mathrm{X_1\ g\ of\ food}\left(\frac{\mathrm{Y_1\ g\ of\ fat}}{\mathrm{100g\ food}}\right) = \mathrm{Z_1\ g\ of\ fat} \qquad \text{Equation 1}$$

The diaries include a figure, in tonnes per year, which extrapolates the food waste mass from the participants in the study to the more than 2.4 million residents in the region. This project uses this figure and the proportion of fat in the food disposed of 'down the drain' to make the same estimation for the FOG loading:

$$\left(\frac{\mathrm{W_2\ tonne\ of\ fat}}{\mathrm{X_2\ tonne\ of\ food}}\right)\left(\frac{\mathrm{Y_2\ tonne\ of\ food}}{\mathrm{year}}\right) = \mathrm{Z_2}\ \frac{\mathrm{tonne\ of\ fat}}{\mathrm{year}} \qquad \text{Equation 2}$$

During the processing of the data, the most common challenge was incomplete information in the diaries. For instance, the verbatim record of the food waste was not always detailed enough, so some assumptions were necessary. Two recurring examples were milk and cooking oil. In many cases, the food registered in the diary only said "milk," while in the CNF there was information for whole milk, skimmed, 1% M.F., 2% M.F., among others. In this case, 44% of the market share of dairy products in western Canada corresponds to milk with 2% M.F. (Statista, 2018a). Therefore, the nutritional information for 2% M.F was used when there were no specifications of the type of milk (225 entries). A

similar instance was when the transcript only said “cooking oil.” Since Statista (2018b) mentions that one of the most used cooking oils in the world is canola, its nutritional information was the one used for those calculations (20 entries).

In the cases where the food in the literal transcript was not present in the CNF, the nutritional information from the food the author considered as the most similar in the database replaced it. This situation happened with 169 foods entered in the diaries. This action undoubtedly affects the final result, but given the lack of detail in the diaries, it was necessary. All the equivalences used for each food are in Annex II.

Another assumption was made when the verbatim record contained more than one type of food. For calculation purposes, this study assumes an equal proportion for each one in the total mass. For example, if the entry said “broccoli and cheese,” the assumption was that 50% of the total mass corresponds to broccoli and 50% to cheese.

Similarly, several entries indicated that the food was cooked; however, it did not specify how (e.g., fried, boiled). The calculations included this specification only when the entry included the cooking method, and the database provided information on the prepared food. The entries “plate scraps,” “wok liquids,” “food scraps,” “mix,” and “leftover on plate” presented a particular issue because those verbatim transcripts do not provide enough information to make any assumption about the content of the food waste. Therefore, the data from those five (5) entries are not part of the final results.

There were also occasions when the literal transcript was sufficiently detailed, but there was no information in the databases. These cases fell in two general types. The first was where the lack of information was because it was a non-edible part of the food, e.g., egg shells, so the assumption was that they had no amount of fat. The second was when the food waste was a part of a fruit or vegetable, such as a banana peel or a stem of parsley; there, the calculations used the information of the whole food. Additionally, when the databases did not include information on the mass of saturated and unsaturated free fatty acids in a particular food, the calculations consider them as 0 (see Annex II).

Step 2

The next stage was to classify the data. The first classification was using the thirteen food categories created by the Metro Vancouver Food Waste Study:

- Oil and fat.
- Vegetables.
- Fruits.
- Dairy and egg.
- Condiments, sauces, herbs, spices (such as gravy, mayo, ketchup, olives, pickles).
- Staple foods.
- Composite meals.
- Meat.
- Sweet carb products.
- Confectionary and snacks.
- Bread and similar (non-sweet) carb products.
- Drinks.
- Other.

The other two classifications were according to:

1. The type of household ('Apartment or condominium,' 'Townhouse or duplex,' or 'Single-family detached houses/Suite in-house').
2. The disposal site (food grinder, sink, or toilet).

Step 3

The information of the daily influent flow of WWTP (m^3/day) and the fat and oil concentration of a monthly sample (mg/L) were used to calculate the average monthly load of fat and oil (tonne/month) that arrives at the five Metro Vancouver wastewater treatment plants (WWTPs):

$$\left(\frac{X_3 \text{ mg of fat}}{1 \text{ L}}\right)\left(\frac{1 \text{ tonne}}{1x10^9 \text{ mg}}\right)\left(\frac{X_3 \text{ m}^3}{1 \text{ month}}\right)\left(\frac{1000 \text{ L}}{1 \text{ m}^3}\right) = Z_3 \frac{\text{tonne of fat}}{\text{month}} \qquad \text{Equation 3}$$

Metro Vancouver provided the data from the regional WWTPs. Note that this data is a monthly average figure, and therefore is not considered to be an accurate estimation of the amount of FOG in the wastewater system.

Limitations

There were some limitations to the approach outlined in Step 1. The two most relevant are the possible inaccuracy of the amount of food registered in the diaries and that the information is from a single week of 2014. Thus, the extrapolation to the whole year does not consider seasonal variations of food consumption. Also, both the population and their patterns of food consumption and waste disposal may have varied from 2014 to the present, e.g., more people eating away from home, immigrants with different culinary customs, and different preferences in the consumption of meals.

Results

During the seven days in which the Metro Vancouver Food Waste Study took place, the participating residents recorded a total 233.21 kg of food waste that they disposed of through the sink, food grinder, or toilet. Of that mass, 11.18 kg corresponds to fat, which represents 4.79% of the total weight of the food that the participants disposed of 'down the drain.'

Despite incomplete information on the saturated and unsaturated free fatty acids content in the foods, it is useful to include those results in the analysis. From the total mass of fat, 4.16 kg (~37.3%) corresponded to saturated FFA, while 5.88 kg (~52.7%) are unsaturated FFA. It is important to remember that the literature reviewed as part of this study indicates that saturated FFA could cause more severe damage to the wastewater system.

Using the information from the diaries, around 138388.64 tonnes of food is wasted by residents of Metro Vancouver every year, with 20775.38 tonnes (15.02%) going 'down the drain.' Of this former amount, this project estimates that 1019.14 tonnes is fat (i.e., 4.91% of the food disposed of through the sink, food grinder, and toilet), which would mean that residential food waste introduces 84.93 tonnes of fat into the regional wastewater

system every month. This would be equivalent to each person pouring 1.13 g of FOG 'down the drain' every day of the year.

Of the 13 Food Categories, approximately half of them (six) contribute 89% of the food waste mass entering to the sewers: 'Dairy products and egg,' 'Composite meals,' 'Drinks,' 'Vegetables,' 'Fruits,' and 'Condiments, sauces, herbs, spices.'

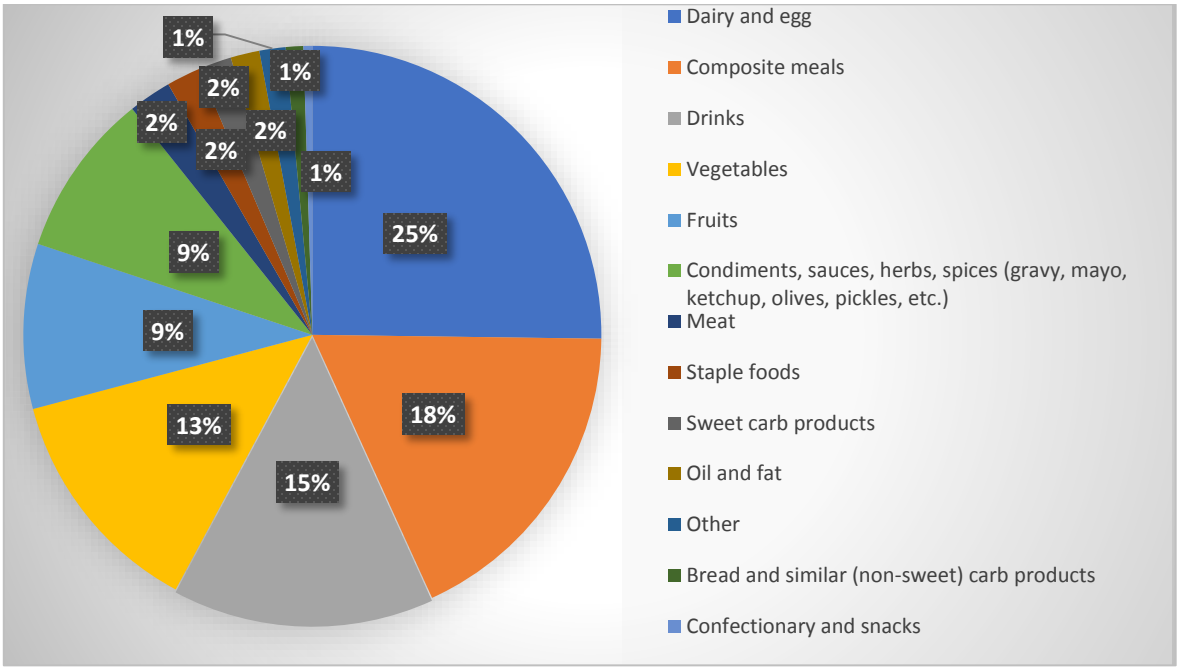

Figure 1. Percentage of Food mass by Food Category

Nearly half of the food waste entering the regional wastewater system comes from 'Single-family detached houses/Suite in-house.' The sink is the most common disposal site (52% of food waste), with the food grinder a close second.

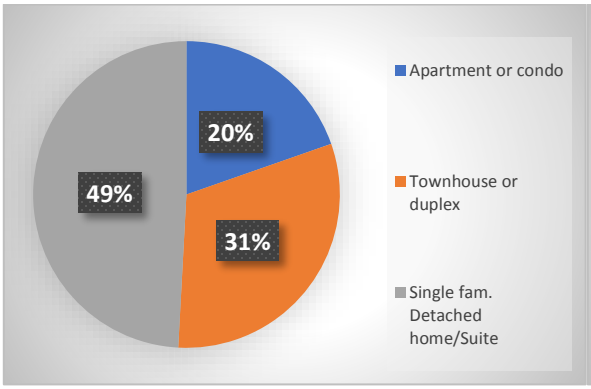

Figure 2. Percentage of Food mass by Household Type

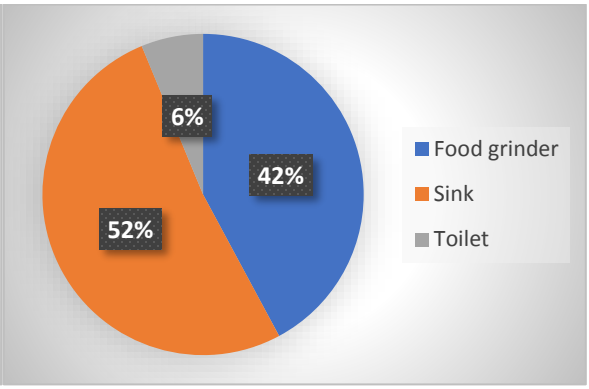

Figure 3. Percentage of Food mass by Disposal Site

The four Food Categories that contribute 76% of the fat mass are 'Dairy products and eggs;' 'Oil and fat;' 'Condiments, sauces, herbs, spices;' and 'Composite meals.' Milk, cheeses, and eggs were common dairy products registered in the diaries. Similarly, from

the ‘Condiments’ category, some of the most recurrent foods mentioned were mayonnaise, different types of sauces, and mustard.

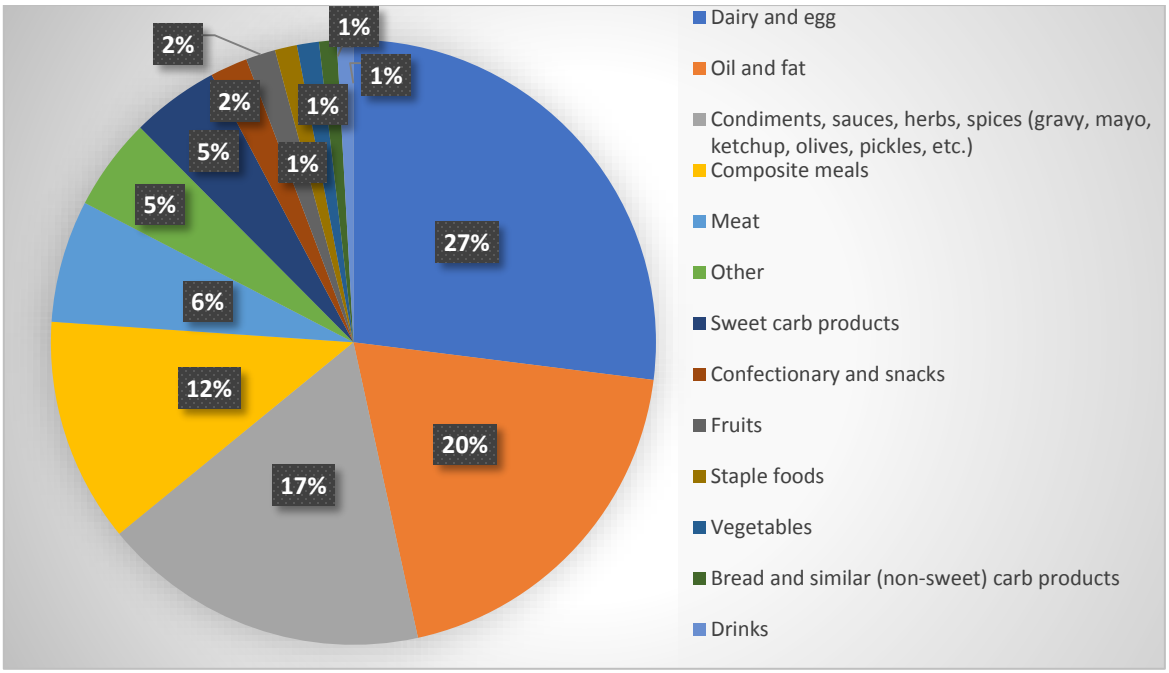

Figure 4. Percentage of Fat mass by Food Category

As with the food mass, the single-family detached houses/suite in-house and the sink are the main contributors of fat mass by Household Type and Disposal Site, respectively. Food grinders were used to dispose of 32% of the total fat mass.

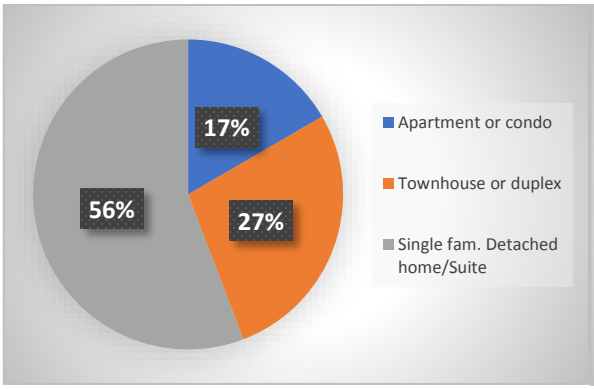

Figure 5. Percentage of Fat mass by Household Type

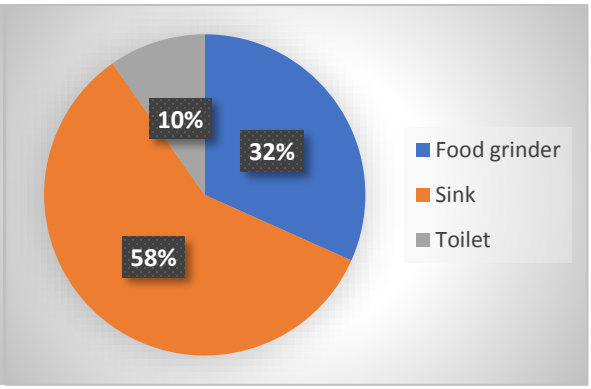

Figure 6. Percentage of Fat mass by Disposal Site

The most used Disposal Site by the different household types is the sink, except for residents of ‘Townhouses or duplex,’ who also use their food grinders almost as much as their sink. Two of the three household types seldom use the toilet as a disposal site.

Note that the Love Food Hate Waste study 2014 reports that 45% of dwellings in the region have food grinders and that the penetration rate by household type is: 38% single family houses; 61% town houses and duplex and 43% apartments. The fact that

residents of ‘townhouses and duplex’ use their grinder more is likely related to the fact that more ‘townhouses and duplex’ have food grinders.

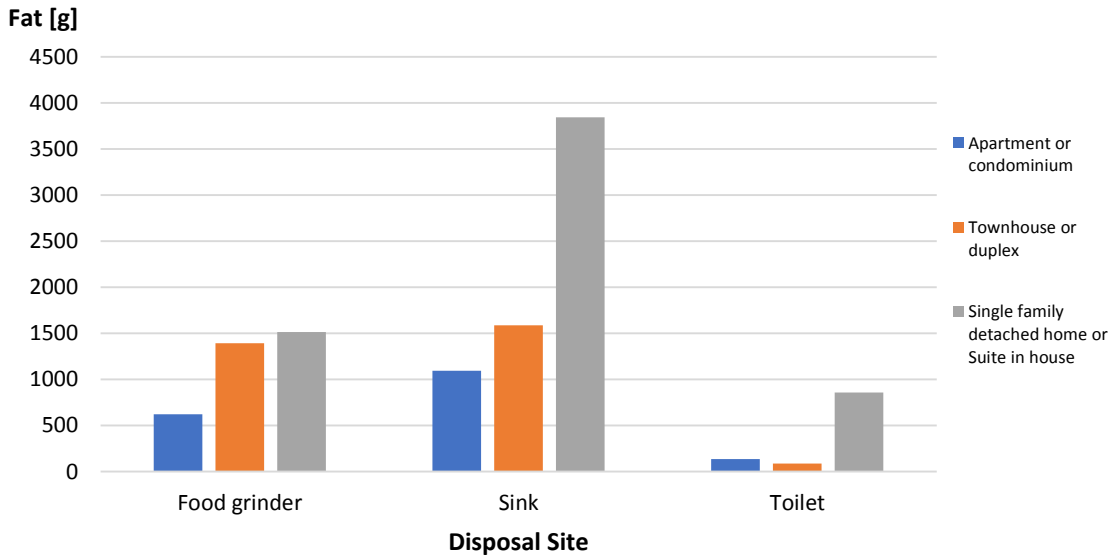

Figure 7. Fat mass by Disposal Site and Household Type

The four food categories with the most significant fat content are ‘Dairy products and eggs;’ ‘Oil and fat;’ ‘Condiments, sauces, herbs, spices;’ and ‘Composite meals.’ The primary residential source of those categories are people living in ‘Single-family detached houses/Suite in-house.’

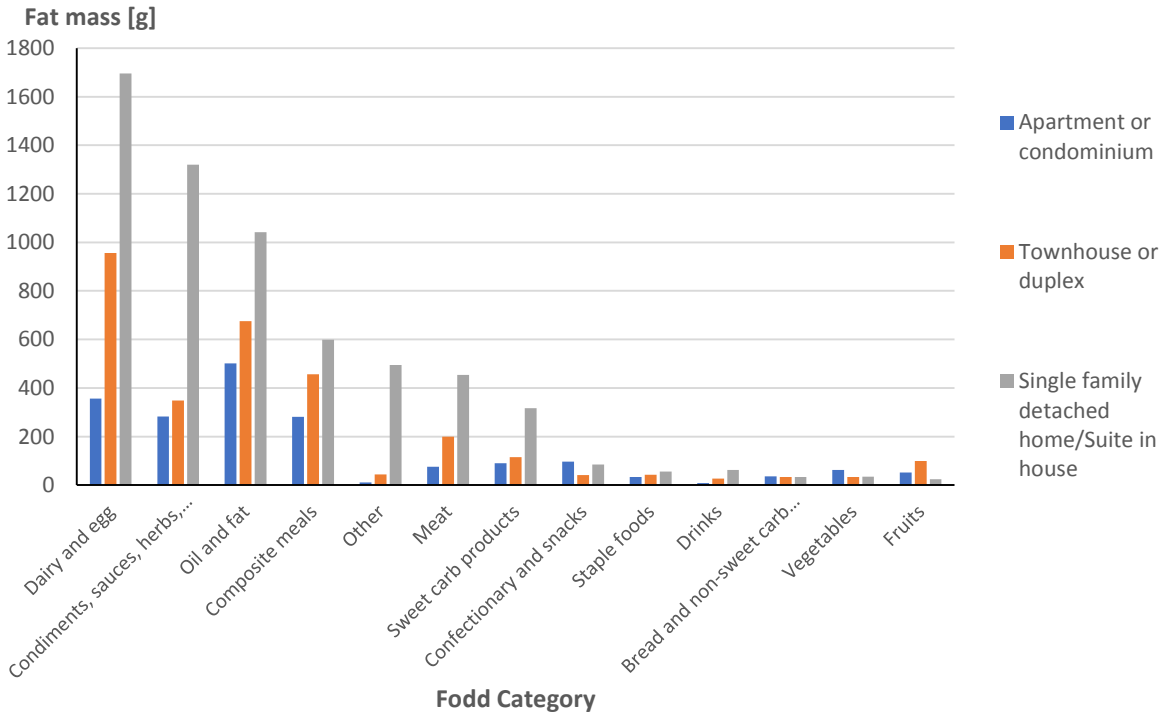

Figure 8. Fat mass by Food Category and Household Type

The largest four fat-contributing Food Categories are disposed to sewer predominantly through the sink. Meanwhile, 'Condiments, sauces, herbs, spices' is the main Food Category introducing FOG to the sewers via the toilet. Unlike in the other Disposal Sites, 'Meat' is the Food Category with the third highest amount of fat disposed of in food grinders.

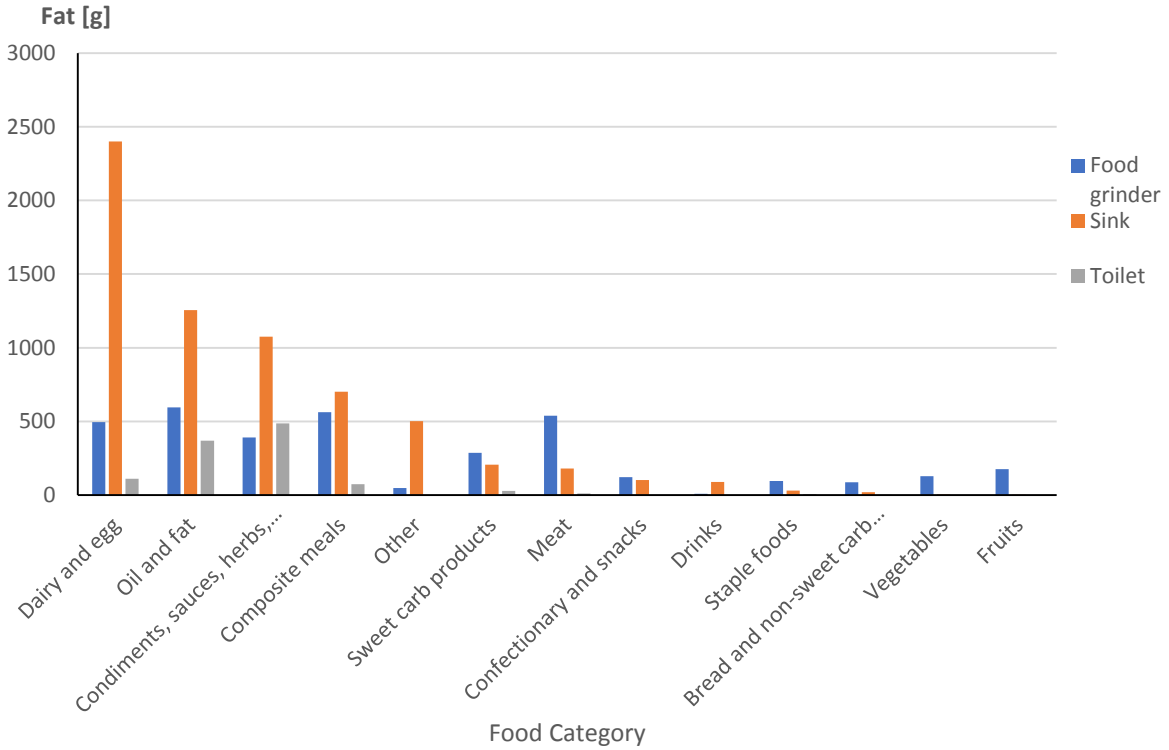

Figure 9. Fat mass by Food Category and Disposal Site

As with the percentage of Fat mass by Food Category, 'Dairy products and eggs;' 'Oil and fat;' 'Condiments, sauces, herbs, spices;' and 'Composite meals' represent the four principal contributors (77%) of saturated free fatty acids to the wastewater system.

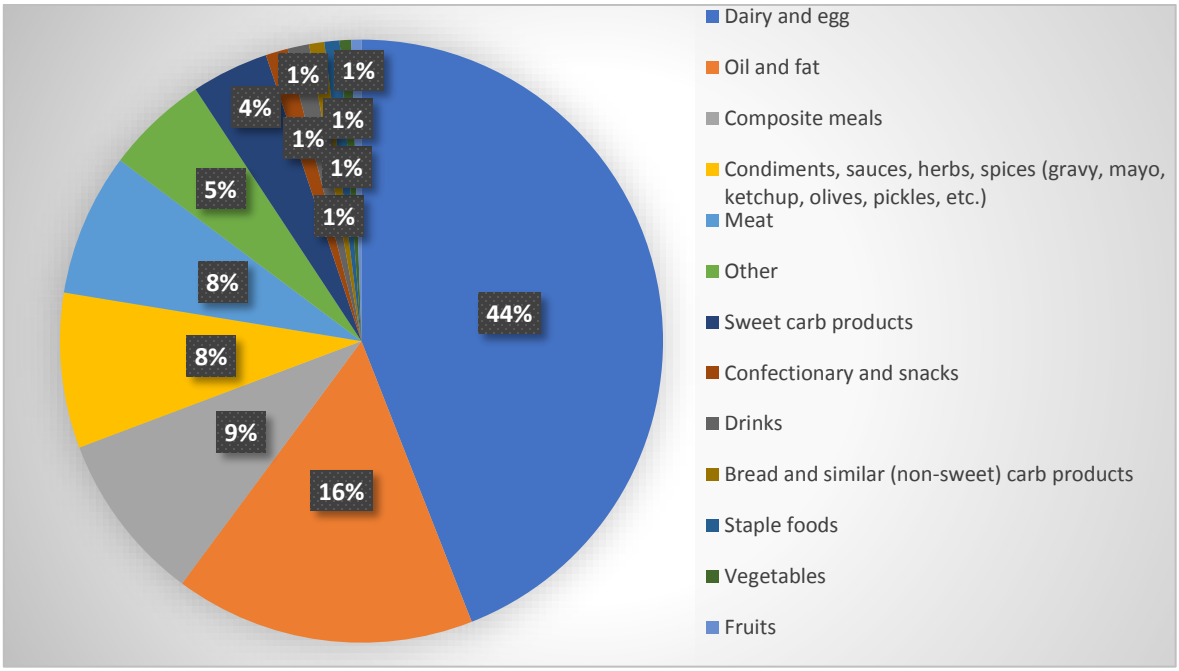

Figure 10. Percentage of Saturated Free Fatty Acids mass by Food Category

After looking at the results of Fat mass and the Saturated FFA mass by Food Category, is no surprise that 'Single-family detached houses/Suite in-house' and the sink maintain the tendency of being the primary contributor of saturated FFA and their principal site of disposal, respectively.

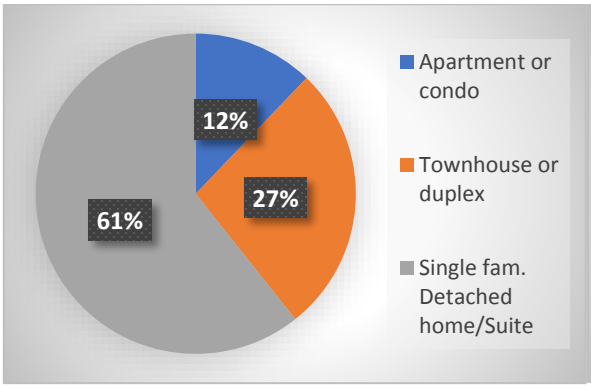

Figure 11. Percentage of Saturated Free Fatty Acids mass by Household Type

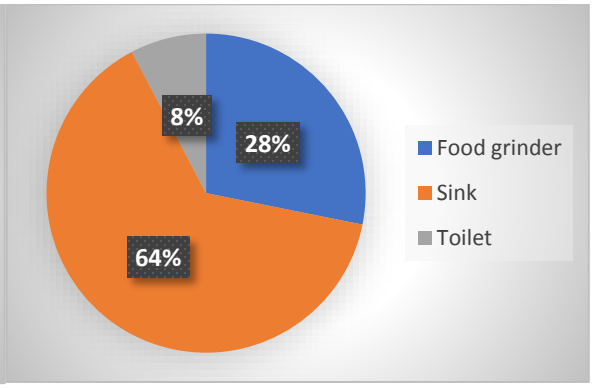

Figure 12. Percentage of Saturated Free Fatty Acids mass by Disposal Site

Wastewater Treatment Plants Data

Table 1. Oil and Grease in Wastewater Treatment Plants of Metro Vancouver

WW Treatment Plant	Oil & Grease Influent per month [mg/L]	Flow [L/month]	Oil & Grease Loading per month [tonne]
Annacis Island	32.5	1.48E+10	475.31
Iona Island	9.667	1.68E+10	155.65

Lions Gate	9.58	2.53E+09	24.38
Lulu Island	38.0	2.15E+09	80.39
Northwest Langley	17.417	3.91E+08	6.72
Total	107.17	3.67E+10	742.46

Using the above monthly data taken at Metro Vancouver WWTPs, approximately 742.46 tonnes arrived monthly to its five WWTP in 2014. The calculation of 84.93 tonnes/month of FOG from all households in the Metro Vancouver would represent 11.44% of the former figure. It is important to reiterate that the figures in Table 1 are from monthly grab samples and are not expected to accurately represent the amount of FOG reaching the wastewater treatment plants. Further, as FOG accumulates in the wastewater system these figures are not intended to be an accurate estimate of the total FOG in the wastewater system.

Discussion

The four categories with the highest loading of FOG ('Dairy products and eggs;' 'Oil and fat;' 'Condiments, sauces, herbs, spices;' and 'Composite meals') entering into the regional wastewater system have an important similarity besides of having high-fat contents. Almost all of them contain food or ingredients which are liquids, e.g., oil or soup, or a colloid with at least one liquid substance, like milk, dressings, sauces, and yogurts. This feature makes those foods easier for people to dispose of them 'down the drain.'

When looking at the Household Types, single-family detached houses put more fat mass into the sewers than the other two households. Information provided by Metro Vancouver on population by household type indicates that 57.40% of the population in 2014 lived in single-family detached houses. This probably made the diaries to contain more entries from people living in this type of dwelling (45.48% of the entries were from single-family detached houses). Interestingly, although these houses should have more space for a bin only for food waste, their residents prefer to use the sink, food grinder, and even the toilet more than the other households.

The sink is the most used Disposal Site of all the Household Types and for the top four fat-contributing food categories, along with 'Drinks' and 'Others.' The majority of foods in these categories have a liquid or colloidal component; thus, it would be easier to pour them through the sink.

The preferred Disposal Site for the seven remaining Food Categories is the food grinder. From the total food mass, residents dispose of 42% of it through the food grinder; however, this percentage decreases to 32% when looking at the fat mass. One reason behind this reduction is that people use food grinders to dispose of fruits and vegetables (51% of the food mass disposed of in food grinders) which have a low amount of fat (9% of the fat mass disposed of in food grinders). 'Meat' is the Food Category contributing the third highest amount of fat to food grinders. As food grinders can cut the meat in small pieces, it can be easier to dispose of this food by this means, which is likely the same reason for using it to dispose of fruits and vegetables.

As mentioned in the Introduction, the reviewed literature (See Annex I) has implied that saturated free fatty acids should be a significant concern due to its role in the formation of blockages in sewers. This study found that saturated FFA mass corresponds to around 37.3% of the total fat mass and are mostly present in the categories; 'Dairy products and eggs;' 'Oil and fat;' 'Meat;' 'Condiments, sauces, herbs, spices;' and 'Composite meals.' Regarding the Household Type and Disposal Site, saturated FFA in food follow the same tendencies as total fat. Residents living in single-family detached houses are the principal source of saturated FFA, and the sink is the preferred way to dispose of them. Any strategies taken to reduce the disposal to the sewers of the five Food Categories mentioned should also decrease the amount of saturated FFA in the regional wastewater system.

Based on the information in the diaries, just a small percentage (less than 5%) of the total mass of food entering into the wastewater system was FOG. Assuming all of it reaches the WWTPs and extrapolating for the total population in Metro Vancouver, it would represent 11.44% of the total oil and grease arriving at the plants every month. This figure might suggest that the impact of FOG in food waste from households is lower than from other sources like restaurants or industries. However, even if the assumptions were correct, there are some critical points to consider.

First, it is important to remember that the monthly average concentrations of the oil and grease arriving at the WWTPs are not an accurate estimation of the amount of FOG entering the plants. Also, people do not necessarily consume the same food consistently throughout the year, i.e., there probably is seasonal variability. Additionally, as these results are from the 2014 Metro Vancouver Food Waste Study, some other considerations are relevant. People might have different patterns when disposing of their food waste now since the data in the diaries is from 2014. Also, the 'Wipe It, Green Bin It' campaign started in 2017. The positive impact of this campaign on the residents' behavior is unknown. On the other hand, the population is expected to keep growing in the region (Metro Vancouver 2018c, 2010), which would translate in more consumption of food and, possibly, more food disposed of 'down the drain.'

Nonetheless, the most critical factor that might prevent FOG from reaching the WWTPs is its accumulation in the pipes and pump station wet wells, which is the main problem associated with it. In this regard, also routine and preventative maintenance conducted by municipal and Metro Vancouver staff remove a significant amount of FOG before it ever reaches the WWTPs.

Conclusions and recommendations

The diaries show that, at least in 2014, residents of Metro Vancouver bought and prepared more food or food ingredients than they actually consume. 15.36% of the food waste mass ended up in the regional wastewater system and, due to its content of FOG, contributed to the formation of solid deposits that can block the sewers.

According to the results, residential FOG from food waste contributes over 1000 tonnes of fat to the wastewater system every year. Dairy products and eggs, oils and fat,

condiments, and composite meals are the food products and ingredients with the highest loading of fat which residents usually dispose of through the sink.

According to the results from the Household Use and Disposal of Grease study in Metro Vancouver (Justason Market Intelligence, 2015), 17% of residents said that "it is easy or convenient" to use the sink, food grinders, and toilet as disposal sites for FOG, while 14% did this due to "not being aware of other ways to dispose of grease." The study also mentions that residents "aware of their municipality's stance on the disposal of FOG are less likely to dispose of grease into the drain (25% versus 70%)."

However, the issue is with large amounts of liquid and semi-liquid food waste, such as milk, cream, and soups. The City of Vancouver recommends placing some of these wastes, e.g., mayonnaise and sauce, in the green bin (City of Vancouver, 2018), adding that newspaper, a paper towel or a paper bag could be used to minimize the liquids in the bin and the odors associated with them. Other Canadian municipalities, like the city of Calgary (City of Calgary, 2018), recommend pouring milk down the sink, but as previous research shows, that contributes to the FOG issue in the wastewater system. Scottish Water (Scottish Water, 2016) provides an entirely different recommendation: leave them to cool/harden, scrape them into a container and then put them in the appropriate bin depending on their local Council or waste contractor. A possible solution in Metro Vancouver could be a combination: residents could use a plastic container to store the waste in the freezer, then scrape it into a newspaper, paper towel, or a paper bag and put it in the green bin in the day waste collection is scheduled. As 21% of representatives of households poured their unused oil or grease into a container to dispose of later in the garbage, while 14% said that they stored used oil and grease in the fridge (Justason Market Intelligence, 2015), the proposed strategy could help to continue and spread this positive behavior.

Regarding used cooking oil and grease, large amounts of FOG can be dropped off at specific Metro Vancouver recycling facilities. Adopting a similar strategy to the one used in the city of London, Ontario, could increase the small proportion of Metro Vancouver residents (6%) who keep FOG in a container to dispose of at a recommended depot (Justason Market Intelligence, 2015). The 'Your Turn' program (City of London, 2018; Your Turn 2017) provides biodegradable cups to the residents for disposing of their FOG. First, they pour cooled FOG into the cup, and they store it in the fridge or freezer until it is full or ready for disposal. Giving the residents biodegradable cups to store their FOG and placing them in the organics bin could be perceived as more convenient than taking them to the depot. Nevertheless, first Metro Vancouver would need to be sure that the biodegradable cups are compatible with the regional food waste treatment system. Also, the purchase and distribution of the cups would have associated costs for the region.

The impact of food grinders, although less than sinks, is still considerable. Besides the leading four fat-contributing Food Categories ('Dairy products and eggs;' 'Oil and fat;' 'Condiments, sauces, herbs, spices;' and 'Composite meals'), people need to be aware not to use food grinders to dispose of meat because of its moderate-to-high fat content, which is also rich in saturated free fatty acids.

Without knowing the total amount of FOG entering the wastewater system from all the possible sources, it is difficult to assess the impact of households accurately. Further research could include information about the most common areas with reported sewer blockages due to FOG and explore its relationship with the ratio of restaurants and households in those areas.

Finally, the 'Love Food, Hate Waste' campaign spreads the right message about reducing avoidable household food waste by providing residents with useful tips to use more of the food they purchase. Nevertheless, in a multicultural region as Metro Vancouver, a campaign such as the 'Wipe It, Green Bin It' it is also very useful as it recommends small and concrete actions. Expanding it with reminders not to use the 'drain' to dispose of the most FOG-contributing Food Categories identified in this study could make a huge difference.

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Annex I. Literature review

Problems and definition

A major issue affecting sewer systems is blockages due to fat, oil, and grease (FOG) deposits. They are a concern for municipalities due to their contribution to sanitary sewer overflows, which can lead to property flooding and contamination of water bodies with sewage. These types of events can have adverse effects on human health and the environment (He et al., 2017; Husain et al., 2014; Wallace et al., 2017).

FOG blockages cause problems all over the world. Ducoste et al. (2008) reported that FOG deposits cause approximately 40-50% of the sewers blockages in the USA. Similarly, they are responsible for around 12,500 flooding events in the United Kingdom (Williams et al., 2012), 21% of the sanitary sewers overflow in Australia (Marlow et al., 2011) and 70 % in Malaysia (Husain et al., 2014). When FOG enters a wastewater treatment plant, it is usually separated in the skimming tanks (Wallace et al., 2017). If not, it can cause blockages in the plant infrastructure and harm the settlement and clarification facilities (Wallace et al., 2017).

The term “FOG” refers to the by-products of cooking, including meat fats, food scraps, cooking oil, tallow, gravy, fats, margarine, sauces, lard, butter, dressing, deep-fried food, and cheeses (Husain et al., 2014). The primary sources of FOG in the sewer system are food service establishments and households (He et al., 2017; Husain et al., 2014). Other sources include discharges from industrial activities, like food processing (Husain et al., 2014). In this literature review, no study was found that quantified the contribution of households to FOG in the sewer system. Residential areas, especially those with high-rise buildings, were identified to have the second-highest number of FOG related problems after city centers, which probably have a high number of restaurants, in Norway and Sweden (Mattsson et al., 2014).

Composition

The main chemical components of FOG deposits are free fatty acids (FFAs). They are carboxylic acids with long-chain hydrocarbon side groups that can be produced from the hydrolysis of their ester form, which is usually found in lipids. The most common FFAs in food have a straight chain from 8 to 22 carbon atoms. If there are only single bonds between the carbon atoms of a chain, the FFA is known as saturated; when there are one or more double bonds, they are called unsaturated (Husain et al., 2014).

The most common form of fatty acids is as esters attached to a glycerol molecule, which has three carbons atoms. Depending on how many of them are acylated, it can be called monoacylglycerol (MAG), diacylglycerols (DAG) or triacylglycerols (TAG). With the latter being the most common (Husain et al., 2014).

Studies have found that FOG deposits in the sewers are not only formed by long FFAs but also different minerals and metals, mainly calcium (Keener et al., 2008; Williams et al., 2012). Their results indicate that many FOG deposits are calcium fatty acid salts produced by saponification. The latter is a process in which esters react with bases to give

alcohols and salts of carboxylic acids (Daintith, 2008). Additionally, Benecke et al. (2017) also found TAG in trace amounts in deposits from three urban locations in Wisconsin, USA.

The most abundant FFA found in FOG deposits is palmitic acid (which is saturated), with unsaturated fatty acids like oleic and linoleic also found in significant amounts. Calcium was the most common metal found; others like iron, aluminum, and magnesium were also present in lower concentrations (Benecke et al., 2017; Keener et al., 2008; Williams et al., 2012).

Some possible explanations for the abundance of palmitic acid are the generation of saturated fatty acids during cooking and the preferential breakdown of unsaturated acids by the action of lipolytic enzymes, present in food residuals in grease interceptors (Iasmin et al., 2014). Microorganisms in sewer systems can also transform unsaturated fatty acids to saturated fatty acids, like palmitic (Williams et al., 2012).

Calcium in wastewater is thought to come mainly from the concrete corrosion of sewer systems induced by microbes (He et al., 2017). Although calcium is naturally present in water and wastewater, Keener et al. (2008) found no correlation between the hardness of a water source and the high calcium concentration in FOG deposits in the same area. Other proposed sources of calcium are food waste and human urine, but they have not been studied yet (He et al., 2017).

FOG deposits analyzed by Keener et al. (2008) showed layers of debris in alternation with layers of FOG-related solids, which suggests a discontinuous formation process (He et al., 2017). Dirt and detritus from floors, tables, and walls that reach the sewers can be sources of debris found in FOG deposits (Keener et al., 2008). As recently found in London, non-flushable waste, such as wet wipes and sanitary items, can contribute to the formation of deposits too (Khomami, 2018).

Mechanism of FOG deposits formation

FOG interacts with calcium, leading to the formation of hardened calcium-based fatty acid salts through a saponification reaction (Keener et al., 2008). This formation route was confirmed in an experiment of lab-based FOG deposits made from FFAs and calcium chloride (He et al., 2011). FOG deposits primarily made of calcium salts of unsaturated fatty acids (like oleic or linoleic) seem to have better adhesive properties, more viscosity, and lower yield strength than those made of calcium salts of saturated fatty acids (like palmitic) (He et al., 2013). Gross et al. (2017) proposes that the decrease in yield strength is due to the double bonds present in unsaturated acids flexible double bonds reduce the uniformity and strength of the structure of the FOG deposit.

In addition to saponification, the aggregation of unreacted FFAs, calcium, other metals, and debris was identified as another process in FOG deposit formation (He et al., 2011; Williams et al., 2012). The finding that FFAs, rather than fatty acid salts and triglycerides, were the predominant species in FOG deposits further supported this theory (Benecke et al., 2017).

He et al. (2013) proposed a mechanism that describes the FOG deposit formation considering saponification and aggregation. When FFAs reach the sewage system, they

partition into oil and go to the surface of wastewater. Calcium, naturally present in wastewater or generated from concrete corrosion, accelerates the rate of saponification of FFAs at the oil/water or oil/concrete interfaces. Then, the saponified solid act as a core fixed to the pipeline surface on which other unreacted FFAs, calcium excess, and debris aggregate (He et al., 2011; Williams et al., 2012). Also, unreacted FFAs diffuse toward the solid core matrix drawing with it calcium and other cations due to van der Waals forces and electrostatic repulsion (He et al., 2013).

It should be noted that a recent study showed that lab-based FOG deposits were formed with and without the addition of metals (Gross et al., 2017). Thus, it was proposed that the formation of the deposits in the absence of metals was through a crystallization process. When analyzing the melting profile of the FOG deposits, all of them presented the same melting temperature of known crystalline FFAs, which demonstrated that the deposits contained crystallized fatty acids. Gross et al. (2017) also found that the addition of calcium increases the yield strength of the deposits. This phenomenon was attributed to a shift from a crystallization process to a saponification process, as saponified fatty acids usually have higher yield strength than those crystallized.

Relevant factors

Calcium salts and FOG concentration, the FFA types, water hardness, wastewater pH and temperature have been identified as important factors affecting the formation process of FOG deposits (Iasmin et al., 2014).

So far, research on the type of FFA shows that oleic and palmitic acid lead to calcium-based saponified solids with a higher yield and degree of saponification than linoleic or lauric acid (Del Mundo and Sutheerawattananonda, 2017). Increases in temperature and pH, which can be due to the use of alkaline detergents, favor the reaction rate of saponification (Iasmin et al., 2016).

The hydraulic structures of sewers can affect the spatial distribution of FOG deposits. These deposits can form in pipes with roots intrusions due to the additional surface area of the roots, while those found in manholes and pipe sags are caused by low flow conditions, which result in longer contact times between the FFAs and the surface (Dominic et al. 2013). Also, FOG deposits can form in a straight pipe section due to the roughness of the surface and the increased availability of free fatty acids as oil accumulates (Dominic et al. 2013; He et al., 2013). Other factors mentioned by He et al., 2017 are partial and inadequate flows (Marlow et al., 2011), the density of food service establishments and high-rise residential buildings (Mattsson et al., 2014), kitchen practices and poorly maintained grease interceptors (Williams et al., 2012).

Conclusions and recommendations

The most frequently recommended strategies in the literature always involve education and awareness campaigns with the stakeholders involved, which highlight the importance of promoting good practices of FOG management in domestic and commercial settings (Mattsson et al., 2015, Wallace et al., 2017). Palmitic acid was the most common fatty acid found in field FOG deposits, which suggests that saturated fatty acids should be the primary

focus of campaigns and source control programs. All foods contain this type of fat, but it is mainly present in animal foods, e.g., dairy products, meats, and ice cream. Some plants and products made of them also contain saturated fats, like coconut, coconut oil, palm oil, and palm kernel oil (Harvard T.H. Chan). It is important to encourage residents not to dispose of those food products in the sink or food grinders.

Regulations to reduce FOG discharges in sewer systems focus on food service establishments. The primary mechanism used by authorities is requiring or enforcing the installation of grease interceptors (He et al., 2013). For this strategy to work better, a standardized monitoring procedure is required (Mattsson et al., 2015, Wallace et al., 2017). For households, Mattsson et al. (2015) mention the possibility of installing grease interceptors in high-rise residential buildings. The main challenge would be that changes to the Canadian Plumbing Code would be required, since grease interceptors are not designed to manage all of the household wastewater. A dedicated pipe system from each household's kitchen to the central grease interceptor would be required. This would be cost-prohibitive in existing buildings.

Although many initiatives target FOG from food service establishments, there are some examples of interventions in households in the scholar literature. The RecOil project, in the EU, used a multi-country approach to reduce FOG blockages through education campaigns directed to the public and the collection and subsequent use of waste oil for the production of biodiesel (Wallace et al., 2017). Similarly, in Austria, there was another successful example of the collection of FOG using jars distributed to households (Körbitz et al., 2003).

In Canada, there have been different campaigns supported mainly by municipalities. The City of London and FluksAqua, an online resource for water and wastewater services, developed the "Your Turn" program (Your Turn; London, Canada), in which the municipality distributes collection cups where residents can store and refrigerate FOG wastes. When the cups are full, they can be disposed of with the rest of the organic waste or taken to an environmental depot. The program's website reports that the city "has been saving $100,000 a year over the last 3 years without having to unclog their pipes" (Your Turn). Recently, it has expanded to other municipalities across Canada (Cision, 2017). There are other campaigns which recommend collecting and depositing FOG wastes in the "green bin" (organic waste), instead of pouring them through the sink (Regional Municipality of Wood Buffalo; Ottawa; Metro Vancouver). Finally, there are educational campaigns, such as "I don't flush" which comes from a partnership between a private and a non-profit organization. Using videos, ads, and a website, they seek to increase the public awareness about the benefits of taking care of the wastewater system (I don't flush).

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Annex II. Table of foods

Note: If no Source is indicated in the table, the information was obtained from the Canadian Nutrient File (CNF, https://food-nutrition.canada.ca/cnf-fce/index-eng.jsp)

Food entries in red correspond to the cases where the food in the literal transcript was not present in the CNF, so nutritional information from the another food in the database ('Food equivalent') replaced it.

Food registered in the diary	Food equivalent	Total fat [g]	Saturated fatty acids [g]	Monounsaturated fatty acids [g]	Polyunsaturated fatty acids [g]	Unsaturated fatty acids [g]	Source	Website
cooking oil; oil; vegetable oil; cooking liquid	Vegetable oil, canola	100	7.365	63.276	28.142	91.418		
beef sauce; spaghetti sauce; pasta sauce; sauce; Cabbage roll sauce; catelli pasta sauce; Knorr sidekick	Sauce, steak, tomato based, ready-to-serve	0.23	0	0	0	0		
saurkraut brine; saurkraut	Sauerkraut, canned, solids and liquid	0.14	0.034	0.013	0.067	0.08		
Tomato juice	Juice, tomato, canned	0.29	0.019	0.005	0.027	0.032		
Olive oil	Vegetable oil, olive	100	13.808	72.961	10.523	83.484		
balaic vinegar; Newman's own balsamic vinagrette; balsamic reduction	Vinegar, balsamic	0	0	0	0	0		
Vinegar	Vinegar, distilled (white)	0	0	0	0	0		
Egg	Egg, chicken, whole, fresh or frozen, raw	10.01	3.043	4.182	1.446	5.628		

Lemon juice	Lemon juice, raw	0.24	0.04	0	0	0		
lemon pulp and seeds; lemon	Lemon, raw, without peel	0.3	0.039	0.011	0.089	0.1		
Pork	Pork, carcass, lean and fat, raw	35.07	12.44	15.93	3.8	19.73		
pasta; quinoa pasta	Pasta, corn, dry	2.08	0.29	0.543	0.924	1.467		
fruit smoothie; smoothie mix; smoothie mix (berries, whey, ice, vanilla); smoothie: banana, blueberry, whey powder, almond milk; smoothie; smoothie: milk, bananas, mixed frozen fruit; Blueberry smoothie spinach, and kale; Blueberry smoothie	Fruit juice smoothie, ODWALLA, ORIGINAL SUPERFOOD (from USDA)	0.36	0.105	0.04	0.112	0.152	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/09513?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=Fruit+juice+smoothie%2C+ODWALLA%2C+ORIGINAL+SUPERFOOD&ds=&qt=&qp=&qa=&qn=&q=&ing=
papaya; papaya salad	Papaya, raw	0.26	0.081	0.072	0.058	0.13		
blueberries; berries	Blueberry, raw	0.33	0.028	0.047	0.146	0.193		
salad; veggie salad; prewashed salad mix; green salad; mixed vegetable peelings; mix veg	Fast foods, entree, salad, vegetable, no dressing	0.07	0.01	0.004	0.034	0.038		

peelings; mix veggie peelings; frozen vegetables								
tomato; tomatoes; cherry tomatoes; grape tomato; liquid from canned tomatos	Tomato, red, ripe, raw, year round average	0.2	0.028	0.031	0.083	0.114		
homemade tomato sauce; salsa (tomato water/sauce); tomato sauce; pacific organic creamy tomato soup; tomato salsa	Tomato sauce, unsalted	0.3	0.041	0.044	0.121	0.165		
whole rice; rice	Grains, rice, white, long-grain, regular, cooked	0.28	0.077	0.088	0.076	0.164		
vidalia onion and peel; onion; spanish onion; onion skin	Onion, raw	0.1	0.042	0.013	0.017	0.03		
cereal, rice crispies; rice krispies cereal	Cereal, ready to eat, Rice Krispies, Kellogg's	1.03	0.335	0.248	0.327	0.575		
milk; milk 2%; lactose free milk; foamed milk; organic milk	Milk, fluid, partly skimmed, 2% M.F.	1.98	1.257	0.56	0.073	0.633		
vector cereal	Meal replacement (cereal),	5.4	0.918	1.092	2.811	3.903		

	ready to eat, Vector, Kellogg's							
peanut butter; peanut butter (smooth)	Peanut butter, smooth type, fat, sugar and salt added	51.36	10.147	25.495	12.32	37.815		
jam	Sweets, jams and preserves	0.07	0.01	0.038	0	0.038		
sandwich; brown toast; bread; toast; frozen pizza crust; slice bread; bread crusts; burger buns (from Superstore); Safeway extra thick sliced bread; pie crust	Bread, white, commercial	2.66	0.641	0.587	1.318	1.905		
miso soup	Miso Soup, UPC: 830757000226	10	0	0	0	0	USDA National Nutrient Database (No data on Saturated, Monounsaturated, and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45089760?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=Miso+Soup%2C+UPC+&ds=&qt=&qp=&qa=&qn=&q=&ing=
parmesan cheese	Cheese, parmesan, hard	25.83	16.41	7.515	0.569	8.084		
juice; orange juice	Orange juice, raw	0.2	0.024	0.036	0.04	0.076		

cottage cheese; 2% cottage cheese	Cheese, cottage, (2% M.F.)	2.27	1.235	0.516	0.083	0.599		
apple core; apple; ambrosia apple; gala apple; organic apple core	Apple, Gala, raw, with skin	0.12	0	0	0	0		
banana peel; banana; banana stem	Banana, raw	0.33	0.112	0.032	0.073	0.105		
orange peel; orange rind; orange navel peel	Orange peel, raw	0.2	0.024	0.036	0.04	0.076		
lettuce ends; lettuce; lettuce leaves; green lettuce; veggie leaves; veggie peelings; salad leaves	Lettuce, iceberg	0.14	0.018	0.006	0.074	0.08		
vegetable peels, vegetable scraps	Vegetables, mixed, frozen, unprepared	0.52	0.098	0.031	0.235	0.266		
mashed potatoes	Potato, mashed, homemade, prepared with 2% M.F. milk	0.32	0.101	0.042	0.04	0.082		
potato peels; large potato peel; potato peelings; yellow potato peel; nugget	Potato, skin, raw	0.32	0.101	0.042	0.04	0.082		

potato; golden russet potato peelings; russet potato peelings; russet potato								
yogurt; plain yogurt; yogurt drink; Astro organic yogurt; Danone yogurt; pro-biotic; strawberry yogurt; silhouette yogourt; bag yogurt; hommade yogurt; Safeway yogurt	Yogourt, plain (2-3.9% M.F.)	1.98	1.307	0.514	0.062	0.576		
soy milk	16235, SILK Plain, soymilk	1.65	0.206	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/16235?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=SILK+Plain%2C+soymilk&ds=&qt=&qp=&qa=&qn=&q=&ing=
pancake; pancake mix; Pancake batter; homemade batter;	Pancake, plain, homemade	9.7	2.122	2.474	4.447	6.921		

quick batter								
cheerios	Cereal, ready to eat, Cheerios, General Mills	6.35	1.31	2.22	2.29	4.51		
almond milk , almond original	Beverages, almond milk, unsweetened, shelf stable (from USDA)	0.96	0.08	0.59	0.24	0.83	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/14091?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=Beverages%2C+almond+milk%2C+unsweetened%2C+shelf+stable&ds=&qt=&qp=&qa=&qn=&q=&ing=
vanilla yogurt	Yogourt, vanilla flavoured (2-3.9% M.F.)	2.83	1.865	0.728	0.097	0.825		
granola; granola cereal	Cereal, ready to eat, granola, homemade	24.36	4.537	7.643	10.71	18.353		
alfredo sauce	Sauce, Alfredo, dehydrated	36.35	13.18	13.669	8.61	22.279		
strawberry banana smoothie	Fast foods, strawberry banana smoothie made with ice and low-fat yogurt	0.14	0	0.049	0.052	0.101	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/305680?manu=&fgcd=&ds=&q=Fast%20foods,%20strawberry%20banana%20smoothie%20ma

								de%20with%20ice%20and%20low-fat%20yogurt
wine	Alcohol, table wine, red (11.5% alcohol by volume)	0	0	0	0	0		
mayonaise; mayo and mustard prepared sauce; salad dressing; mayo dip; Little Creek salad dressing; salad dressing and vegetable juice; craft mayonaise dressing	Salad dressing, mayonnaise, commercial, regular	74.85	11.703	16.843	44.69	61.533		
corn porridge; porridge	PAMANA, GINATAANG MAIS, CORN PORRIDGE WITH COCONUT MILK, UPC	12	8	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/349725?manu=&fgcd=&ds=&q=PAMANA,%20GINATAANG%20MAIS,%20CORN%20PORRIDGE%20WITH%20COCONUT%20MILK,%20UPC:%20795981230088
rice porridge	OTTOGI, VEGETABLE RICE PORRIDGE, UPC	4.41	2.94	0	0	0	USDA National Nutrient Database (No data on Monounsaturated	https://ndb.nal.usda.gov/ndb/foods/show/346432?manu=&fgcd=&ds=&q=OTTOGI,

							and Polyunsaturated fatty acids)	%20VEGETABLE%20RICE%20PORRIDGE,%20UPC:%208801045083100
mushroom soup; Campbell's mushroom soup; Campbell canned soup; Campbell's cream of mushroom soup	Soup, cream, mushroom, canned, condensed	6.52	0.291	0.915	0.118	1.033		
diet cola	DIET COKE, DIET COLA, UPC: 049000057782	0	0	0	0	0	USDA National Nutrient Database (No data on Saturated, Monounsaturated, and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45308483?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=diet+cola&ds=&qt=&qp=&qa=&qn=&q=&ing=
cilantro	Coriander (cilantro), raw	0.52	0.014	0.275	0.04	0.315		
ketchup; heinz ketchup	Tomato ketchup (catsup)	0.1	0.014	0.015	0.041	0.056		
condensed milk	Milk, condensed, sweetened, canned	8.7	5.486	2.427	0.337	2.764		
egg plant	Eggplant (aubergine, brinjal), raw	0.18	0.034	0.016	0.076	0.092		
red pepper trim; bell pepper stem and seeds; pepper;	Pepper, sweet, red, raw	0.3	0.027	0.003	0.07	0.073		

Hot House red pepper trim								
yellow pepper trim	Pepper, sweet, yellow, raw	0.21	0.031	0	0	0		
chicken broth; soup; chicken soup; homemade chicken soup; chicken broth soup; Hot Pot Soup; homemade broth from chicken stew; soup broth; chicken soup broth from Campbell's chicken noodle soup; No Name Brand chicken broth	Soup, broth, chicken, dehydrated, water added	0.23	0.057	0.089	0.074	0.163		
fish juice; salmon skin; fish; salmon skin and bones; salmon head and bones; canned salmon juice; salmon cooked with miso	Fish, salmon, chinook (spring), baked or broiled	13.38	3.214	5.742	2.662	8.404		
parsely stems; parsley	Parsley, fresh	0.79	0.132	0.295	0.124	0.419		
tofu; tofu liquid	Tofu, regular; soft or	5.38	0.542	4.338	0.542	4.88		

	firm, prepared with magnesium chloride (nigari)							
celery; celery stalk ends; celery stalks	Celery, raw	0.17	0.042	0.032	0.079	0.111		
skim milk	Milk, fluid, skim	0.08	0.056	0.022	0.003	0.025		
steel cut oats	Grains, oats	6.9	1.217	2.178	2.535	4.713		
Vietnamese noodles (take-out): vermicelli, cabbage, carrots, bean sprouts	Chinese dish, chow mein, vegetable, without meat or noodles, restaurant prepared	1.68	0.293	0.411	0.921	1.332		
eggnog; Boathouse farm's holiday egg nog	Eggnog, 7% M.F., Canadian product, 4% to 8% M.F.	4.19	2.591	1.302	0.198	1.5		
soy sauce; soya sauce; soy	Soy sauce (made from soy), tamari	0.1	0.011	0.017	0.044	0.061		
avocado skin; avocado peel	Avocado, raw, all commercial varieties	14.66	2.126	9.799	1.816	11.615		
grapefruit; grapefruit peel; grapefruit skin and fiber	Grapefruit, pink or red, all areas, raw	0.14	0.021	0.02	0.036	0.056		
lemon rind; lemon peel; dandy lemon peel	Lemon peel, raw	0.3	0.039	0.011	0.089	0.1		
pineapple, pineapple peel; pineapple core	Pineapple, raw	0.12	0.009	0.013	0.04	0.053		
chard stems; red	Chard, swiss, raw	0.2	0.03	0.04	0.07	0.11		

chards ends								
oatmeal; instant oatmeal; quaker oatmeal	Cereals, QUAKER, Instant Oatmeal Organic, Regular	6.3	1.11	1.98	2.3	4.28	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/08640?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=instant+oatmeal&ds=&qt=&qp=&qa=&qn=&q=&ing=
canola oil	Vegetable oil, canola	100	7.365	63.276	28.142	91.418		
black bean and corn salsa;bottled salsa; President's Choice fresh salsa; black bean sauce; salsa	Sauce, salsa, ready-to-serve	0.17	0.03	0.025	0.115	0.14		
bottled dill pickles and brine; dill pickle juice and spices; Pickle, Juice; pickle juice	Pickles, cucumber, sour	0.2	0.052	0.003	0.081	0.084		
fudge	Candies, fudge, chocolate, prepared-from-recipe (from USDA)	10.41	6.448	2.943	0.373	3.316	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/304867?manu=&fgcd=&ds=&q=Candies,%20fudge,%20chocolate,%20prepared-from-recipe
roast chicken and bones;	Chicken, broiler, meat and	13.6	3.79	5.34	2.97	8.31		

chicken bones and skin; chicken skin; skin of chicken breasts	skin, roasted							
tomato soup; gazpacho soup puree; Campbell's tomato soup	Soup, tomato, ready-to-serve	1.41	0.357	0.296	0.656	0.952		
coffee cream	Cream, table (coffee), 18% M.F.	18	11.205	5.201	0.671	5.872		
carrot peel; carrot; baby carrot	Carrot, raw	0.24	0.037	0.014	0.117	0.131		
garlic clove; garlic peel; garlic skin; garlic clove skin	Garlic, raw	0.5	0.089	0.011	0.249	0.26		
western family hummus; prepared hummus	Hummus, commercial	9.6	1.437	4.039	3.613	7.652		
oyster	Ostrich, oyster, raw	3.67	1.22	1.25	0.61	1.86		
cereal; corn flakes; bahg cereal	Cereal, ready to eat, Corn Flakes, Kellogg's	0.76	0.214	0.118	0.344	0.462		
BBQ sauce; Kraft BBQ sauce for chicken and ribs	Sauce, barbecue, ready-to-serve	0.63	0.045	0.082	0.101	0.183		
broccoli (raw)	Broccoli, raw	0.37	0.039	0.011	0.038	0.049		
broccoli (boiled, cooked)	Broccoli, boiled, drained	0.41	0.079	0.04	0.17	0.21		
cauliflower (raw)	Cauliflower, raw	0.28	0.13	0.034	0.031	0.065		
cauliflower (boiled, cooked)	Cauliflower, boiled, drained	0.45	0.07	0.032	0.217	0.249		

homemade salad dressing	Salad dressing, french, homemade, unspecified oil	70.2	12.6	20.7	33.7	54.4		
leek soup	Soup, leek, dehydrated, water added	0.81	0.4	0.34	0.04	0.38		
strawberry; strawberry trim	Strawberry, raw	0.3	0.015	0.043	0.155	0.198		
apple mango juice	Apple juice, canned or bottled, without added vitamin C	0.13	0.022	0.006	0.039	0.045		
grapefruit juice	Grapefruit juice, pink, raw	0.1	0.014	0.013	0.024	0.037		
ginger ale	Carbonated drinks, ginger ale	0	0	0	0	0		
rice pudding with raisins (homemade)	Dessert, pudding, rice, with raisins, homemade	1.65	1.028	0.511	0.077	0.588		
tangerine peels; mini and mandarin peels; mandarine small; japanese mandarines; baby mandarines	Tangerine (mandarin), raw	0.31	0.039	0.06	65	65.06		
shrimp shells; prawn shells; prawn tails; shrimp tails; tiger shrimp tails	Crustaceans, shrimp, mixed species, raw	1.01	0.261	0.181	0.295	0.476		
chicken fat; chicken	Animal fat, chicken	99.8	29.8	44.7	20.9	65.6		

juices; chicken cooking juices								
steak fat; greases/juices from ground beef; meatloaf fat	Animal fat, beef tallow	100	49.8	41.8	4	45.8		
romaine lettuce	Lettuce, cos or romaine	0.3	0.039	0.012	0.16	0.172		
red onion trimmings	RED ONION, UPC : 711535512561	0	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45356834?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=RED+ONION%2C+UPC+%3A+711535512561&ds=&qt=&qp=&qa=&qn=&q=&ing=
yellow onion trimmings; yellow medium onion	YELLOW ONIONS, UPC: 041268162796	0	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45182440?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=YELLOW+ONIONS%2C+UPC%3A+041268162796&ds=&qt=&qp=&qa=&qn=&q=&ing=

green onions trimmings	GREEN ONIONS, UPC: 851413003078	0	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45186660?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=GREEN+ONIONS%2C+UPC%3A+851413003078&ds=&qt=&qp=&qa=&qn=&q=&ing=
kale stems; kale sprigs; kale; kale salad	Kale, raw	0.93	0.091	0.052	0.338	0.39		
radish	Radish, raw	0.1	0.032	0.017	0.048	0.065		
zucchini top; zucchini	Squash, summer, zucchini, raw	0.32	0.084	0.011	0.091	0.102		
fruit juice (thawed); mixed fruit juice; fruit salad juice; fruit juice	Juice drink, fruit, ready-to-drink	0.11	0.017	0.002	3	3.002		
wonton soup with chicken broth; wonton soup broth; soup: chicken broth, noodles, wontons	Soup, wonton (won ton), canned, ready-to-serve	0.77	0.258	0.275	0.174	0.449		
beer	Alcohol, beer, regular, (5% alcohol by volume)	0	0	0	0	0		

soft drink	Carbonated drinks, cola	0	0	0	0	0		
sour cream; cream; Dairyland regular sour cream; creamo	Cream, sour, cultured, 14% M.F	14.1	8.7	4.1	0.5	4.6		
bacon fat; bacon dripping; fat	Animal fat, bacon grease	99.5	39.004	44.874	11.144	56.018		
cucumber; baby cucumber	Cucumber, raw	0.11	0.037	0.005	0.032	0.037		
beets	Beets, raw	0.17	0.027	32	6	38		
chocolate cookies	Cookie, chocolate chip, commercial, regular, higher fat	24.72	8.091	6.272	8.417	14.689		
asparagus ends; asparagus	Asparagus, raw	0.12	0.04	0	0.05	0.05		
grape	Grape, red or green (European type, such as Thompson seedless), adherent skin, raw	0.16	0.054	0.007	0.048	0.055		
bruschetta	BRUSCHETTA, UPC: 850474000286 (from USDA)	7	1.5	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45202629?fgcd=&manu=De+Carlo+srl&format=&count=&max=25&offset=0&sort=fd_s&order=asc&qlookup=&ds=&qt=&qp=&qa=&qn=&q=&ing=
hommade relish;	Pickle relish, sweet	0.47	0.054	0.209	0.122	0.331		

greeen relish								
pesto	Sauce, pesto, CLASSICO, basil pesto, ready-to-serve (form USDA)	36.38	6.718	10.049	18.425	28.474	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/06629?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=Sauce%2C+pesto%2C+CLASSICO%2C+basil+pesto%2C+ready-to-serve+&ds=&qt=&qp=&qa=&qn=&q=&ing=
kiwi; kiwi peel	Kiwi fruit, raw	0.52	0.029	0.047	0.287	0.334		
raspberries	Raspberry, raw	0.65	0.019	0.064	0.375	0.439		
spinach; spring green; spinach salad	Spinach, raw	0.39	0.063	0.01	0.165	0.175		
cracker	Cracker, standard snack-type	26.43	5.562	6.553	13.137	19.69		
honey mustard	Salad dressing, honey mustard, regular	40.83	5	11.458	22.839	34.297		
syrup; maple syrup	Sweets, syrups, maple, bulk	0.24	0.007	0.011	0.017	0.028		
trail mix	Snacks, trail mix, regular	29.4	5.55	12.53	9.65	22.18		
chia seeds	Seeds, chia seeds, dried	30.74	3.33	2.309	23.665	25.974		
v8 juice	V8 V-FUSION, VEGETABLE & FRUIT JUICE, PEACH,	0	0	0	0	0	USDA National Nutrient Database (No data on	https://ndb.nal.usda.gov/ndb/foods/show/332209?manu=&fg

	MANGO, UPC: 051000196200						Monounsaturated and Polyunsaturated fatty acids)	cd=&ds=&q=V8%20V-FUSION,%20VEGETABLE%20&%20FRUIT%20JUICE,%20PEACH,%20MANGO,%20UPC:%2005100196200
cinnamon bun icing	Cinnamon bun, with icing (honey bun)	26.61	12.649	8.723	3.676	12.399		
persimmon, persimmon leaves; persimmon peel	Persimmon, native, raw	0.4	0	0	0	0		
pear	Pear, raw, with skin	0.14	0.022	0.084	0.094	0.178		
orange	Orange, with peel, raw	0.3	0.035	0.055	0.06	0.115		
lemon (peel + raw without peel)	Lemon, raw, without peel	0.3	0.039	0.011	0.089	0.1		
canned tuna water; tuna juice; No Name Canned Tuna; tuna canned juice	Fish, tuna, white, canned with water, drained, unsalted	2.97	0.792	0.784	1.109	1.893		
chocolate mile; Dairyland milk with hot chocolate; Dairyland chocolate milk	Milk, fluid, chocolate, partly skimmed, 2% M.F.	1.9	1.177	0.455	0.089	0.544		
hot chocolate; cadbury hot chocolate;	Hot chocolate, cocoa, homemade, prepared with 2% milk	2.34	1.431	0.677	0.084	0.761		

Nutella hot chocolate								
oat, peanut and almond porridge	Nuts, almonds	49.93	3.802	31.551	12.329	43.88	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/12061?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=nuts%2C+almonds&ds=&qt=&qp=&qa=&qn=&q=&ing=
peanut	Peanuts, all types, raw (from USDA)	49.24	6.279	24.426	15.558	39.984		
fruit drink	Juice drink, fruit, ready-to-drink	0.11	0.017	0.002	0.03	0.032		
tropicana orange juice; Minute Maid orange juice; old south orange juice; simply orange orange juice; forzen orange juice	Juice drink, orange	0	0	0	0	0		
pineapple juice	Pineapple juice, canned, added vitamin C	0.12	0.008	0.014	0.042	0.056		
sparkling soda water	Carbonated drinks, club soda	0	0	0	0	0		
butter	Butter, regular	81.11	51.368	21.021	3.043	24.064		
mushroom; juices from	Mushroom, white, raw	0.34	0.05	0	0.16	0.16		

canned mushrooms								
rum	Alcohol, rum (40% alcohol by volume)	0	0	0	0	0		
chai latte with milk	Tea, chai latte, prepared with whole milk	2.14	1.377	0.681	0.079	0.76		
cabbage; chopped cabbage	Cabbage, raw	0.1	0.034	0.017	0.017	0.034		
red cabbage	Cabbage, red, raw	0.16	0.021	0.012	0.08	0.092		
curry sauce; Chickpea Curry Sauce from frozen	CLASSIC CURRY SAUCE, UPC: 859483003004	6.61	0.41	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45222102?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=CLASSIC+CURRY+SAUCE%2C+UPC%3A+859483003004&ds=&qt=&qp=&qa=&qn=&q=&ing=
green olives; olives; olive brine	Olive, pickled, canned or bottled, green	15.32	2.029	11.314	1.307	12.621		
ranch salad dressing; ranch dressing	Salad dressing, ranch dressing, commercial, regular	44.54	6.964	9.166	25.68	34.846		
greek yogurt	Yogourt, Greek style, plain, 2% M.F.	2	1.143	0.457	0.114	0.571		
frozen blackberries	Blackberry, frozen, unsweetened	0.43	0.015	0.041	0.245	0.286		

spaghetti	Pasta, spaghetti, unenriched, cooked, salted	0.93	0.176	0.131	0.319	0.45		
butternut squash	Squash, winter, butternut, raw	0.14	0.062	0.025	0.051	0.076		
cool whip	KRAFT, COOL WHIPPED TOPPING, ORIGINAL, UPC: 043000009444	16.67	16.67	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45247544?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=KRAFT%2C+COOL+WHIPPED+TOPPING%2C+ORIGINAL%2C+UPC%3A+043000009444&ds=&qt=&qp=&qa=&qn=&q=&ing=
gravy; gravy from pot roast; brown gravy	Gravy, turkey, canned	2.1	0.62	0.9	0.49	1.39		
beef stew; homemade beef stew; leftover sauce from stew; Cambells Chunky Stew; beef stew with carrots, potatoes and onions	Beef stew with potatoes and vegetables	1.6	0.618	0.757	0.127	0.884		
tempura sauce	ASSI, TEMPURA DIPPING SAUCE, UPC:	0	0	0	0	0	USDA National Nutrient Database (No data	https://ndb.nal.usda.gov/ndb/foods/show/45170895

	0816520413 20						on Monounsaturated and Polyunsaturated fatty acids)	?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=ASSI%2C+TEMPURA+DIPPING+SAUCE%2C+UPC%3A+081652041320&ds=&qt=&qp=&qa=&qn=&q=&ing=
broccoli slaw	BROCCOLI SLAW, UPC: 709351000218	0	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45343449?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=BROCCOLI+SLAW%2C+UPC%3A+709351000218&ds=&qt=&qp=&qa=&qn=&q=&ing=
kraft dinner; macaroni and cheese; mac and cheese	Macaroni and cheese, box mix with cheese sauce, prepared	4.99	1.636	2.216	1.044	3.26		
chicken noodle soup; Lipton chicken noodle soup	Soup, chicken noodle, homemade	1.13	0.284	0.326	0.286	0.612		
candied nuts	CANDIED WALNUTS, UPC:	60.71	5.36	10.71	42.86	53.57	USDA National	https://ndb.nal.usda.gov/ndb/f

	099482465087						Nutrient Database	oods/show/45340020?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=CANDIED+WALNUTS%2C+UPC%3A+099482465087+&ds=&qt=&qp=&qa=&qn=&q=&ing=
potato chips	Snacks, potato chips, plain, salted	33.98	3.4	18.963	8.282	27.245		
chicken breast; chicken	Chicken, broiler, breast, meat, roasted	3.57	1.01	1.24	0.77	2.01		
peperoni	Deli-meat, pepperoni	19.86	7.01	8.5	3.475	11.975		
brown rice	Grains, rice, brown, long-grain, cooked	0.9	0.18	0.327	0.323	0.65		
egg mixture; scrambled eggs	Egg, chicken, whole, cooked, scrambled or omelet	11.39	3.312	4.802	2.118	6.92		
1% milk; 1% milk with vanilla and honey	Milk, fluid, partly skimmed, 1% M.F.	0.97	0.633	0.277	0.035	0.312		
homo milk; whole milk	Milk, fluid, whole, pasteurized, homogenized, 3.25% M.F.	3.25	1.865	0.812	0.195	1.007		
formula; organic formula	Infant formula, MEAD JOHNSON,	3.5	1.48	1.2	65	66.2	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show

	Gentlease, ready to feed, with ARA and DHA							/299796?manu=&fgcd=&ds=&q=Infant%20formula,%20MEAD%20JOHNSON,%20Gentlease,%20ready%20to%20feed,%20with%20ARA%20and%20DHA
coconut milk	Nuts, coconut milk (liquid from grated meat and water), raw	23.84	21.14	1.014	0.261	1.275		
mustard seeds	Spices, mustard seed, yellow	36.24	1.989	22.518	10.088	32.606		
canned Western Family creamed corn	Corn, sweet, canned, cream style	0.42	0.065	0.123	0.198	0.321		
sweet onion peel	Onion, sweet, raw	0.08	0	0	0	0		
Fresh Express coleslaw; Coleslaw	Fast foods, side dish, coleslaw	9.91	1.599	2.671	5.348	8.019		
beef; steak juice; meat; steak	Beef, rib, rib eye steak, boneless, lean and fat, 0mm (0") trim, cooked, broiled	18.57	7.82	9.1	0.59	9.69		
turkey sausage (COOKED); weiner hot dog; sausage	Sausage, Italian, turkey, cooked	5.54	1.965	2.088	1.266	3.354		
corn (COOKED)	Corn, sweet, yellow, on or off the cob,	1.5	0.197	0.374	0.603	0.977		

	boiled, drained							
hamburger	Fast foods, sandwiches and burgers, hamburger, large, single patty, with condiments, vegetables and mayonnaise	12.37	3.972	4.67	3.144	7.814		
beef dip gravy; beef gravy; beef au juice	Gravy, beef, canned	2.36	1.153	0.962	0.08	1.042		
cheese sauce	Sauce, cheese, ready-to-serve	13.29	6.01	3.823	2.599	6.422		
canned PC soup: beef, barley, carrots and mushrooms	Soup, beef barley, ready-to-serve	8.21	0.318	0.234	0.11	0.344		
lo bok; bok choy	Bok choy, pak-choi, raw	0.2	0.027	0.015	0.096	0.111		
Greek Gods greek style yogurt (honey flavor)	THE GREEK GODS, PROBIOTIC GREEK STYLE YOGURT, HONEY, BLUEBERRY, UPC: 078355570080 (from USDA)	14.01	8.989	0	0	0		
chicken breading with seasonings; chicken with homemade bread crumbs	Chicken breast tenders, breaded, cooked in conventional oven	17.69	3.786	6.787	3.083	9.87		
tzatziki; Green House tzatziki	TZATZIKI SAUCE, UPC:	7.14	3.57	0	0	0	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show

	825779010360						(No data on Monounsaturated and Polyunsaturated fatty acids)	/45101418?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=TZATZIKI+SAUCE%2C+UPC%3A+825779010360&ds=&qt=&qp=&qa=&qn=&q=&ing=
multigrain chips	Snacks, multigrain chips, plain	21.11	2.166	11.501	6.513	18.014		
que pasa blue corn chips	Organic Tortilla Chips, Blue Corn - Que pasa	24	3	0	0	0	Nutritionix website (No data on Monounsaturated and Polyunsaturated fatty acids)	https://www.nutritionix.com/i/que-pasa/organic-tortilla-chips-blue-corn/595355e9eb9059ea409d22db
Uncle Ben's quick brown rice	UNCLE BEN'S, WHOLE GRAIN BROWN RICE, UPC: 054800120079	3.12	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/433165?manu=&fgcd=&ds=&q=UNCLE%20BEN%27S,%20WHOLE%20GRAIN%20BROWN%20RICE,%20UPC:%2005480120079
raisin bran; Kellog's raisin bran cereal	Cereal, ready to eat, Raisin Bran, Kellogg's	1.87	0.405	0.281	0.933	1.214		
beef broth; Beef Soup Broth	Soup, broth, beef, ready-to-serve	0.01	0.006	0	0	0		

baby food (mango, apple, carrot, peach)	Babyfood, fruit, jarred, apple and other fruit (plum, mango, kiwi, pear, banana, apricot and/or pineapple), all stages	0.04	0.014	0	0.2	0.2		
icing	Icing (frosting), glaze, homemade	0.53	0.271	0.137	0.067	0.204		
egg yolk	Egg, chicken, yolk, fresh or frozen, raw	32.68	9.932	13.651	5.253	18.904		
rice milk	Beverages, rice milk, unsweetened	0.97	0	0.625	0.313	0.938	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/303354?manu=&fgcd=&ds=&q=Beverages,%20rice%20milk,%20unsweetened
ham deli meat	Deli-meat, ham, cooked, sliced	4.13	1.533	1.762	0.651	2.413		
lemongrass sauce	LEMONGRASS TAMARIND SAUCE, UPC: 011225191435	6.67	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/462856?manu=&fgcd=&ds=&q=LEMONGRASS%20TAMARIND%20SAUCE,%20UPC:%2001225191435
pork fat; roast dripping; pork drippings and juice	Animal fat, lard (pork)	100	40	45.1	11.2	56.3		

squash; acorn squash trimmings; squash peel	Squash, summer, all varieties, raw	0.18	0.044	0.016	89	89.016		
marichino cherry juice	MARASCHINO CHERRY FLAVORED SYRUP, UPC: 041580180027	0	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/501268?manu=&fgcd=&ds=&q=MARASCHINO%20CHERRY%20FLAVORED%20SYRUP,%20UPC:%2004158 0180027
breakfast shake	Milk shake (fast food), chocolate	3.7	2.313	1.075	0.14	1.215		
leeks	Leeks (bulb and lower-leaf portion), raw	0.3	0.04	0.004	0.166	0.17		
yams	Yam, raw	0.17	0.037	0.006	0.076	0.082		
brussel sprouts	Brussels sprouts, raw	0.3	0.062	0.023	0.153	0.176		
parsnips	Parsnip, raw	0.3	0.05	0.112	0.047	0.159		
sweet potato	Sweet potato, raw	0.05	0.018	0.001	0.014	0.015		
croissant	Croissant, butter, commercial	21	11.659	5.525	1.094	6.619		
pizza	Fast foods, pizza, cheese, meat and vegetable, regular crust, frozen, cooked	14.43	5.083	5.89	2.578	8.468		
mango orange juice	ORANGE MANGO JUICE DRINK, UPC: 089396152920	0	0	0	0	0	USDA National Nutrient Database (No data on Saturated,	https://ndb.nal.usda.gov/ndb/foods/show/464783?manu=&fgcd=&ds=&

							Monounsaturated, and Polyunsaturated fatty acids)	q=ORANGE%20MANGO%20JUICE%20DRINK,%20UPC:%2008939 6152920
turkey slices	Deli-meat, turkey breast, cooked, sliced	2.03	0.551	0.819	0.57	1.389		
peas (COOKED)	Peas, green, boiled, drained	0.22	0.039	0.019	0.102	0.121		
pickled beet juice; homemade pickled beets	Beets, pickled, canned, solids and liquid	0.08	0.013	0.016	0.029	0.045		
bagel	Bagel, whole-wheat (multigrain)	1.53	0	0.29	0.936	1.226		
raisin bread	Bread, white with raisins, commercial	4.06	1.174	0.835	1.87	2.705		
clam chowder soup	Soup, clam chowder, New England, ready-to-serve	5.64	1.122	1.249	2.741	3.99		
sour soup	Chinese dish, soup, hot and sour, restaurant prepared	1.21	0.22	0.28	0.31	0.59		
coconut yogurt	COCONUT YOGHURT, UPC: 853923002 138	5.73	3.08	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/334801?manu=&fgcd=&ds=&q=COCONUT%20YOGHURT,%20UPC:%20853923002138

greek vanilla yogurt	Yogourt, Greek style, vanilla flavoured, fat free (0-0.5% M.F.)	0.04	0.039	0	0	0		
danone peach yogurt	PEACH FINEST YOGHURT, UPC: 853923002602	4.85	2.64	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/334788?manu=&fgcd=&ds=&q=PEACH%20FINEST%20YOGHURT,%20UPC:%2085392 3002602
peach; peach fruit cup juice	Peach, raw	0.25	0.019	0.067	0.086	0.153		
corn bread	Bread, cornbread, homemade, made with 2% milk	7.1	1.555	1.83	3.206	5.036		
Oikos kiwi greek yogrut	Danone Oikos Greek Yogurt Kiwi Yogurt	2	1	0	0	0	My Fitness Pal website	https://www.myfitnesspal.com/food/calories/danone-oikos-greek-yogurt-kiwi-yogurt-527418581
Activia raspberry yogurt	Activia Raspberry	0	0	0	0	0	My Fitness Pal website	https://www.myfitnesspal.com/food/calories/632443060
apple juice	Apple juice, canned or bottled, added vitamin C	0.13	0.022	0.006	0.039	0.045		
apple cider	Vinegar, cider	0	0	0	0	0		
apple pie (piece)	Pie, apple, commercial, 2 crust	11	3.797	4.388	2.198	6.586		

Quaker instant apple and cinnamon oatmeal	Cereal, hot, oats, instant: apple & cinnamon, prepared, Quaker	0.94	0.166	0.283	0.343	0.626		
orange mermelade	ORANGE JAM, UPC: 617115023796	0	0	0	0	0	USDA National Nutrient Database (No data on Saturated, Monounsaturated, and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45185275?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=ORANGE+JAM%2C+UPC%3A+617115023796&ds=&qt=&qp=&qa=&qn=&q=&ing=
chinese cabbage trim	Cabbage, Chinese (pe-tsai), raw	0.2	0.043	0.023	0.072	0.095		
egg (hard boiled)	Egg, chicken, whole, cooked, boiled in shell, hard-cooked	10.01	3.043	4.182	1.446	5.628		
frying oil	Vegetable oil, palm	100	49.3	37	9.3	46.3		
lamb fat	Lamb, Canadian, fat, cooked	64.92	30.677	24.583	3.369	27.952		
grapeseed oil	Vegetable oil, grapeseed	100	9.6	16.1	69.9	86		
bitter gourd (COOKED); bittermelon soup	Balsam-pear (bitter gourd, bitter melon), pods, boiled, drained	0.18	0.014	0.033	0.078	0.111		
mango	Mango, raw	0.38	0.092	0.14	0.071	0.211		

veggie soup	Soup, vegetable, homemade	0.23	0.098	0.077	0.029	0.106		
dip; dilly dip	Dip, sour cream base (with dehydrated onion soup)	13.02	8.026	3.784	0.473	4.257		
pork roast gravy	Gravy, pork, dehydrated	8.63	4.29	3.881	0.454	4.335		
half and half cream	Cream, fluid, half and half	11.5	7.032	3.32	0.554	3.874	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/299326?manu=&fgcd=&ds=&q=Cream,%20fluid,%20half%20and%20half
Safeway french loaf; top layer of sourdough starter; sour dough starter; french bread crumbs	Bread, French or Vienna, (also sourdough), toasted	2.14	0.502	0.386	0.83	1.216		
safeway signature cafe beef pot roast	Beef pot roast, with browned potatoes, peas and corn	5.25	1.872	2.552	0.709	3.261		
campbell's Italian soup	Soup, Italian wedding, ready-to-serve	1.21	0.433	0.44	0.235	0.675		
philadelphia light smoked salmon cream cheese spread	Cheese, cream, light	15.28	9.098	3.996	0.658	4.654		
canned peaches; canned peaches	Peach, canned halves or slices, juice	0.03	0.004	0.012	0.016	0.028		

(liquid); canned peach juice	pack, solids and liquid							
schneider fat free ham	Deli-meat, ham, cooked, fat free, sliced	1.26	0.434	0.527	0.239	0.766		
Save-On Foods pork schnitzel	Pork, loin, centre cut (centre chop), bone-in, lean, pan-fried	7.66	2.597	3.028	1.059	4.087		
chocolate cheerios	GENERAL MILLS, CHEERIOS, MULTI GRAIN CEREAL, DARK CHOCOLATE CRUNCH, UPC: 016000482685	5.36	1.79	1.79	1.79	3.58	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/331407?manu=&fgcd=&ds=&q=GENERAL%20MILLS,%20CHEERIOS,%20MULTI%20GRAIN%20CEREAL,%20DARK%20CHOCOLATE%20CRUNCH,%20UPC:%20016000482685
pink lemonade	Lemonade, pink, frozen concentrate, water added	0.15	0.006	2	0.013	2.013		
lentil soup with mixed lentil and lemon	Soup, lentil, ready-to-serve	0.53	0.069	0.238	0.175	0.413		
hommade carrot juice	Carrot juice, canned	0.15	0.027	0.007	0.071	0.078		
carrot pudding	Cake mix, carrot, pudding-type, dry, unprepared	9.8	1.472	4.036	3.702	7.738		
condensed soup	Soup, broth, chicken, canned, condensed	0.03	0.013	0.008	0.003	0.011		

lime skins	Lime, raw	0.2	0.022	0.019	0.055	0.074		
mushroom risotto	MUSHROOM RISOTTO, UPC: 085239345245	4.44	0.74	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/465049?manu=&fgcd=&ds=&q=MUSHROOM%20RISOTTO,%20UPC:%20085239345245
egg white	Egg, chicken, white, fresh or frozen, raw	0	0	0	0	0		
Lucerne 1% cottage cheese	Cheese, cottage, (1% M.F.)	1.02	0.645	0.291	0.031	0.322		
cheese; cheddar cheese	Cheese, cheddar	33.82	19.368	8.428	1.433	9.861		
turkey and vegetable soup; vegetable and turkey soup	Soup, turkey, ready-to-serve	1.87	0.52	0.75	0.46	1.21		
bran cereal	Cereal, ready to eat, All Bran Original, Kellogg's	3.5	0.616	0.566	2.018	2.584		
Fruit salad; fruit	Fruit salad (peach, pear, apricot, pineapple, cherry), canned, juice pack, solids and liquid	0.03	0.004	0.005	0.011	0.016		
savoy cabbage	Cabbage, savoy, raw	0.1	0.013	0.007	0.049	0.056		
meatloaf	Meat loaf with tomato sauce, mashed potatoes and peas	6.7	3	3	0	3		
bacon	Pork, cured,	35.09	11.964	15.53	6.112	21.642		

	bacon, cooked, pan-fried							
harvest crunch cereal	Cereal, ready to eat, Harvest Crunch: original, Quaker	17.04	12.484	2.03	1.468	3.498		
english muffin	English muffin, plain (also sourdough)	1.69	0.733	0.383	0.498	0.881		
breaded scallops	Mollusks, scallop, mixed species, breaded and fried	10.94	2.669	4.498	2.856	7.354		
lentil	Lentils, boiled	0.38	0.053	0.064	0.175	0.239		
curry; thai red curry	Spices, curry powder	14.01	1.648	8.782	3.056	11.838		
fruit loops	Cereal, ready to eat, Froot Loops, Kellogg's	3.02	1.567	0.443	0.768	1.211		
mushroom gravy	Gravy, mushroom, canned	2.71	0.4	1.17	1.02	2.19		
Wing's plum sauce; plum sauce	Sauce, plum, ready-to-serve	1.04	0.153	0.24	0.588	0.828		
rootbeer milkshake	Milk shake, not chocolate, dry mix, unprepared	2.6	2.059	0.332	0.06	0.392		
waffle batter; waffle mix	Waffle, plain, homemade	14.1	2.866	3.521	6.785	10.306		
sweet pickles	Pickles, cucumber, sweet	0.41	0.067	0.004	0.106	0.11		
bakd potato	Potato, flesh and skin, baked	0.13	0.035	0.003	0.058	0.061		
raisin	Raisin, golden seedless	0.46	0.151	0.019	0.135	0.154		

whipping cream; Foremost Whipping Cream	Cream, whipping, 32% M.F.	32	19.999	9.367	0.0968	9.4638		
fish soup; salmon soup	Soup, broth, fish	0.6	0.133	0.108	0.245	0.353		
baby cereal	Babyfood, cereal, mixed grain, with milk powder and fruit, prepared with water	2.41	0.707	0.895	0.639	1.534		
Wendy's frosty	WENDY'S, Frosty Dairy Dessert	2.6	1.635	0.692	0.117	0.809	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/21248?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=WENDY%27S%2C+Frosty+Dairy+Dessert&ds=&qt=&qp=&qa=&qn=&q=&ing=
Knor minestrone soup	Soup, minestrone, ready-to-serve	0.14	0.052	0.022	0.057	0.079		
green beans	Beans, snap (Italian, green or yellow), raw	0.22	0.5	0.01	0.113	0.123		
cheese dip	Dip, cream cheese base	35.2	16.735	8.848	5.194	14.042		
feta cheese	Cheese, feta	21.28	14.946	4.623	0.591	5.214		
Broth from boiling ribgs	Soup, broth, beef, dehydrate	0.08	0.04	33	0.003	33.003		

	d, water added							
dempster's wholegrain bread; wholewheat bread crumbs	Bread, whole grain (whole-wheat), commercial	3.29	0.771	0.939	1.436	2.375		
Hostess hickory stix	HICKORY STICKS, UPC: 070309042254	32.14	10.71	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45191086?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=HICKORY+STICKS%2C+UPC%3A+070309042254&ds=&qt=&qp=&qa=&qn=&q=&ing=
Chapman ice cream; Island farm's ice cream; PC chocolate ice cream	Dessert, frozen, ice cream, chocolate	11	6.8	3.21	0.41	3.62		
McCain frozen french fries	Potato, french-fried, frozen, all types, salt added in processing, home-prepared, heated in oven	5.48	0.848	1.874	1.502	3.376		
Hunt's tomato paste	Tomato products, canned paste, with salt	0.47	0.1	0.06	0.15	0.21		
mustard; French's yellow mustart	Sauce, mustard, yellow,	3.34	0.214	2.182	0.774	2.956		

	ready-to-serve							
goat cheese	Cheese, goat, semi-soft, (35% to 55% water, 30% M.F.)	29.84	20.639	6.808	0.709	7.517		
green pepper	Pepper, sweet, green, raw	0.17	0.058	0.008	0.062	0.07		
canned black bean liquid	Beans, black, mature seeds, canned, solids and liquid, reduced sodium	0.29	0.075	0.025	0.125	0.15		
canned red beans	Beans, kidney, red, canned, solids and liquid, reduced sodium	0.36	0.125	0.147	0.174	0.321		
miracle whip	MIRACLE WHIP DRESSING, UPC: 021000049493	23.33	3.33	6.67	13.33	20		
honey	Sweets, honey, strained or extracted	0	0	0	0	0		
cinnamon toast crunch cereal	Cereal, ready to eat, Cinnamon Toast Crunch, General Mills	12.94	1.23	7.352	1.987	9.339		
golden graham cereal	Cereal, ready to eat, Golden Grahams, General Mills	3.45	0.361	1.775	0.929	2.704		
muffin	Muffin, plain, homemade, made	11.4	2.156	2.757	5.721	8.478		

	with 2% milk							
blueberries frozen	Blueberry, frozen, unsweetened	0.64	0.053	0.091	0.279	0.37		
Beef, roast; roast beef	Beef, hip, rump roast, lean and fat, 3mm (1/8") trim, broiled	11.08	4.23	4.76	0.44	5.2		
salmon pate	SMOKED SALMON PATE, UPC: 617390580410	15.79	7.02	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45257740?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=salmon+pate&ds=&qt=&qp=&qa=&qn=&q=&ing=
Crepe Batter	CREPE MIX, UPC: 689076183420	5.71	3.81	0	0	0		
plain noodles; noodles	Pasta, egg noodles, enriched, cooked, salted	2.07	0.419	0.581	0.552	1.133		
post almond cranberry	Cereal, ready to eat, Selects, Cranberry Almond Crunch, Post	5.22	0.643	2.693	1.437	4.13		
okra	Okra (gumbo), raw	0.19	0.026	0.017	0.027	0.044		
potato patties	POTATO PATTIES, UPC: 056210371065	13.33	1.67	0	0	0	USDA National Nutrient Database (No data on Monounsa	https://ndb.nal.usda.gov/ndb/foods/show/45034162?fgcd=&manu=&for

							turated and Polyunsaturated fatty acids)	mat=&count=&max=25&offset=&sort=default&order=asc&qlookup=potato+patty&ds=&qt=&qp=&qa=&qn=&q=&ing=
chickpeas	Chickpeas (garbanzo beans, bengal gram), raw	6.04	0.603	1.377	2.731	4.108		
Knorr packaged soup mix	Soup, mixed vegetable (with pasta), ready-to-serve	0.13	0.026	0.035	0.058	0.093		
bear paw cookies	DARE, BEAR PAWS SOFT COOKIES, UPC: 055653005902	11.11	3.33	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45164388?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=cookie+paw&ds=&qt=&qp=&qa=&qn=&q=&ing=
blueberry protein shake	KROGER, CARBMASTER, PROTEIN SMOOTHIE, BLUEBERRY CREAM, UPC: 011110505644	0.68	0.34	0	0	0		
Western Family babaghanoush dip	ALL NATURAL BABA GANOUSH HUMMUS, UPC:	11.29	1.61	0	0	0	USDA National Nutrient Database (No data on	https://ndb.nal.usda.gov/ndb/foods/show/45180747?fgcd=&m

	865329000045						Monounsaturated and Polyunsaturated fatty acids)	anu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=baba+ganoush&ds=&qt=&qp=&qa=&qn=&q=&ing=
Tostitos garlic and black bean chips	TOSTITOS® ARTISAN RECIPES® ROASTED GARLIC & BLACK BEAN TORTILLA CHIPS	28	4	0	0	0	Tostitos Canada website (No data on Monounsaturated and Polyunsaturated fatty acids)	https://www.tostitos.ca/products/tostitos%C2%AE-artisan-recipes%C2%AE-roasted-garlic-black-bean-tortilla-chips
kellog's mini wheat; mini wheats	Cereal, ready to eat, frosted Mini-Wheats (original, maple, brown sugar, strawberry), Kellogg's	1.86	0.405	0.254	1.032	1.286		
buttermilk; Island Farms buttermilk	Milk, fluid, buttermilk, cultured, 2% M.F.	2	1.242	0.576	0.071	0.647		
hellman's light mayonaise	Salad dressing, mayonnaise and mayonnaise type, fat free	2.7	0.6	1.887	0.063	1.95		
strawberry fruitopia	FRUITOPIA STRAWBERRY PASSION AWARENESS	0	0	0	0	0	Coca-Cola Canada website (No data on Saturated, Monounsaturated, and	https://www.coca-cola.ca/brands/fruitopia/fruitopia-strawberry-passion-awareness

							Polyunsaturated fatty acids)	
organic raw kombucha multi green	LATTA, KOMBUCHA RAW & ORGANIC, GREEN TEA, UPC: 610074987765	0	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45165471?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=kombucha+green&ds=&qt=&qp=&qa=&qn=&q=&ing=
quick oats oatmeal; quaker quick oats	Cereals, QUAKER, Quick Oats, Dry	6.87	1.11	1.98	2.3	4.28	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/08402?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=Quick+Quaker+Oats&ds=&qt=&qp=&qa=&qn=&q=&ing=
Breton's wholewheat crackers	Cracker, whole-wheat	14.13	2.063	3.248	6.945	10.193		
homemade plum chutney	PLOUGHMAN'S PLUM CHUTNEY, UPC: 858723003002	0	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45053568?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=plum+c

								hutney&ds=&qt=&qp=&qa=&qn=&q=&ing=
red leaf lettuce	Lettuce, red leaf	0.22	0.017	0.005	0.072	0.077		
green stems of scallions	Onion, spring (green) or scallion (includes tops and bulb), raw	0.19	0.032	0.027	0.074	0.101		
quinoa	Grains, quinoa, dry	6.07	0.706	1.613	3.292	4.905		
Costco quinoa salad	QUINOA SALAD, UPC: 825779020000	3.52	0.22	2.2	1.1	3.3	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/45284953?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=quinoa+salad&ds=&qt=&qp=&qa=&qn=&q=&ing=
canberry juice	Cranberry juice, unsweetened	0.13	0.01	0.023	0.07	0.093		
rolled oat porridge; oatmeal porridge	Cereal, hot, oats, porridge (with added oat bran, wheat bran and flax seed), prepared, Rogers	1.25	0.2	0	0	0		
fruit cake	Cake, fruitcake, commercial	9.1	1.048	4.2	3.323	7.523		
chicken bones	BONED CHICKEN, UPC: 041358531259	14.29	4.46	0	0	0	USDA National Nutrient Database (No data on	https://ndb.nal.usda.gov/ndb/foods/show/45341537?fgcd=&m

							Monounsaturated and Polyunsaturated fatty acids)	anu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=chicken+bone&ds=&qt=&qp=&qa=&qn=&q=&ing=
beans	Beans, pinto, boiled, salted	0.65	0.109	0.106	0.188	0.294		
tartar sauce; heinz tartar sauce; tartat sauce: miracle whip, onion, capers	Sauce, tartar, ready-to-serve	16.7	3.333	3.605	9.044	12.649		
peach juice	PEACH FLAVORED JUICE DRINK, UPC: 067311966579	0	0	0	0	0	USDA National Nutrient Database (No data on Saturated, Monounsaturated, and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45239439?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=peach+juice&ds=&qt=&qp=&qa=&qn=&q=&ing=
fish cracker	Deep Fried Prawn / Fish Crackers	28	4	0	0	0	My Fitness Pal website	https://www.myfitnesspal.com/food/calories/generic-deep-fried-prawn-fish-crackers-492029964
pomegranate;	Pomegranate, raw	1.17	0.12	0.093	0.079	0.172		

pomegranate fruit								
instant mr. Noodles; ramen noodle soup	Soup, ramen noodles, any flavour, dry	17.59	8.117	6.156	2.198	8.354		
rice vermicelli	Grains, rice and vermicelli mix, beef flavour, prepared with margarine	3.2	0.682	1.126	0.915	2.041		
keylime sherbert	LIME SHERBET, UPC: 713733948586	1.16	0.58	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45163078?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=lime+Sherbet&ds=&qt=&qp=&qa=&qn=&q=&ing=
roasted mini potatos	OVEN ROASTED POTATOES, UPC: 071117617061	4.29	0.36	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45361715?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=roast+potato&ds=&qt=&qp=&qa=&qn=&q=&ing=
Honey tempura soy	SOY HONEY GARLIC SAUCE, UPC:	0	0	0	0	0	USDA National Nutrient Database (No data on	https://ndb.nal.usda.gov/ndb/foods/show/45062361?fgcd=&m

	021130480296						Monounsaturated and Polyunsaturated fatty acids)	anu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=honey+soy&ds=&qt=&qp=&qa=&qn=&q=&ing=
prune juice	Prune juice, canned	0.03	0.003	0.021	0.007	0.028		
basmati rice	BASMATI RICE, UPC: 041224725027	0	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45114566?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=basmati&ds=&qt=&qp=&qa=&qn=&q=&ing=
Nestle good start formula	NESTLE, GOOD START SUPREME, with iron, DHA and ARA, ready-to-feed	3.37	1.47	1.08	0.74	1.82	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/03960?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=nestle+formula&ds=&qt=&qp=&qa=&qn=&q=&ing=
quaker instant oatmeal: maple brown sugar	Cereal, ready to eat, Oatmeal Squares, Maple & Brown	4.57	1.137	1.374	1.312	2.686		

	Sugar, Quaker							
canmbell's chicken noodle soup	CAMPBELL'S, CHICKEN NOODLE SOUP, UPC: 051000038869	1.31	0.33	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45293588?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=campbell+noodle&ds=&qt=&qp=&qa=&qn=&q=&ing=
sweet and sour sauce	Sauce, sweet and sour, ready to serve	0.02	0	0	0	0		
homemade foccacia pizza	Bread, focaccia, Italian flatbread, plain	7.89	0.877	5.67	0.994	6.664		
heavy cream	Cream, fluid, heavy whipping	37	23	10.7	1.4	12.1	SELF Nutrition Data	http://nutritiondata.self.com/facts/dairy-and-egg-products/51/2
brown sugar	Sweets, sugar, brown	0	0	0	0	0		
chilli; hot sauce	Sauce, chili, peppers, hot, chili, mature red, canned	0.6	0.08	0.411	0.074	0.485		
homemade caesar salad dressing	Salad dressing, caesar dressing, regular	57.85	8.78	13.5	32.85	46.35		
Coconut creamer for coffee	Nuts, coconut cream (liquid from grated	16.31	15.472	0.679	0.159	0.838		

	meat), sweetened , canned							
muffin batter	Bread, cornbread (also corn muffin mix), dry mix, prepared	9.58	3.732	3.494	1.963	5.457		
blackberry	Blackberry, raw	0.49	0.014	0.047	0.28	0.327		
sour cream 7%	Cream, sour, light	3.44	2.339	0.877	0.057	0.934		
custard	Dessert, egg custard, dry mix, prepared with 2% milk	2.83	1.475	0.896	0.201	1.097		
pistachios	Nuts, pistachio nuts, dry roasted, salted	44.82	5.456	23.676	13.448	37.124		
pudding	Corn pudding , homemade	5.04	2.451	1.499	0.55	2.049		
gravy juices from chicken casserole	Gravy, chicken, canned	5.71	1.41	2.55	1.5	4.05		
Slurpee	7-ELEVEN, SLURPEE, COTTON CANDY, CHERRY, UPC: 052548575434	0	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45157261?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=Slurpee&ds=&qt=&qp=&qa=&qn=&q=&ing=
Brownie mix	Cookie, brownie, regular, dry mix, unprepared	14.9	2.519	5.158	6.373	11.531		

McDonald's Orea McFlurry	McDONALD'S, McFLURRY with OREO cookies	5.66	2.577	1.716	0.364	2.08	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/21339?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=oreo+flurry&ds=&qt=&qp=&qa=&qn=&q=&ing=
flour	Grains, wheat flour, white, all purpose, enriched, calcium fortified	0.98	0.155	0.087	0.413	0.5		
clam nectar; clam juice	Mollusks, clam, mixed species, canned, liquid	0.02	0.002	0.002	0.006	0.008		
wasabi	Wasabi, root, (Japanese horseradish), raw	0.63	0	0	0	0		
Maggi 2 minute noodle curry	Maggi® Curry Noodles	18.7	8.6	0	0	0	Maggi UK website (No data on Monounsaturated and Polyunsaturated fatty acids)	https://www.maggi.co.uk/products/world-foods/curry-noodles/
fruitopia juice	FRUITOPIA FRUIT INTEGRATION	0	0	0	0	0	Coca-Cola Canada website (No data on Saturated, Monounsaturated, and Polyunsatu	https://www.coca-cola.ca/brands/fruitopia/fruitopia-fruit-integration

							rated fatty acids)	
strawberry and banana shake	Strawberry Banana Shake, Medium	6.7	4.9	0	0	0	Nutritionix website (No data on Monounsaturated and Polyunsaturated fatty acids)	https://www.nutritionix.com/i/sonic/strawberry-banana-shake-medium/52cdccc1051cb9eb3200495f
stuffing	Bread stuffing, dry mix, prepared	8.6	1.734	3.808	2.604	6.412		
chicken fingers, mac and cheese	CHICKEN FINGERS WITH MAC & CHEESE, UPC: 031000007171	6.52	1.36	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45246986?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=chicken+finger&ds=&qt=&qp=&qa=&qn=&q=&ing=
cheese burger; cheese burger with lettuce	Fast foods, sandwiches and burgers, cheeseburger, large, single patty, with condiments, vegetables and mayonnaise	15.8	5.746	5.352	2.366	7.718		
cup cakes	CUP CAKES, UPC: 03003491170	19.72	8.45	0	0	0	USDA National Nutrient Database (No data on Monounsaturated	https://ndb.nal.usda.gov/ndb/foods/show/45327401?fgcd=&manu=&format=&cou

							and Polyunsaturated fatty acids)	nt=&max=25&offset=&sort=default&order=asc&qlookup=cup+cake&ds=&qt=&qp=&qa=&qn=&q=&ing=
sugar	Sweets, sugars, granulated	0	0	0	0	0		
barleys	Grains, barley, pearled, cooked	0.44	0.093	0.057	0.214	0.271		
mint	Peppermint, fresh	0.94	0.246	0.033	0.508	0.541		
prepared/ packaged pizza sauce	Sauce, pizza, canned, ready-to-serve	1.15	0.46	0.461	0.099	0.56		
thawed frozen raspberries; frozen raspberry pulp	Raspberry, frozen, sweetened	0.16	0.005	0.015	0.089	0.104		
Campbell's cheddar cheese soup	Soup, cheddar cheese, canned, condensed	6.58	2.531	1.481	2.085	3.566		
chocolate	Sweets, baking chocolate, unsweetened, square	52.31	32.277	16.068	1.551	17.619		
puff pastry (COOKED)	Puff pastry, frozen, ready-to-bake, baked	38.5	5.502	8.828	22.228	31.056		
homemade squash soup	Soup, butternut squash, ready-to-serve	0.73	0.239	0.291	0.136	0.427		
peach syrup	Peach, canned halves or slices, heavy syrup pack,	0.1	0.01	0.035	0.047	0.082		

	solids and liquid							
pulled pork	PULLED PORK, UPC: 021130100736	7.14	2.5	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45289612?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=pulled+pork&ds=&qt=&qp=&qa=&qn=&q=&ing=
seasoning sauce	SEASONING SAUCE, UPC: 083737230117	0	0	0	0	0	USDA National Nutrient Database (No data on Saturated, Monounsaturated, and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45240792?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=seasoning+sauce&ds=&qt=&qp=&qa=&qn=&q=&ing=
honey garlic sauce	ROLAND, BARBEQUE SAUCE, GARLIC HONEY, UPC: 041224872608	2.63	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45027657?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=sauce+honey+garlic&ds=&qt=&qp=&qa=&qn=&q=&ing=

batter for fish	Fish, battered and fried	11.19	2.713	4.729	3.046	7.775		
tortilla	Tortilla, ready-to-bake / fry, corn	2.85	0.453	0.692	1.419	2.111		
homemade macaroni	Pasta, macaroni (elbow), enriched, cooked	0.93	0.176	0.131	0.319	0.45		
orville popcorn	Snacks, popcorn, microwave, butter flavour	34.02	7.216	21.143	2.392	23.535		
canteloupe ; canteloupe skin	Melon, cantaloupe, raw	0.19	0.051	0.003	0.081	0.084		
beef bologna	Deli-meat, bologna (baloney), beef	18.83	8.903	8.058	1.025	9.083		
snap peas	SUGAR SNAP PEAS, UPC: 03003430256	0	0	0	0	0		
ham bone	Pork, cured, ham, rump, bone-in, separable lean only, heated, roasted	3.07	0.917	1.067	0.562	1.629		
hobbard squash seeds and peels	Squash, winter, hubbard, raw	0.5	0.103	0.037	0.21	0.247		
spaghetti squash (COOKED)	Squash, winter, spaghetti, baked or boiled, drained	0.26	0.062	0.022	0.126	0.148		
sweet potato soup	Sweet Potato Soup	1.765	1.013	0.065	0.49	0.555	Nutritionix website	https://www.nutritionix.com/food/sweet-potato-soup
marble cheese	MARBLE CHEESE, UPC:	33.33	20	0	0	0	USDA National Nutrient	https://ndb.nal.usda.gov/ndb/f

	890769002090						Database (No data on Monounsaturated and Polyunsaturated fatty acids)	oods/show/45188701?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=marble+cheese&ds=&qt=&qp=&qa=&qn=&q=&ing=
fruit syrup	Fruit Syrup	0	0	0	0	0	Nutritionix website	https://www.nutritionix.com/food/fruit-syrup
waffle sauce	WAFFLE BREAKFAST SAUCE, UPC: 031000101541	10.67	2.67	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45362056?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=waffle+sauce&ds=&qt=&qp=&qa=&qn=&q=&ing=
marinade for chicken	ADOLPH'S, PRIME CUT, CHICKEN MARINADE MIX, UPC: 021500012195	0	0	0	0	0	USDA National Nutrient Database (No data on Saturated, Monounsaturated, and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45107994?fgcd=&manu=&format=&count=&max=25&offset=75&sort=default&order=asc&qlookup=marinade&ds=&qt=&qp=&qa=&qn=&q=&ing=

marinade	MARINADE, UPC: 074175264536	0	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45356532?fgcd=&manu=&format=&count=&max=25&offset=0&sort=default&order=asc&qlookup=marinade&ds=&qt=&qp=&qa=&qn=&q=&ing=
glaze sauce	CAROLINA STYLE GRILLING GLAZE SAUCE, UPC: 04656702169	0	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45291685?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=glaze+sauce&ds=&qt=&qp=&qa=&qn=&q=&ing=
hoisin sauce	Sauce, hoisin, ready-to-serve	3.39	0.568	0.963	1.698	2.661	USDA National Nutrient Database	https://food-nutrition.canada.ca/cnf-fce/report-rapport.do
Old El Paso thick and chunky salsa	THICK AND CHUNKY SALSA, UPC: 041415095083	0	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45217337?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=thick+and+chunky+salsa&ds=

								&qt=&qp=&qa=&qn=&q=&ing=
steak bone	Beef, chuck, blade steak, with bone, lean, cooked, braised	15.85	6.47	8.07	0.66	8.73		
oatmeal with raisins	Cereals, QUAKER, Instant Oatmeal, Raisin and Spice, dry	4	0.605	1.191	1.254	2.445	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/08436?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=instant+oatmeal&ds=&qt=&qp=&qa=&qn=&q=&ing=
powdered milk	Milk, dry, skim, powder, regular	0.77	0.499	0.2	0.03	0.23		
spinach dip	Dip, spinach, sour cream base	23.91	5.315	6.111	10.745	16.856		
indian flatbread	FLATBREADS, UPC: 041190046997	14.29	0	0	0	0		
Moroccan stew with beans, yams, potatos and spinach	ORGANIC MOROCCAN SEASONED CHICKEN STEW, UPC: 819269011838	2.88	0.48	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45202988?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=Moroccan+stew&ds=&qt=&qp=&qa=&

								qn=&q=&ing=
Red lentil pasta	ORGANIC RED LENTIL PASTA, UPC: 837186006478	2.94	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45269068?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=lentil+pasta&ds=&qt=&qp=&qa=&qn=&q=&ing=
sun tropic coconut water	COCONUT WATER, UPC: 099482444105	0	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45168057?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=coconut+water&ds=&qt=&qp=&qa=&qn=&q=&ing=
canned pear juice	Pear, canned halves, juice pack, solids and liquid	0.07	0.004	0.014	0.015	0.029		
lime jello	LIME JELLY SLICES, UPC: 077890362167	0	0	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45215547?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlook

								up=lime+jelly&ds=&qt=&qp=&qa=&qn=&q=&ing=
unpopped popcorn kernels	Snacks, popcorn, unpopped kernels	4.31	0.64	0.992	2.476	3.468		
beef stroganoff	Soup, beef stroganoff, canned, chunky style, ready-to-serve	4.6	2.324	1.556	0.246	1.802	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/06980?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=stroganoff&ds=&qt=&qp=&qa=&qn=&q=&ing=
honeynut cheerios	Cereal, ready to eat, Cheerios: honey nut, General Mills	3.99	0.85	1.39	1.4	2.79		
jelly	Jellies	0.02	0.005	0.001	0.004	0.005	USDA National Nutrient Database	https://ndb.nal.usda.gov/ndb/foods/show/19300?fgcd=&manu=&format=&count=&max=25&offset=25&sort=default&order=asc&qlookup=jelly&ds=&qt=&qp=&qa=&qn=&q=&ing=
TV dinner	READY-TO-EAT MEAL, UPC: 853237003845	2.5	0.36	0	0	0	USDA National Nutrient Database (No data on Monounsa	https://ndb.nal.usda.gov/ndb/foods/show/45331337?fgcd=&manu=&for

							turated and Polyunsaturated fatty acids)	mat=&count=&max=25&offset=&sort=default&order=asc&qlookup=ready+meal&ds=&qt=&qp=&qa=&qn=&q=&ing=
chicken curry	CHICKEN CURRY, UPC: 805993001313	9.68	2.42	0	0	0	USDA National Nutrient Database (No data on Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45081331?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=chicken+curry&ds=&qt=&qp=&qa=&qn=&q=&ing=
leftover cake	Cake, chocolate, commercial, with chocolate icing (frosting), in-store bakery	20.05	5.917	7.343	4.622	11.965		
banana shake	Banana shake	3.7	2.3	1	0.2	1.2	Nutritionix website	https://www.nutritionix.com/food/banana-shake
mango shake	Mango Milk Shake	3.8	2.2	1	0.2	1.2	Nutritionix website	https://www.nutritionix.com/food/mango-milk-shake
waterchestnut juice (from can)	Waterchestnuts, Chinese, canned, solids and liquid	0.06	0.016	0.001	0.026	0.027		
strawberry jam	STRAWBERRY JAM, UPC:	0	0	0	0	0	USDA National Nutrient	https://ndb.nal.usda.gov/ndb/f

	5903295010899						Database (No data on Monounsaturated and Polyunsaturated fatty acids)	oods/show/45293253?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=strawberry+jam&ds=&qt=&qp=&qa=&qn=&q=&ing=
blackberry jam	BLACKBERRY JAM, UPC: 051500040416	0	0	0	0	0	USDA National Nutrient Database (No data on Saturated, Monounsaturated and Polyunsaturated fatty acids)	https://ndb.nal.usda.gov/ndb/foods/show/45308628?fgcd=&manu=&format=&count=&max=25&offset=&sort=default&order=asc&qlookup=blackberry+jam&ds=&qt=&qp=&qa=&qn=&q=&ing=
graham cracker crumbs	Cookie, graham cracker, plain or honey (includes cinnamon)	10.6	1.633	2.509	5.388	7.897		
meat soup	Soup, beef and vegetable, ready-to-serve	0.95	0.289	0.281	0.301	0.582		
pork bone soup	Pork Soup	9.78	2.91	3.33	1.29	4.62	Nutritionix website	https://www.nutritionix.com/food/pork-soup
chives	Chives, raw	0.73	0.146	0.095	0.267	0.362		
sauce in chickpea can	Chickpeas (garbanzo beans, bengal gram),	1.95	0.204	0.444	0.881	1.325		

	canned, solids and liquid							