



UNIVERSIDAD DE JAÉN
Centro de Estudios de Postgrado

COOKING OIL KNOWLEDGE AND PERCEPTIONS OF CONSUMERS IN THE UNITED STATES, AN EXPLORATORY VIEW

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Jaén, a ____ de _____ de 20____

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Summary

Perceived health benefits of a food product are often highly-influential factors for consumers while they are in the decision-making process. Nowadays, there is an overwhelming amount of information available to consumers relating to nutrition and health, including a great volume of misinformation. It is important for producers and marketers of olive oil to have current data that demonstrates to what degree consumers have correct information about olive oil. Even more importantly, industry professionals must be able to assess the degree to which misinformation persists. This is especially important for export markets in regions where olive oil is not produced, meaning the consumers likely have little or no exposure to information about the product.

Abstract

This research takes a look at a group of consumers in the United States and evaluates both their subjective (self-perceived) knowledge regarding olive oil and some other common cooking oils in the US market, and their objective (actual) knowledge in relation to statements derived from accepted research. Included are questions that ask the participants about olive oils blended with canola or other seed oils, a product offering that has recently gained some popularity in the US.

1. Introduction

Olive oil is a product that continues to enjoy growing popularity in the US market. Reasons for consumption vary. Cultural traditions related to cooking and eating in many immigrant populations are often continued after their arrival in the US, particularly among Mediterranean and Middle Eastern immigrant families. Many gourmet consumers associate olive oil with fine dining and cooking. The high price of quality extra virgin olive oil distinguishes it as luxury product for this category of consumers. But for many consumers outside the previously-mentioned groups, the perceived health benefits are the primary reason for purchasing and consuming olive oil.

Consumers are increasingly concerned with their health and recognize the impact that diet can have on their health. The Mediterranean diet, recommended by many doctors, nutritionists, and research scientists, has recently gained popularity among the US population. Olive oil is widely recognized as one of the key factors of the Mediterranean diet for improving health. However, most Americans are not very familiar with the product, how it is produced, and how it specifically can improve their health.

This lack of proximity to the product, not only the physical distance from the cultivation and the production, but also from traditional uses and widespread retail distribution, contributes to a fundamental gap in knowledge about the product and its uses. A

consumer who has interest in consuming olive oil has to work harder to gather information about the product, and has fewer points of reference to evaluate the accuracy of the information they encounter.

In the US market, misinformation about olive oil comes from a variety of influential sources, from models and movie stars, celebrity chefs, and of course, from competitive industries such as other cooking oils. Decades of government nutrition guidelines that either contain no information about olive oil or just blindly classify all fats and oils as unhealthy have also made it more difficult for US consumers to view olive oil in a positive light until more recently, when support has grown for the Mediterranean diet amongst health and nutrition professionals in the US.

In this environment, it is crucial for producers and marketers of olive oil to have current data that shows the level to which consumers have correct information about olive oil. In addition, industry professionals must be able to assess the degree to which misinformation exists, especially information that deters consumers from purchasing and using olive oil, so that they may direct marketing efforts to continual education of the consumer.

Before describing the research objectives, it is important to have a basic understanding of the market, the products, and the specific health attributes of olive oil.

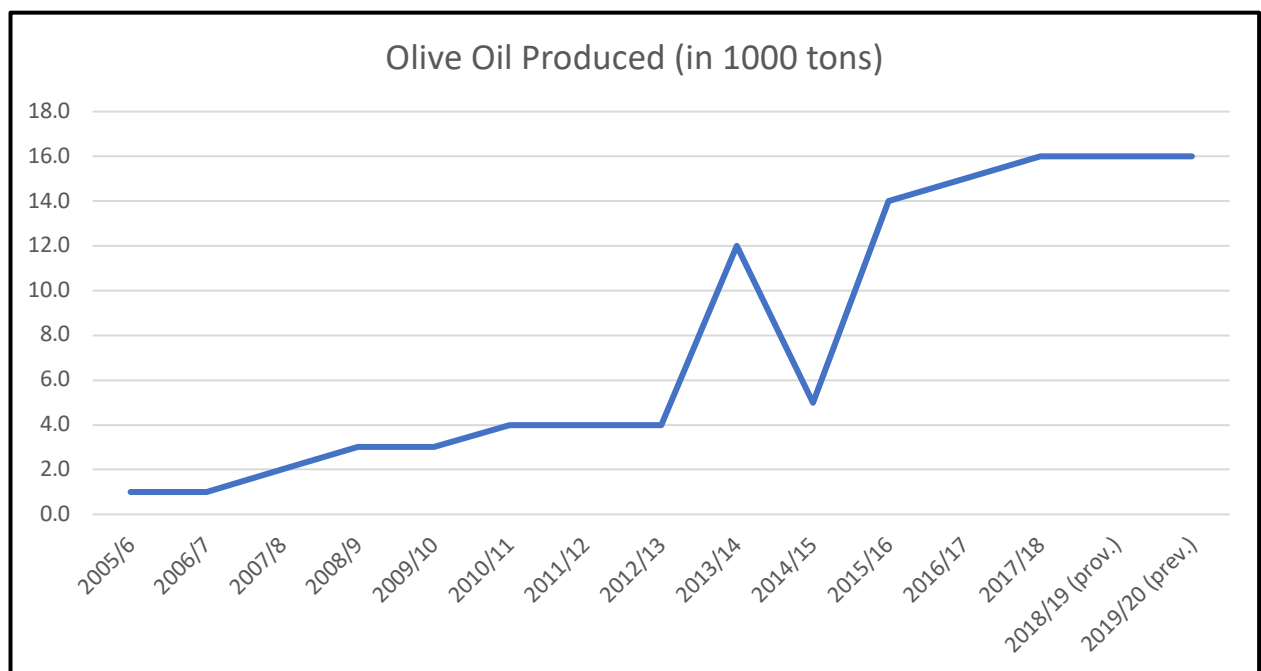
1.1 THE MARKET

With a population estimated at 328,239,523 persons for the year 2019 (US Census), the United States has great market potential based on size alone. In addition, the average American consumer spends around 9.5% of their disposable personal income on food expenditures (USDA, 2019). The combination of this volume of food consumption and buying power make the US an attractive and lucrative market for exportation from producer countries. Indeed, it is currently the third largest market for consumption of olive oil, and market demand greatly exceeds regional production.

The International Olive Council (IOC) reports provisional figures for the 2018/2019 harvest year, where the US consumed more than 331,000 tons of olive oil, less than

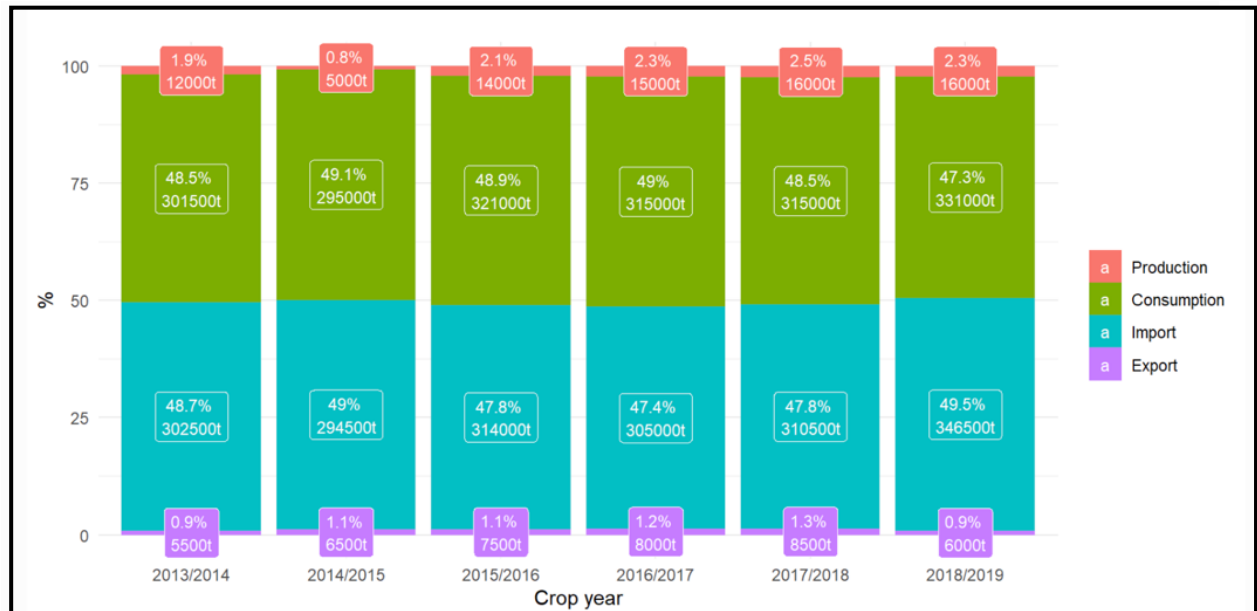
the producer countries of Spain (514,800 tons) and Italy (398,700 tons), but more than Greece (123,100 tons), another top producing country. During this same period, the US produced a total volume of 16,000 tons of olive oil for the third year in a row, primarily in the state of California. Even though production of olive oil in the US has more than tripled in recent years, this production level is still less than 5% of the current market demand.

Graphic 1. US Olive Oil Production, 2005/6-2019/20



Source: Self-Made with data from International Olive Council (2020)

Graphic 2. US olive oil distribution

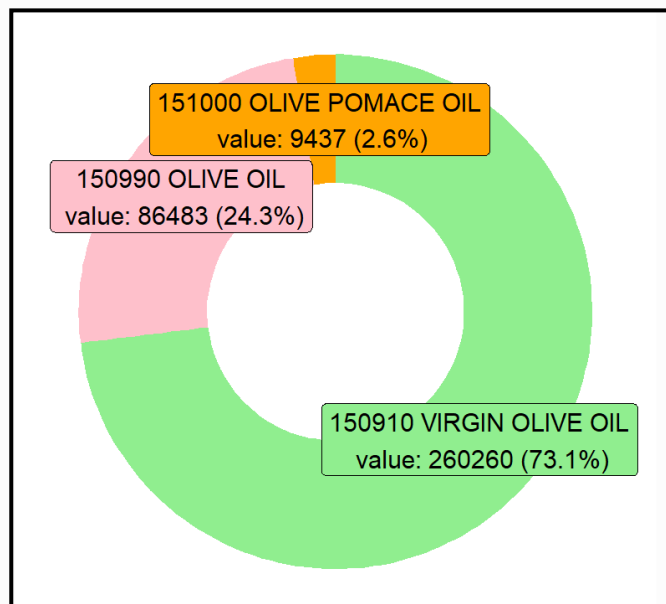


Source: International Olive Council (2020)

The majority of the oil imported into the US each year is classified as virgin olive oil, (IOC Trade Standards, 2018) including in the data both extra virgin and virgin olive oils. (Extra virgin olive oil is the much more commonly consumed by US consumers; it is rare to find packaged virgin olive oil on the shelves of supermarkets or in the kitchens of American households.) The remaining imports, minor in their share by percentage but still considerable due to the high volume, are olive oil (defined as refined olive oils mixed with virgin oils), and olive pomace oil.

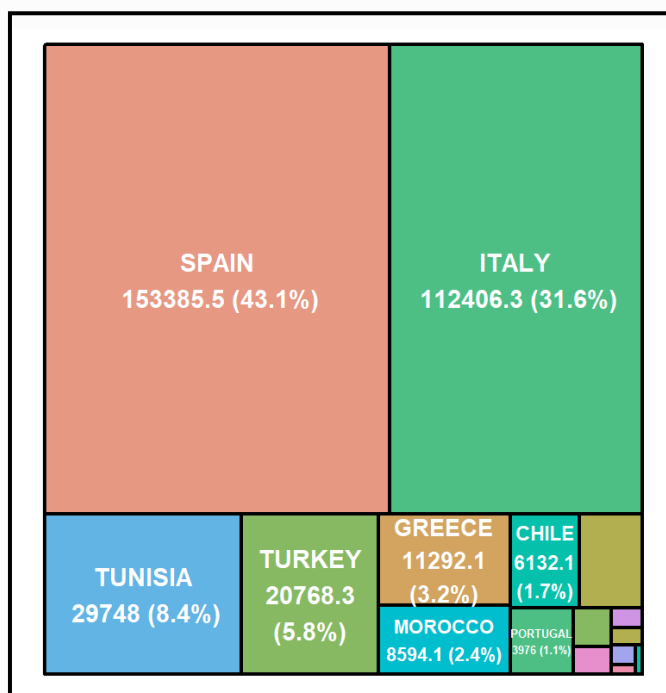
Not surprisingly, the top olive oil-producing countries of Spain and Italy have been the primary countries of origin for imported olive oil, comprising more than 70% of the total imported volume (43.1% and 31.6% respectively in 2018/2019). As of the date of this research, no other single country has yet achieved more than 10% of the market share.

Graphic 3. Olive oil imports by quality of product (2018/2019)



Source: International Olive Council (2020)

Graphic 4. Olive oil imports by country of origin (2018/2019)



Source: International Olive Council (2020)

1.3. THE PRODUCTS

This study focuses on four types of cooking oil available in the US market. While the list of cooking oils used by American consumers is fairly extensive and includes peanut oil, avocado oil, or vegetable oil (a generic term used on labels for cooking oils that may be a blend of any plant-derived oil that retains no identifiable flavor of said plants), this research project takes a look at the cooking oils as defined in the following sections.

Note: All classifications of olive oil are produced by crushing olives and then extracting oil from the pulp, either by mechanical or chemical means. However, the extraction method is one of the primary determining factors in an olive oil's classification.

1.3.1. Extra Virgin Olive Oils

Virgin olive oil must be processed by mechanical means, typically by centrifuge, only occasionally by traditional presses. Thermal limits must be exercised, meaning that the pulp and the oil must be kept under 27°C/80.6°F throughout the milling and extraction process. Chemical and sensory analysis is conducted to determine which of the categories that the resulting oil can be classified as, as set by the respective governing bodies (IOC, USDA). Different parameters determine whether the resulting product is extra virgin olive oil, virgin olive oil, or virgin olive oil not fit for consumption. Between the two consumable options, virgin olive oil is not very readily available to US consumers, so extra virgin olive oil is the primary type of virgin olive oil consumed by the American population.

1.3.2. Olive Oil

If the olive oil is extracted by chemical means, typically by using hexane, it is classified as refined olive oil, but then must be mixed with a small percentage of virgin olive oils to regain flavor, smell, and color, and to obtain shelf stability. This resulting product is simply named olive oil, and is offered to US consumers in “light” and “robust” types. These descriptions can be an indicator of the ratio or type of virgin olive oil added to the refined olive oil. A “light” olive oil will be lighter in color, with little odor and a mild or even bland taste, whereas a “robust” olive oil will have a slightly stronger odor and

flavor, although still not as flavorful or colorful as a quality extra virgin olive oil. From this point forward, the use of the term “olive oil” in this report refers specifically to refined olive oil, and not to the general definition of any oil made from olives.

1.3.3. Olive Oil Blends

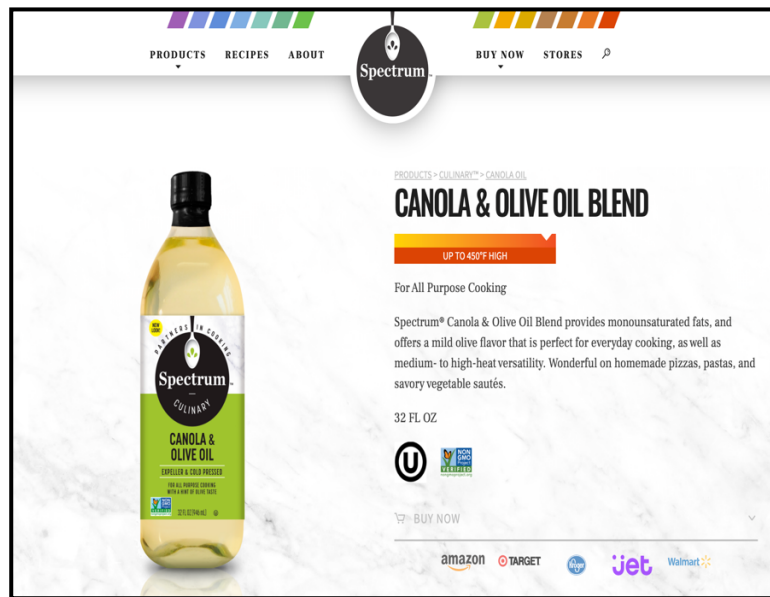
Olive oil may be blended with other seed oils, such as canola or sunflower oil, typically in ratios of 75/25, 85/15, or 90/10, with the seed oil having the greater proportion. This has been a recent trend in the US market, and the brands offering this product version range from organic health brands (Spectrum), olive oil brands (Pompeian) and private store labels (Kirkland Signature of Costco). The marketing surrounding these products focuses on a couple of different aspects, such as implied increased health benefits and/or higher smoke point.

Graphic 5. Olive Oil Blends (Pompeian)



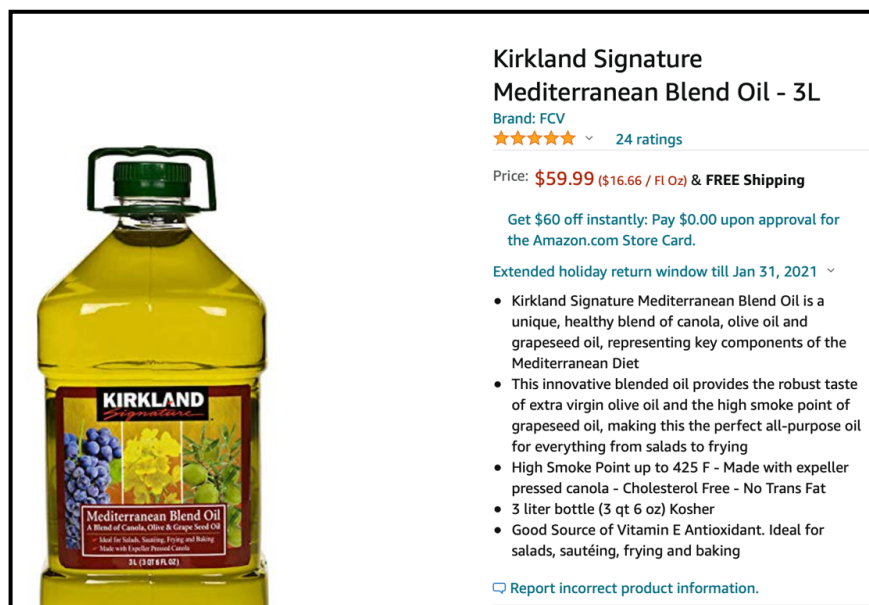
Source: author photo

Graphic 6. Olive Oil Blends (Spectrum)



Source: spectrumorganics.com

Graphic 7. Olive Oil Blends (Kirkland Signature as listed on Amazon)



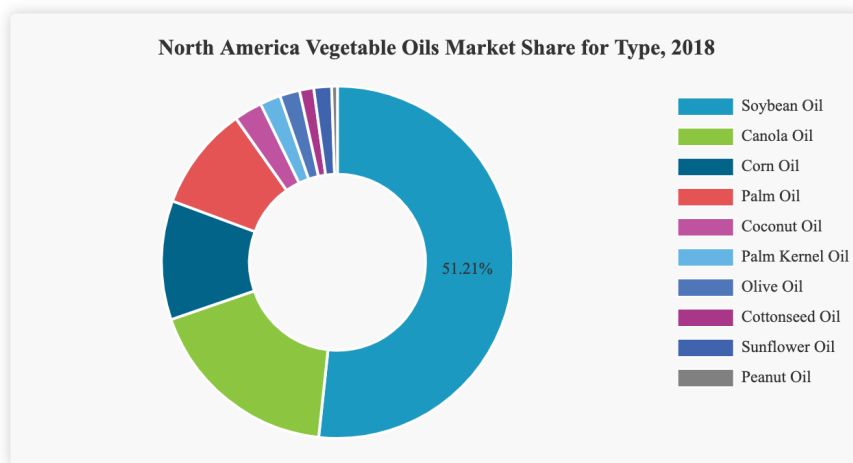
Source: amazon.com

1.3.4. Seed and Vegetable Oils

Soybean, canola, corn, and palm oil are the most-consumed cooking oils in the US. All are refined oils, meaning they are extracted by chemical means from the source

material. These and any other seed/vegetable oils can be found labeled generically as “vegetable oil”, and are included in this category for the purposes of the research.

Graphic 8. Cooking Oils, North American Market

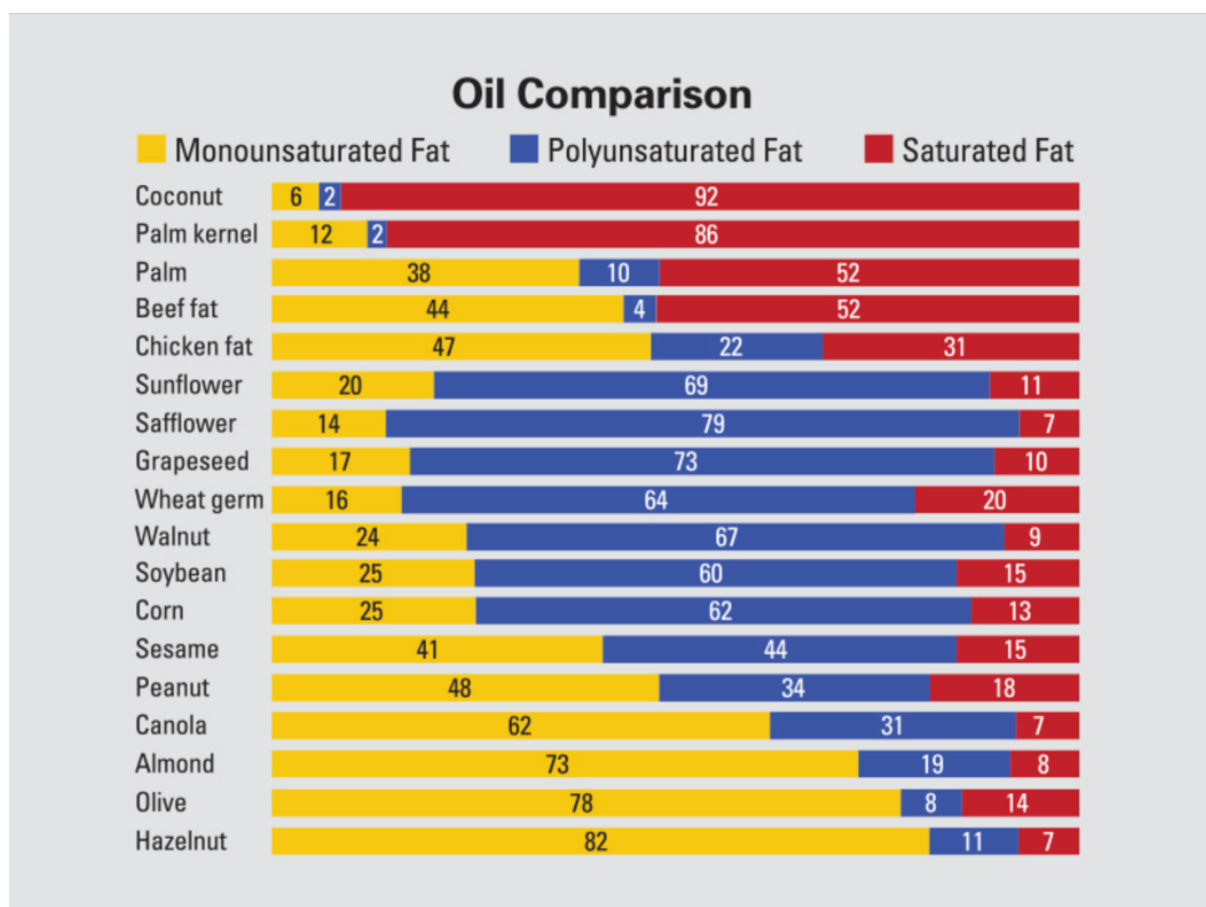


Source: fortunebusinessinsights.com

Some of the oils in this category also have their own set of proven health benefits, when used as a replacement for saturated fats, based on their ratios of monounsaturated and polyunsaturated fats. Canola oil is lower in saturated fat content than olive oil, around 7% as compared to 16% for olive oil. Sunflower oil, also frequently used by US consumers, has one of the highest percentages of polyunsaturated fat, around 69%. Either of these cooking oil choices can contribute to heart health and lower the risk of coronary disease by reducing oxidative stress and lowering LDL cholesterol levels when used as a replacement for saturated fats (Crosby, 2015).

All oils and fats used for cooking have different ratios, or profiles, of saturated, monounsaturated and polyunsaturated fat. It is helpful to have a basic comparison of the different profiles for many oils and fats consumed by humans around the world, as shown below.

Graphic 9. Fat Composition Comparison



Source: Iowa State University Extension and Outreach

This information can help consumers evaluate which products they should use more of, and which ones they should limit their consumption of. The importance of this information depends, of course, on health issues and concerns that vary greatly between individuals.

1.4. HEALTH ATTRIBUTES OF OLIVE OILS

1.4.1. Allowed health claims

Health claims on product packaging are closely regulated by governing bodies such as the US Food and Drug Administration and the European Food Safety Authority. The EFSA allows two different elements to be cited in health claims for olive oil- oleic acid content and polyphenols, and only in relation with their capacity to improve cardiovascular health. Those allowances are specifically outlined as follows:

EFSA approved health claim on the unsaturated fatty acids (Commission Regulation (EU) 432/2012): Replacing saturated fats in the diet with unsaturated fats contributes to the maintenance of normal blood cholesterol levels. The claim may be used only for food which is high in unsaturated fatty acids, as referred to in the claim HIGH UNSATURATED FAT as listed in the Annex to Regulation (EC) No 1924/2006.

EFSA approved health claim on olive oil polyphenols (Commission Regulation (EU) 432/2012): Olive oil polyphenols contribute to the protection of blood lipids from oxidative stress. The claim may be used only for olive oil, containing at least 5 mg of hydroxytyrosol and its derivatives (e.g. oleuropein complex and tyrosol) per 20 g of olive oil. In order to bear the claim information shall be given to the consumer that the beneficial effect is obtained with a daily intake of 20 g of olive oil. (www.efsa.europa.eu)

However, US consumers of olive oil have even less government-supported health information than their European counterparts, as the FDA only allows one health claim to be presented for olive oil.

“Supportive but not conclusive scientific evidence suggests that daily consumption of about 1½ tablespoons (20 grams) of oils containing high levels of oleic acid, when replaced for fats and oils higher in saturated fat, may reduce the risk of coronary heart disease. To achieve this possible benefit, oleic acid-containing oils should not increase the total number of calories you eat in a day.” (www.fda.gov)

1.4.2. Other claims supported by research

While producers and retailers are limited to putting the above health claims on their labels and in their marketing materials, there still exists a large amount of information supporting a much wider range of health benefits of olive oil. Consumers have access to much of this information through sources such as educational social media platforms and through their medical professionals, where the product is credited for risk reduction of many non-communicable diseases. For this reason, olive oil is often utilized as a functional food or food ingredient.

Functional foods can be considered to be those whole, fortified, enriched or enhanced foods that provide health benefits beyond the provision of essential nutrients (e.g., vitamins and minerals), when they are consumed at efficacious levels as part of a varied diet on a regular basis. (Hasler, 2002) Another way to describe a functional food, or a food with functional attributes, is that it can be used to solve a current health problem, or to prevent future health problems.

1.4.2.1. Cardiovascular Health

Cardiovascular health, specifically cholesterol levels and oxidative stress, have already been discussed in regulatory allowances for health claims, but research shows that there remains a long list of other diseases and conditions that can be improved or prevented by consumption of olive oils.

Due to their high percentage of monounsaturated fatty acids and relatively low level of saturated fats, all categories of olive oil - extra virgin, virgin, and olive oil - are recommended for improving heart health and lowering the risk of coronary disease. Apart from cholesterol levels, other risk factors for coronary disease include hypertension and obesity, which also contribute to oxidative stress. Research indicates that virgin olive oils reduce blood pressure. When other culinary fats are excluded from the diet and only virgin olive oils are consumed in a moderate and continuous way, studies have shown an associated reduction in body mass index (Gaforio et al, 2019). While these are not explicitly covered by the qualified health claims, often consumers are motivated to consume olive oil to reduce their blood pressure and/or body mass index. Obesity is also considered a risk factor for diabetes, another non-communicable

disease, so olive oil can also be considered a functional food to help reduce risks associated with developing diabetes.

1.4.2.2. Cancer

Consumption of any foods with high levels of antioxidants is generally recommended to reduce cancer risk. Extra virgin olive oil provides additional benefits due to its high content in antioxidants, in the form of Vitamin E and polyphenolic compounds. Consumption of extra virgin olive oil can also help reduce the risk of some cancers. There is evidence that virgin olive oils may specifically play a role in the prevention of postmenopausal breast cancer (Gaforio et al, 2019).

1.4.2.3. Autoimmune diseases

Oleocanthal is a specific phenolic compound that produces anti-inflammatory effects similar to ibuprofen. It has shown promise as a nutritional therapy for treating autoimmune diseases such as inflammatory bowel disease, rheumatoid arthritis, systemic lupus and sclerosis (Gaforio et al, 2019).

It should be noted that a pungent taste is a sensory indicator of the presence of oleocanthal. Pungency is a taste characteristic that is perceived to have negative meaning in many cultures, especially those cultures and regions where there is no or little olive oil production (Jiminez-Guerrero et al, 2012), including the United States. Consumers in these regions, if they choose to consume olive oil, tend to prefer milder-tasting olive oils. These preferences present a barrier to many consumers being able to realize this specific health benefit.

2. THE RESEARCH PROJECT

Given that a foundation of knowledge regarding the market, the products, and the specific health attributes of olive oil, has been established, it is now time to give attention to the research project.

2.1. OBJECTIVES

The objectives of this research are to gather current data in an exploratory manner that evaluates the subjective knowledge and objective knowledge of consumers of olive oil in the United States, including on the topic of olive oils blended with canola or sunflower oils. The project will also seek to verify that some common misconceptions about olive oil continue to have a strong presence in the minds of American consumers. These particular misconceptions can present as barriers to some consumers when they are in the decision-making process.

2.2. METHODOLOGY

This project uses primary research in the form of primary quantitative data collected via a questionnaire designed by the researcher, followed by rudimentary statistical analysis. There is also supplemental research to the primary data in the form of secondary research to further explain and validate the theories and conclusions. Quantitative research is appropriate for this research because hypotheses have been created that needed to be tested, and the results will be used to make predictions based on generalizations (Chrysochou, 2017).

2.3. WORK SEQUENCE

The research project began with secondary research to establish a theoretical framework and refine possible hypotheses. Once these were accomplished, additional secondary research was done to assist with design of the questionnaire. The initial version of the questionnaire was reviewed and tested by a group of 10 persons with varied experience and expertise in the areas of survey design and data analysis. Changes were made based on their feedback, and the final version of the questionnaire was then distributed for a period of one week. Once access to the questionnaire was closed, basic statistical analysis was conducted using Microsoft

Excel. Because this research is exploratory in nature, and also to keep the length of the questionnaire short, a comprehensive analytical model was not used. The results were compiled for this report.

3. THEORETICAL FRAMEWORK

Product knowledge has long been recognized as a key concept in consumer decision making. (Raju et al., 1993) Two areas of consumer knowledge are labeled subjective knowledge (what consumers think they know) and objective knowledge (what consumers actually know) (Vainauskiene, 2019). These two areas of knowledge seldom correspond exactly, and any existing discrepancy can have a profound impact on consumer decisions. The goal of any entity offering a product or service is that consumers have as close to perfect of an awareness as possible of their product, and therefore it is crucial that marketers be able to measure the accuracy of consumer knowledge so that they may strategically address any discrepancies.

The most common way to measure subjective knowledge is to ask study participants to self-report their level of product knowledge (Brucks, 1985). Objective knowledge is best measured through a series of questions or statements that have verifiable true or false answers, and the correct number of answers a respondent gives creates an index of objective knowledge (Johnson et al., 1984). Comparison of the self-reporting and the objective index will reveal any discrepancies between the two.

4. HYPOTHESES

For the purposes of this research project, the following hypotheses were selected for testing.

1. Groups of consumers who demonstrate a higher level of actual product knowledge are more likely to prefer extra virgin olive oil over other types.
2. Groups of consumers who demonstrate a lower objective knowledge are more likely to purchase and consume olive oil blends (OO Blends).

3. Misperceptions about olive oil continue to persist amongst consumers in the US, specifically the following:

- Bitter taste is a bad thing for olive oil.
- The smoke point for olive oil is too low, making it unhealthy to fry with.
- Olive oil is pressed, and therefore it is important that olive oils are cold-pressed.

5. METHODOLOGY

Recent and similar research projects (Salazar-Ordóñez et al., 2018, Wang, et al., 2013) were referenced for question design.

To gather the data needed to answer the research questions of this study, an online questionnaire was selected as the best form to obtain a wider range for a study group. While online surveys have often some of the lowest response rates of the various distribution methods, this option would provide access to larger segment of the population, especially since the questionnaire could also be redistributed by the participants themselves. Also, given the special circumstances of Covid-19 restrictions in place at the time of the research project, the options for gathering data and the prospective participation of consumers, were limited for any other methods.

5.1. QUESTIONNAIRE DESIGN

An online questionnaire consisting of 24 questions was created using Google Forms. Participants were asked to estimate the frequency, volume and manners of use that they consumed the following groupings of cooking oil:

- Extra Virgin Olive Oil, also identified as EVOO
- Olive Oil (not extra virgin olive oil), also identified as OO
- Olive Oil Blends (with canola or other oil), also identified as OO Blends
- Seed or Vegetable Oils (Sunflower, canola,...)

(Other, or more specific, cooking oil options popular amongst consumers in the US, such as coconut oil, peanut oil, or avocado oil, were not included in the questions because they do not support this specific research at this time.)

Respondents were asked five different questions to describe their self-perceived (subjective) knowledge, as well as several groupings of statements that they had to determine whether they were true or false (objective knowledge).

5.2. DISTRIBUTION OF THE QUESTIONNAIRE

On November 6, 2020, a link to the questionnaire was shared via the Facebook, Instagram, and LinkedIn accounts of the researcher, in addition to a small group of contacts who received the link via direct email. Respondents were also asked to share the questionnaire with their own networks, which some of these contacts also shared on their Twitter accounts. As of November 10, the questionnaire had accumulated 130 responses. At this point, the researcher then shared a link to the questionnaire in a US Facebook group called “What I Ate During COVID-19”, which has a membership exceeding 1,800. This served to not only increase the number of responses but to ensure the sample included respondents outside of the researcher’s social and professional contacts, thereby minimizing any potential bias created by familiarity with the researcher. On November 13, the number of responses reached 215 and the survey was closed to responses.

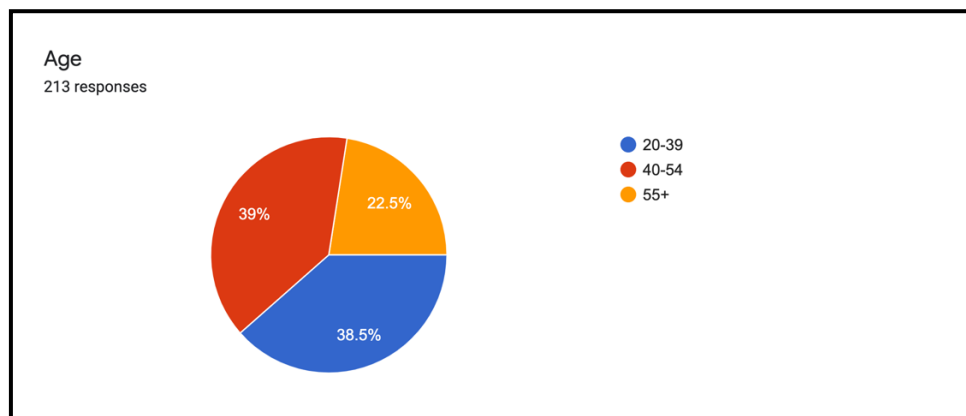
6. **EMPIRICAL STUDIES**

To ensure that the study group consisted only of persons currently residing in the United States, the first question asked the respondents to confirm that they currently reside in the US. Of the 215 respondents, two answered this question with a “no”, hence their responses were eliminated from the dataset used for analysis. Therefore, the final sample size is 213 valid responses.

6.1. DEMOGRAPHICS

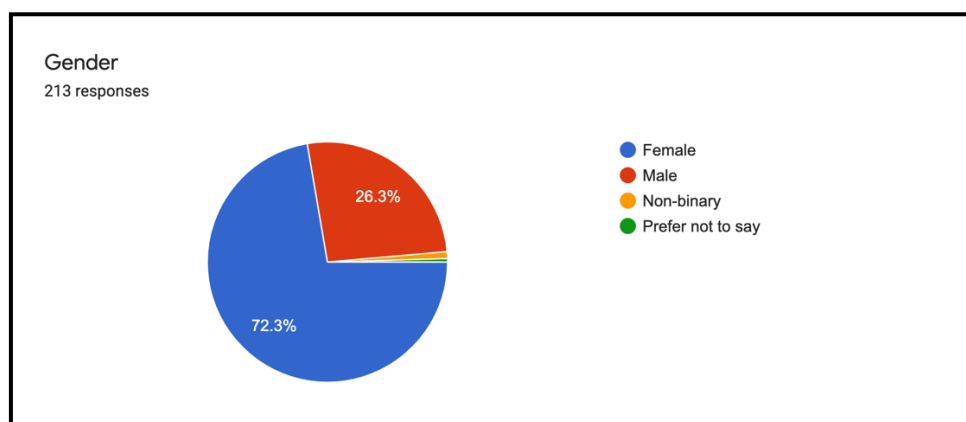
The average respondent is a female (72.3%) between the ages of 20-54 (77.5%), who has completed a bachelor's degree (49.3%), lives in a household of 1 or 2 people (61.5%) and reports a monthly income of more than \$3000. Due to the distribution methods used, this is the expected representation of the peer group, both social and professional, of the researcher. It should be noted that none of the hypotheses posed in this study are dependent on any demographic variables.

Graphic 10. Questionnaire Results – Age



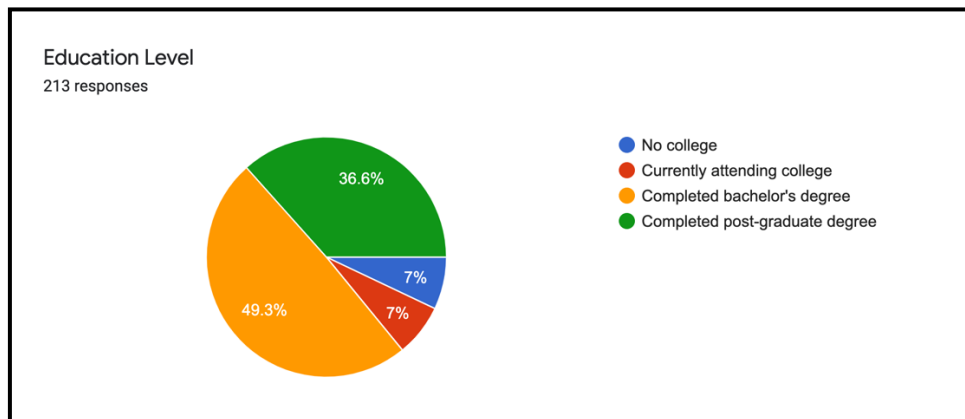
Source: Author, from Google Forms

Graphic 11. Questionnaire Results – Gender



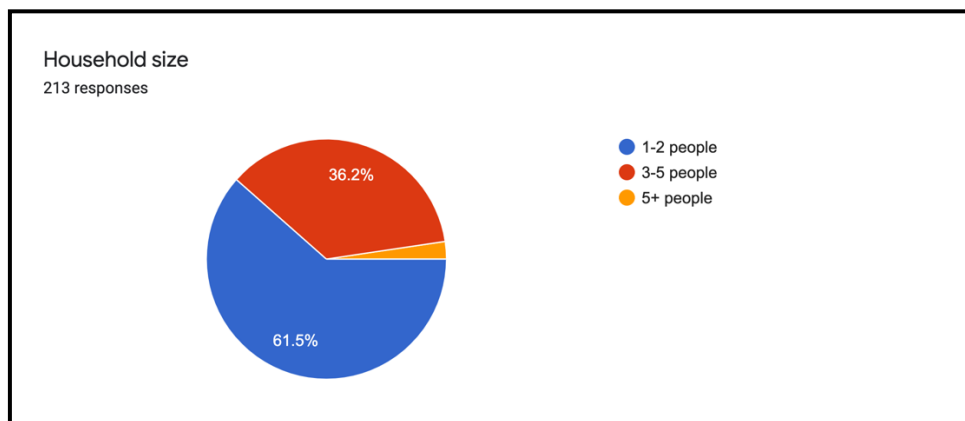
Source: Author, from Google Forms

Graphic 12. Questionnaire Results – Education



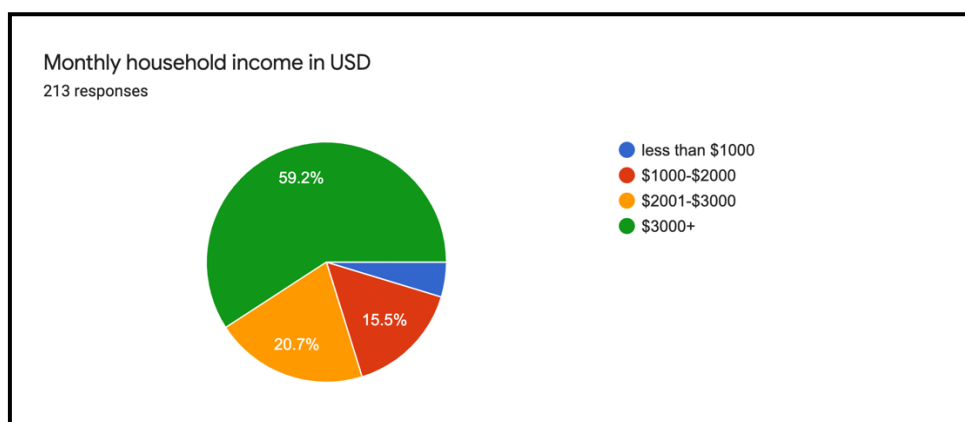
Source: Author, from Google Forms

Graphic 13. Questionnaire Results – Household Size



Source: Author, from Google Forms

Graphic 14. Questionnaire Results – Income



Source: Author, from Google Forms

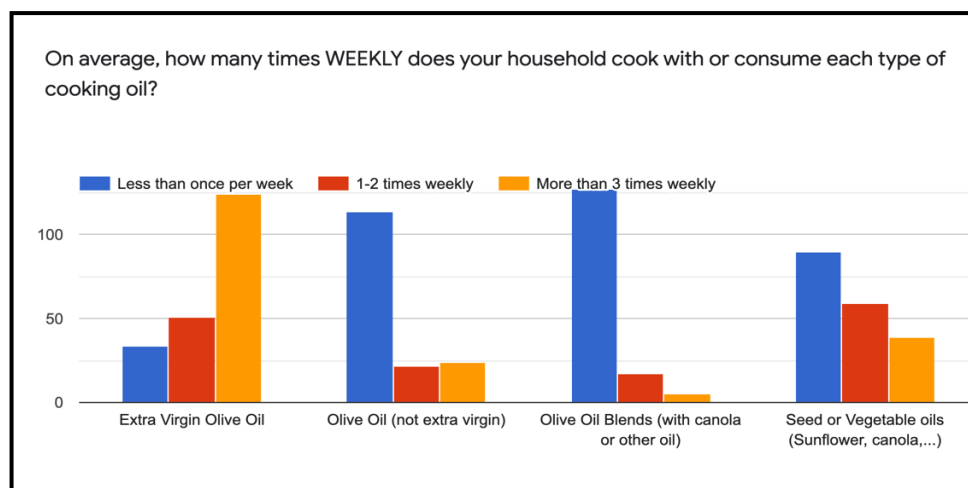
6.2 CONSUMPTION

Respondents were asked if they purchased food that is consumed by their household. This question is intended to support the following questions about consumption. All but one respondent indicated they purchase food for their household. For the research objectives, a negative response to this question is not considered exclusionary, and this respondent's answers were included in the data analysis.

The next three questions sought to establish an estimate of both the frequency of use and volume of consumption of the various types of oil.

First, participants were asked to indicate on average, how many times weekly they cooked with or consumed each type of oil, choosing between less than once per week, 1-2 times weekly, or more than 3 times weekly. Responses indicate that extra virgin olive oil is used most frequently among the study group, with 124 participants estimating they use it more than three times per week. No other type of cooking oil listed had even half of that reported usage frequency.

Graphic 15. Questionnaire Results – Weekly Consumption Rate

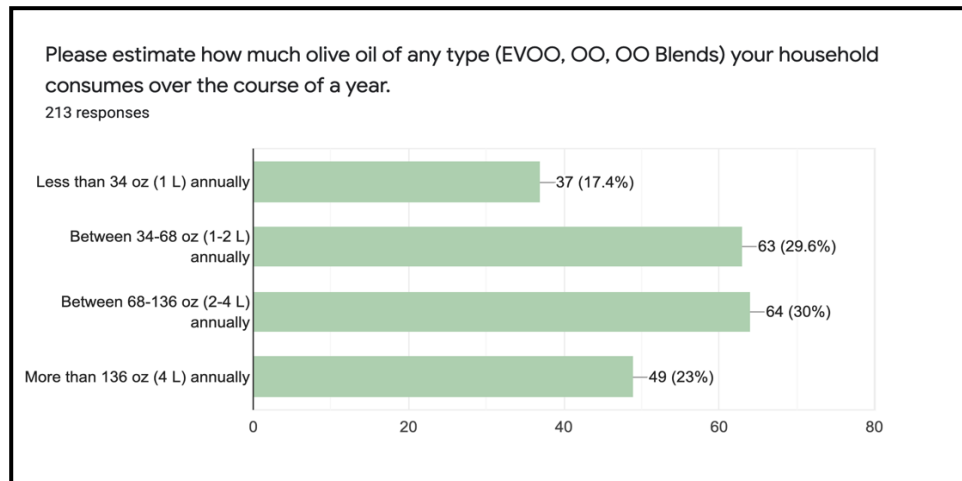


Source: Author, from Google Forms

Next, the participants gave estimates of how much cooking oil their household consumes on an annual basis, first of any type of olive oil (EVOO, OO, OO Blends), and then seed and vegetable oils as a separate question. There was no predominant

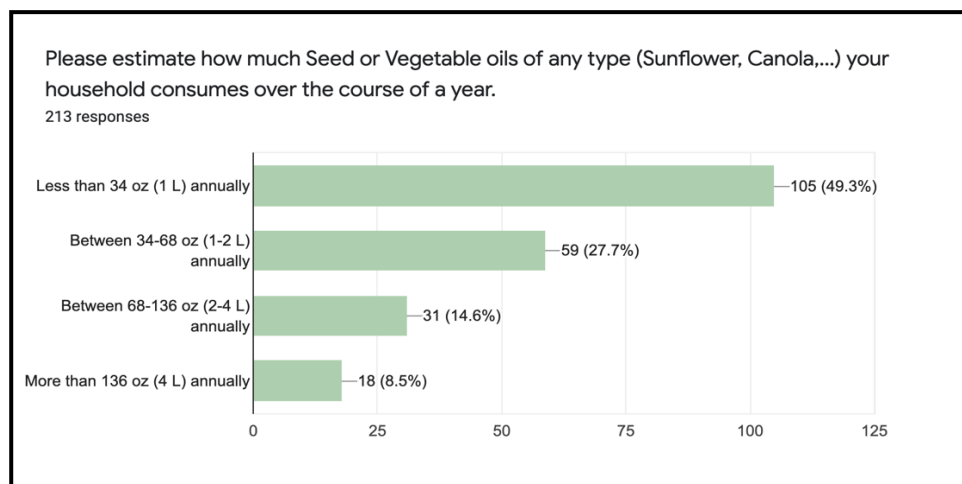
level of consumption for any type of olive oil, with less than 1 liter (17.4%), between 1-2 liters (29.6%), between 2-4 liters (30%), and more than 4 liters (23%). However, when asked the same question about seed or vegetable oils, nearly half (49.3%) reported using less than 1 liter annually. The data indicates that the study group is composed of persons who primarily use some type of olive oil.

Graphic 16. Questionnaire Results – Estimated Consumption Volume, All Olive Oil Types



Source: Author, from Google Forms

Graphic 17. Questionnaire Results – Estimated Consumption, Seed or Vegetable Oils



Source: Author, from Google Forms

The annual consumption levels indicate that the majority of the respondents reported that they use more olive oil of any type than seed or vegetable oils.

6.3 USE OF PRODUCT BY TYPE

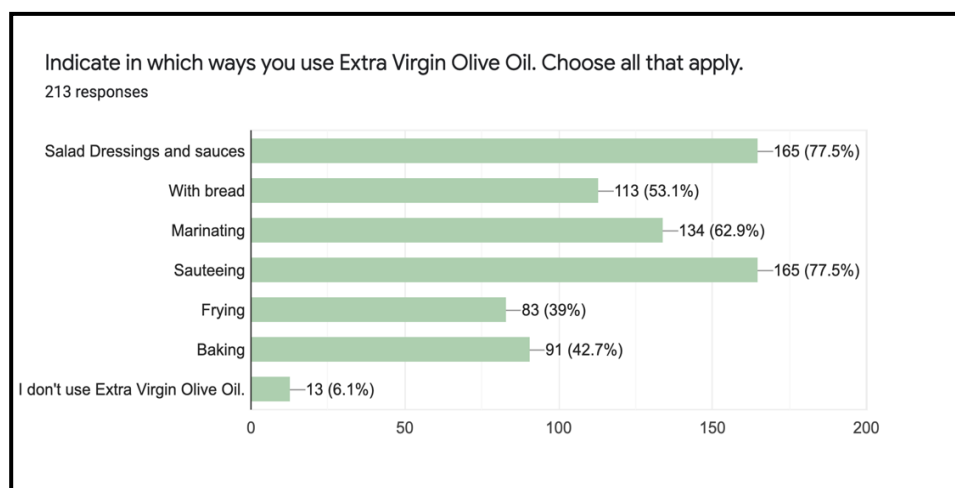
Participants selected from a list of possible ways to use cooking oils in food preparation and consumption. Each type of cooking oil was given its own question, and respondents chose all uses that applied to them.

In addition to giving a sense of the preferences of cooking oil by use, these questions also provided another opportunity to further assess the cooking oil consumption by type. 13 respondents indicated they do not use extra virgin olive oil at all, 122 do not use olive oil, 168 (78.9%) do not use olive oil blends, and 35 do not use seed or vegetable oils. Given these numbers, we can confidently conclude that extra virgin olive oil is the primary type of cooking oil referred to in Question 4.

In respect to types of oil used for frying, 39% of the respondents did report that they use extra virgin olive oil for frying, only 21.6% use olive oil (not extra virgin), but 63.8% reported using seed or vegetable oils. This is not a surprising result, considering the misperceptions regarding olive oil, smoke point, and frying.

Extra virgin olive is most commonly used in salad dressings and sauces, as well as sauteeing, both coming in at 77.5%. Olive oil is also mostly used for sauteeing, but only reported as such by 72 respondents. Seed and vegetable oils are mostly used for frying and baking, with 63.8% and 57.7% respectively.

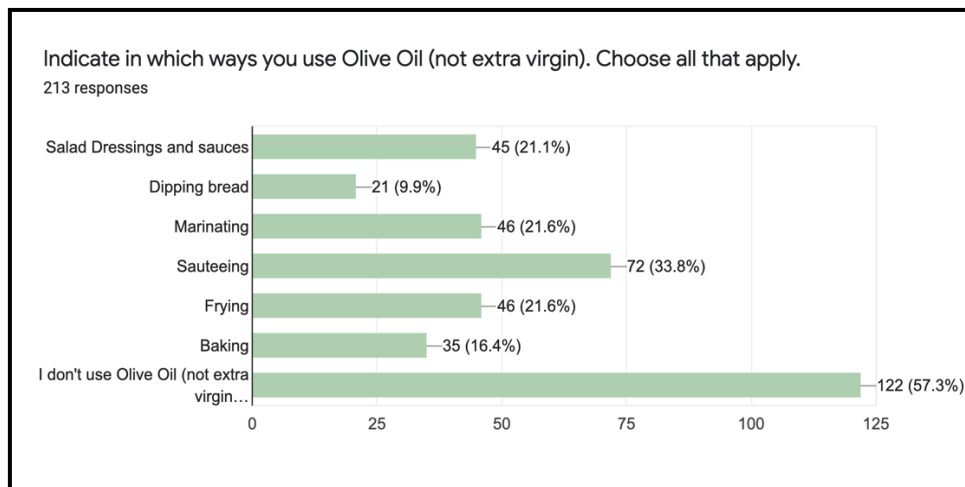
Graphic 18. Questionnaire Results – Uses for EVOO



Source:

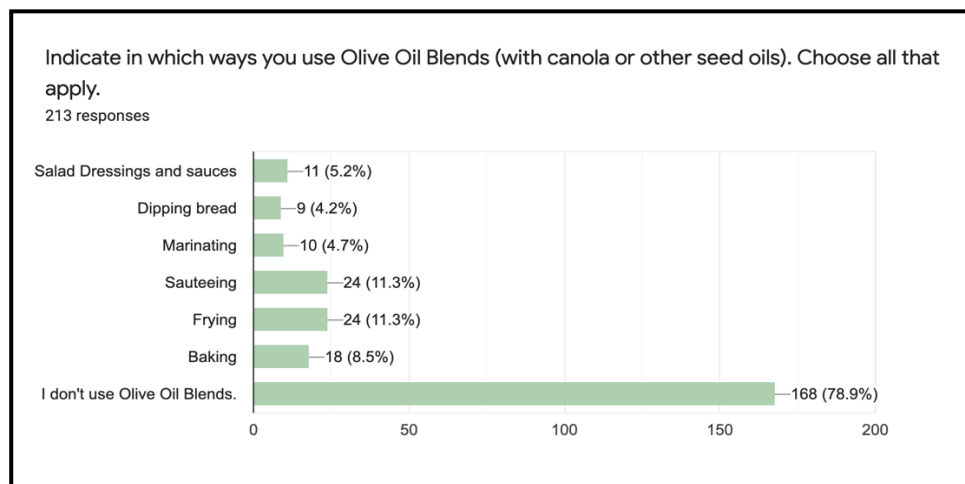
Author, from Google Forms

Graphic 19. Questionnaire Results – Uses for OO



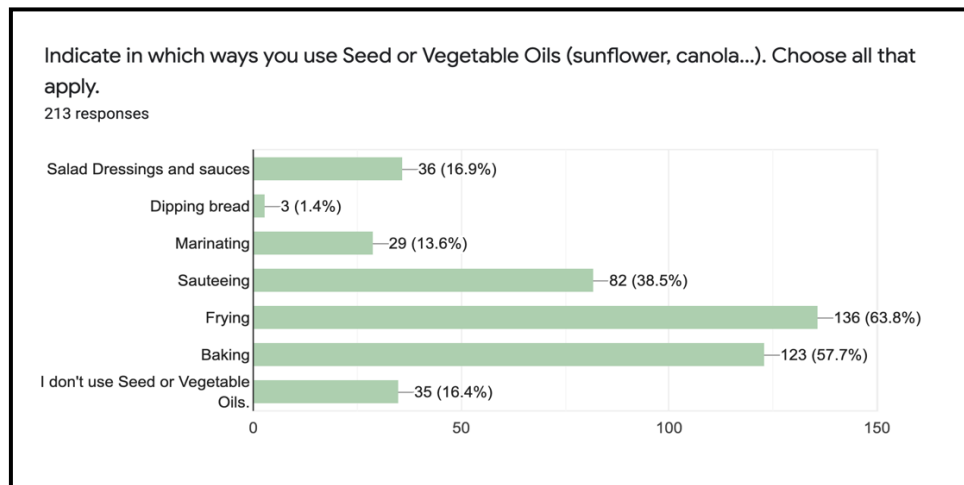
Source: Author, from Google Forms

Graphic 20. Questionnaire Results – Uses for OO Blends



Source: Author, from Google Forms

Graphic 21. Questionnaire Results – Uses for Seed or Vegetable Oils



Source: Author, from Google Forms

6.4 KNOWLEDGE AND PERCEPTIONS

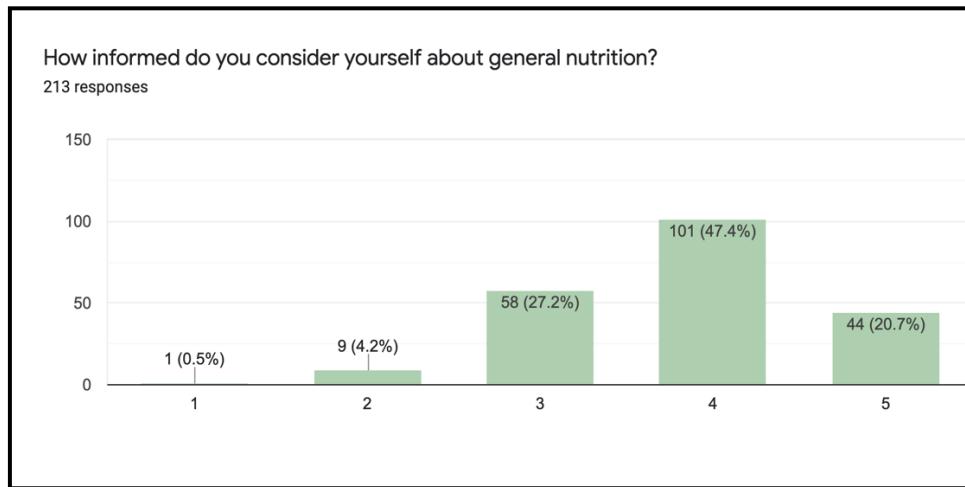
The questionnaire now moves into assessing the self-perceived knowledge, actual knowledge, and perceptions that relate to the research questions, which each subsequent group of questions becoming more focused.

The following questions were used to assess the self-perceived knowledge of the participants, using a Likert scale with a range from 1 to 5, with 1 meaning not informed at all and 5 meaning very informed:

- How informed do you consider yourself about general nutrition?
- How informed do you consider yourself about any health benefits of olive oils?
- How informed do you consider yourself about any health benefits of seed or vegetable oils?

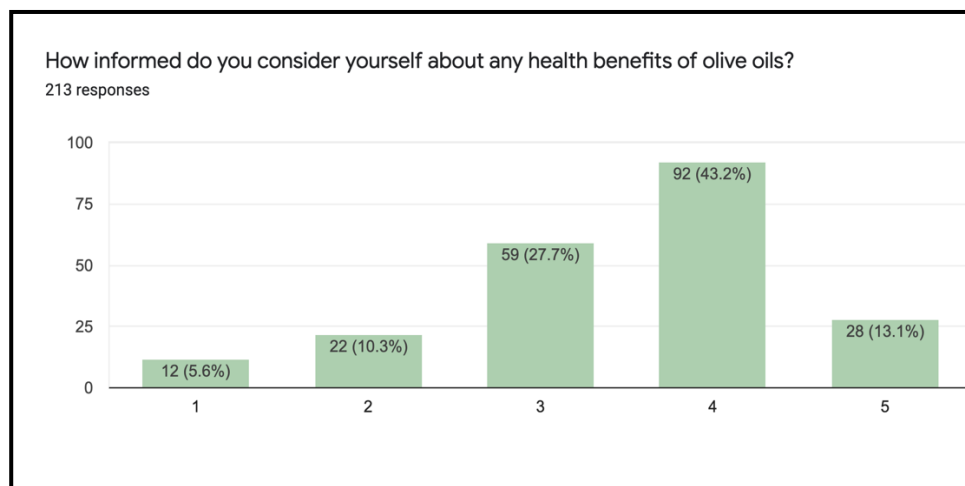
Most respondents felt they are mostly or very informed about general nutrition (47.4% and 20.7%, respectively), slightly fewer (42.3% and 13.1%) had the same level of confidence in their knowledge of the health benefits of olive oils, but the level of knowledge dropped considerably in regards to health benefits of seed and vegetable oils, where these two groups consisted of 26.8% and 6.6% of the respondents.

Graphic 22. Questionnaire Results – General Nutrition



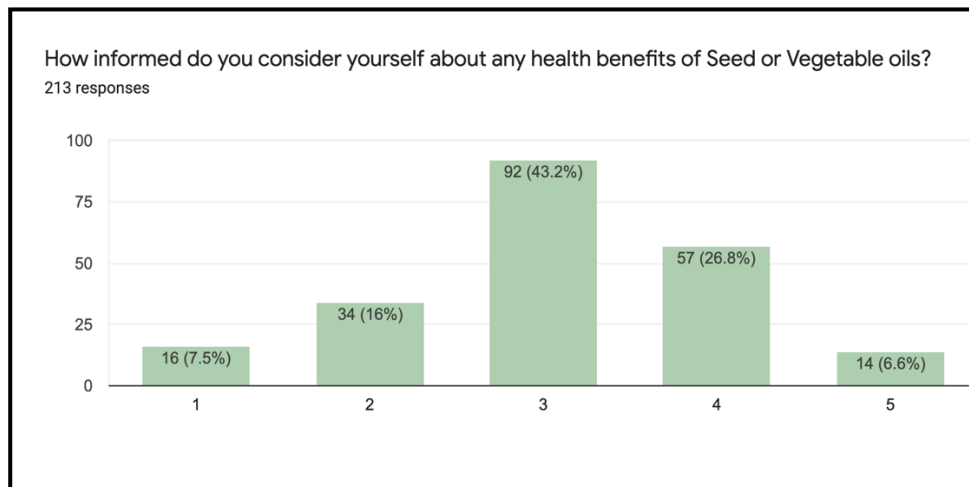
Source: Author, from Google Forms

Graphic 23. Questionnaire Results – Health Benefits of Olive Oils



Source: Author, from Google Forms

Graphic 24. Questionnaire Results – Health Benefits of Seed or Vegetable Oils

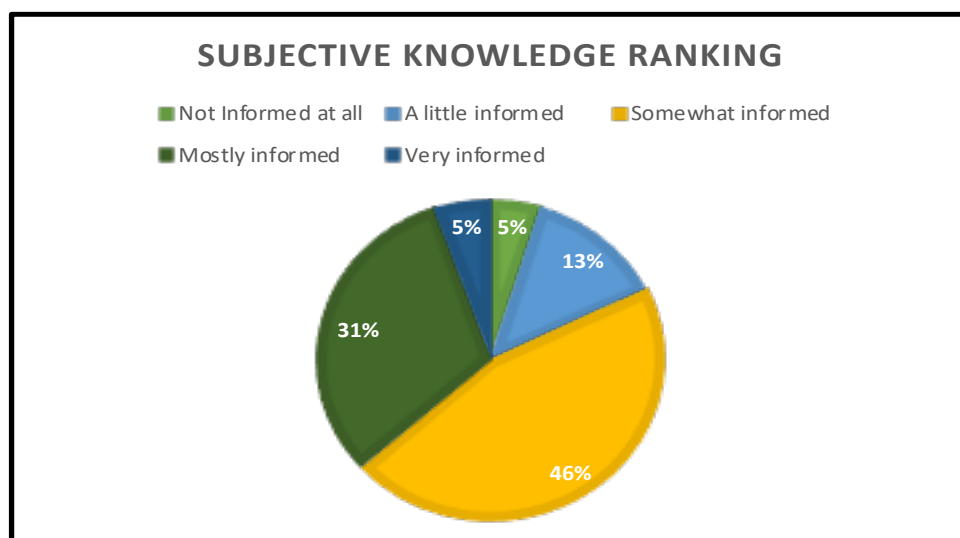


Source: Author, from Google Forms

The responses to these three questions were averaged by respondent, and then the average scores were used to rank the self-perceived knowledge of each participant corresponding to the scale of the Likert Scale, as follows:

- Not informed at all
- A little informed
- Somewhat informed
- Mostly informed
- Very informed

Graphic 25. Questionnaire Results – Subjective Knowledge Ranking



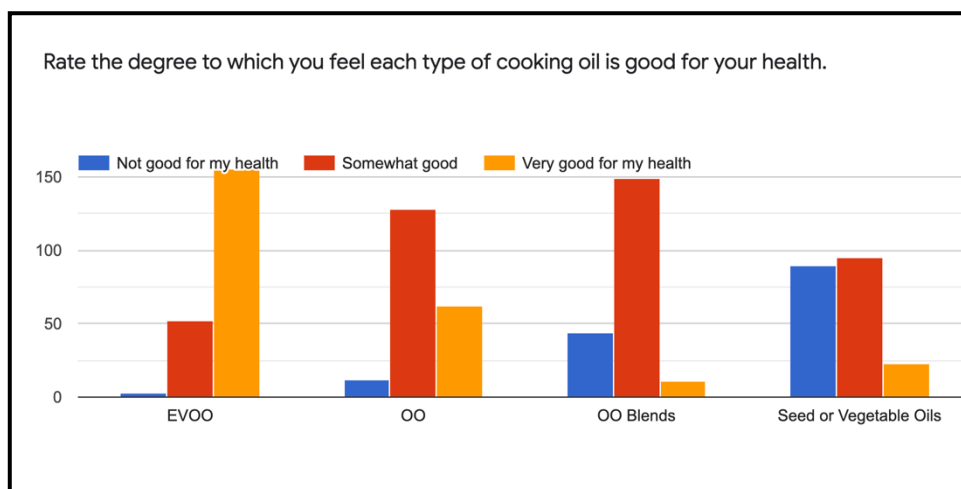
Source: Author, from Google Forms

Nearly half of the study group feels they are right at the middle point of the scale, or are somewhat informed, while another third of the study group feels more confident in their level of knowledge or mostly informed. Only a small percentage placed themselves at either extreme of the scale, with approximately 10% of respondents described themselves as either not informed at all or very informed.

This is an optimistic finding, as consumers in this middle range are more receptive to messaging that increases their actual knowledge of a product. Highly confident consumers are more difficult to persuade because of their positive purchasing experiences which have validated their confidence in their ability to make choices, whereas consumer with little confidence tend to protect themselves from any influences and are defensive against persuasion (Bell, 1967).

The next question seeks to evaluate the perceptions respondents have regarding the healthiness value of each type of oil. A large majority (72.7%) of participants felt that extra virgin olive oil is very good for their health. Olive oil and olive oil blends received mostly “somewhat good” ratings, and an overwhelming majority considered seed or vegetable oils “not good” (42.3%) or “somewhat good” (44.7%). Again, these responses are validated by the indicated frequency of use of extra virgin olive oil.

Graphic 26. Questionnaire Results – Good for Health



Source: Author, from Google Forms

To evaluate the objective knowledge of respondents, the following list of statements were presented in groups of four, and participants were asked to indicate if they believed the statements were true or false.

Statement Group A:

Olive oil contains mostly monounsaturated fat. (True)

Sunflower oil is high in polyunsaturated fat. (True)

Saturated fats and trans fats should be avoided. (True)

All fats should be avoided. (False)

Statement Group B:

The smoke point of olive oil is a valid concern when considering its use for frying. (False)

Combining olive oil with canola oil creates a healthier product for frying than olive oil alone. (False)

EVOO should only be used for dressings and dipping bread. (False)

Using olive oil when baking helps avoid use of saturated fats. (True)

Statement Group C:

All olive oil types are cold-pressed. (False)

Olive oil contains chemically refined oil mixed with extra virgin olive oil. (True)

Cold-pressing makes any oil healthier. (False)

The process of refining any cooking oil removes all antioxidants. (True)

Statement Group D:

EVOO always has a strong peppery taste. (False)

A bitter taste in EVOO is a negative characteristic. (False)

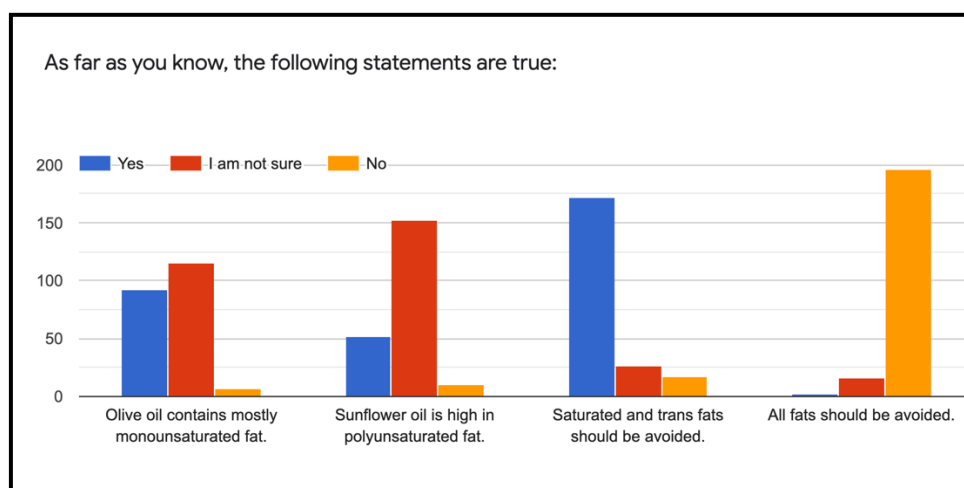
Extra virgin olive oil does not have as long a shelf life as other cooking oils.
(False)

Extra virgin olive oil is high in antioxidants. (True)

We will look at the results for each group of questions.

Statement Group A – 43.2% answered correctly that olive oil contains mostly monounsaturated fat, while only 24.4% knew that sunflower oil is high in polyunsaturated fat. When it comes to general knowledge regarding management of fat intake, 80.8% know that saturated fats should be avoided, and 92% know that it is not advisable that all fats be avoided, again confirming that these consumers are aware that consumption of healthy fats is important.

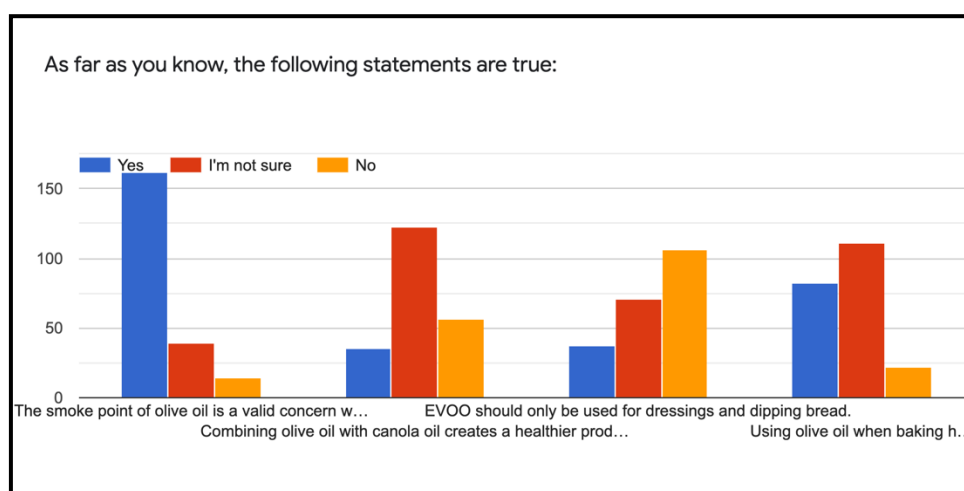
Graphic 27. Questionnaire Results – Knowledge of Fats



Source: Author, from Google Forms

Statement Group B – 76% of respondents believe they should be concerned about the smoke point of olive oil if considering its use for frying, a proven misconception. 35 respondents believe that combining canola oil with olive oil creates a healthier product for frying. Cross checking the individual surveys of these 35 respondents showed that 11 of them were also the only respondents who reported using this product. Slightly less than half of the respondents (49.8%) felt it is not true that olive oil should only be used for dressings or dipping bread, a perception that was also verified by the reported uses earlier in the questionnaire. 38.5% of respondents stated it is true that using olive oil when baking is a strategy to reduce consumption of saturated fats. This finding is also supported by the reported uses earlier in the questionnaire.

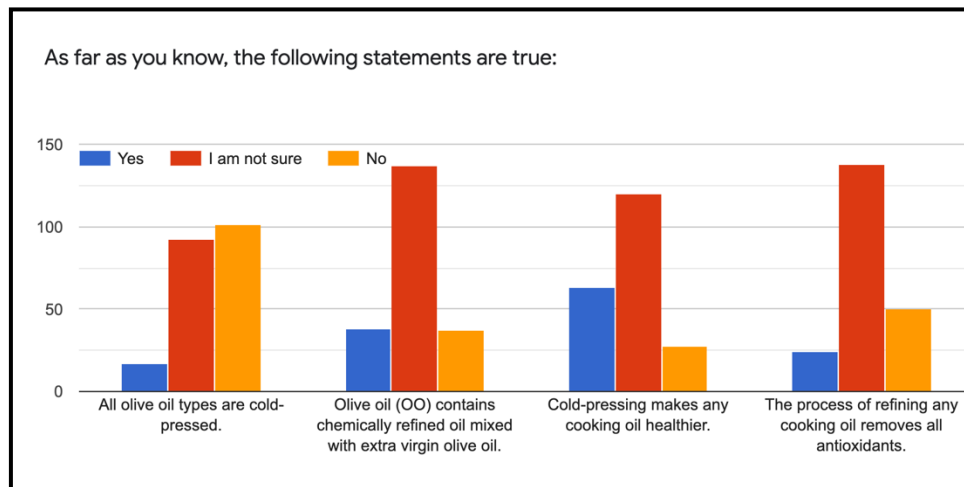
Graphic 28. Questionnaire Results – Misconceptions



Source: Author, from Google Forms

Statement Group C – Nearly half of the respondents know that all olive types are not cold-pressed, with only 17 individuals indicating that this was a true statement. Only 17.8% knew that olive oil contains chemically refined oil mixed with extra virgin olive oil, while the majority were not sure about this statement. Slightly more than half of the respondents were also unsure about whether cold-pressing makes any cooking oil healthier. Lastly, the majority were also not sure if refining any cooking oil removes all antioxidants; 50 respondents were sure that this statement was false.

Graphic 29. Questionnaire Results – Processing Facts



Source: Author, from Google Forms

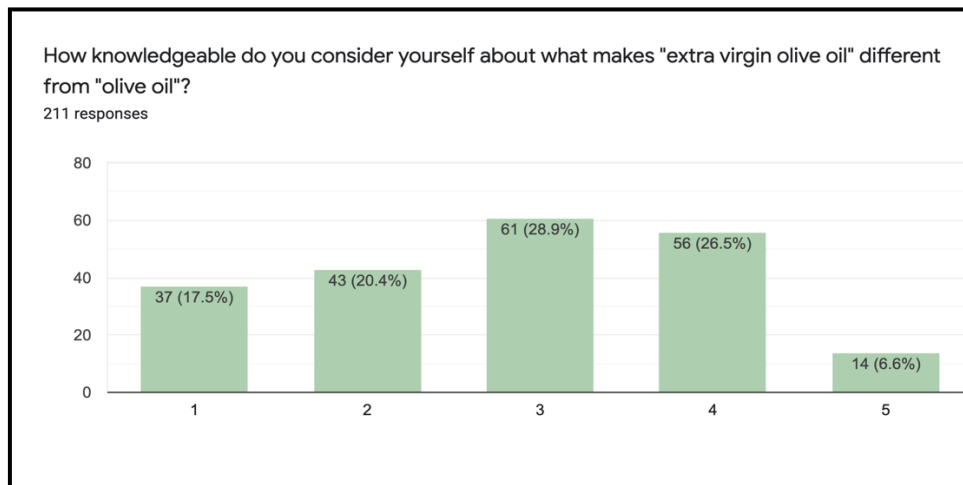
Overall, these results demonstrate a mostly low level of objective knowledge amongst the study group, with the knowledge level decreasing with each group of questions.

Next in the questionnaire, the participants were asked to indicate their confidence in their level of knowledge in these two specific areas:

- How knowledgeable do you consider yourself about what makes “extra virgin olive oil” different from “olive oil”?
- How knowledgeable do you consider yourself about which taste characteristics are considered positive for extra virgin olive oil?

Only 14 respondents felt they are very knowledgeable about the differences between EVOO and OO, with 56 selecting mostly informed, 61 somewhat knowledgeable, 43 a little knowledgeable, and 37 consider themselves having no knowledge at all. As far as taste characteristics, again 56 felt mostly knowledgeable, 60 somewhat, 32 a little, but 50 described themselves as having no knowledge on this topic. Less than 5% (10 respondents) felt they are very knowledgeable.

Graphic 30. Questionnaire Results – Distinction EVOO vs OO



Source: Author, from Google Forms

Graphic 31. Questionnaire Results – Positive Characteristics



Source: Author, from Google Forms

Lastly, the study group was asked one more group of 4 questions that were designed to measure their actual knowledge of the just-mentioned themes. These statements are:

EVOO always has a strong peppery taste.

A bitter taste in EVOO is a negative characteristic.

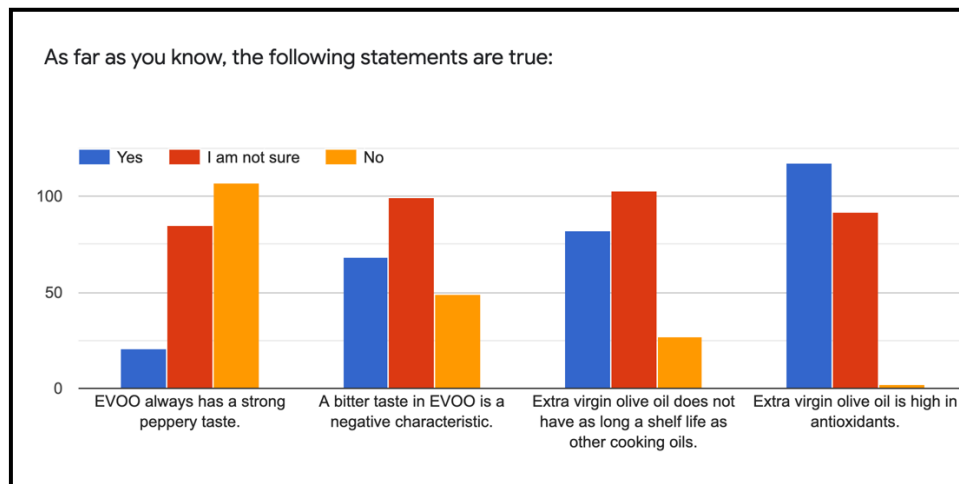
Extra virgin olive oil does not have as long a shelf life as other cooking oils.

Extra virgin olive oil is high in antioxidants.

Approximately half of the respondents (50.2%) were correct in their belief that EVOO does not always have a strong peppery taste. A quarter of the study group also correctly knew that a bitter taste in EVOO is not a negative characteristic. Only 12.7% indicated that the statement about shelf life being shorter for extra virgin olive oil than for other oils. Lastly, and optimistically, more than half (54.9%) of the respondents knew that it is true that extra virgin olive oil is high in antioxidants.

Again, the majority of the results do seem to fall into the middle range of confidence levels. The average self-perceived knowledge was moderately unsure, and the actual knowledge responses seem to support that the majority of the study group lacks the appropriate product knowledge at this point in time.

Graphic 32. Questionnaire Results – Taste and Shelf Stability



Source: Author, from Google Forms

7. CONCLUSIONS

This research provides some insights that could be used to drive further research. As stated before, this research project was exploratory in nature, and therefore not designed to provide sweeping and concrete conclusions, but instead to highlight specific areas that could be tested with more depth, that in turn could assist in developing education campaigns and more effective marketing strategies.

7.1 HYPOTHESES

Groups of consumers who demonstrate a higher level of actual product knowledge are more likely to prefer extra virgin olive oil over other types. This hypothesis was not conclusively supported by the research. While the study group did have high volumes and high frequency of consumption of extra virgin olive oil, there was not a high level of actual product knowledge in general, the exception being the knowledge that extra virgin olive oil is high in antioxidants. No correlation can be drawn between the two variables with the research methodology used.

Groups of consumers who demonstrate a lower objective knowledge are more likely to purchase and consume olive oil blends (OO Blends). This hypothesis was also not conclusively supported by the research. The group of study participants generally had lower objective knowledge, but consumption of olive oil blends was low among the group. Even amongst the group of 35 respondents who think a canola and olive oil blend is a healthier product than either one alone, less than a third of those consumers actually reported using the blended product. Again, no correlation can be drawn between the two variables with the research methodology used.

Misperceptions about olive oil continue to persist amongst consumers in the US, specifically the following:

- *Bitter taste is a bad thing for olive oil.*
- *The smoke point for olive oil is too low, making it unhealthy to fry with.*
- *Olive oil is pressed, and therefore it is important that olive oils are cold-pressed.*

The research did support this hypothesis in a broad sense. The percentage of the respondents who indicated that they perceived these myth statements to be true varied by the misperceptions, but all of the results demonstrate that there is still much education to be done to correct these misperceptions. The most widely-believed myth is the question of olive oil smoke point and its suitability for frying. There was less belief in the topic of the validity of cold-pressed being included on packaging, but this can also be considered a less significant barrier to consumer decision-making. Most

respondents were unsure about the bitter taste statement, indicating this perception could more easily be corrected.

7.2. LIMITATIONS

There are several research limitations that must be acknowledged.

The exploratory nature of the research project limited the size of the study group and the level of detail in the questions. More conclusive results could have been obtained with a larger sample size.

The hypotheses focused on group averages instead of specific individual correlations and only basic statistical analysis was done. Due to time and resource constraints, the project was limited in the ability to explore the specific profiles of each respondent and to measure each individual's knowledge gap.

The distribution method, by using a participant-sharing method, limited the ability to verify the geographic distribution of the respondents, and instead relied on the self-reported assertion that each respondent did, in fact, live and shop in the geographic area of the United States.

The demographic results correspond to the researcher's peer group, which produces a limited analysis of a specific market segment. Given the higher percentage of extra virgin olive oil and olive oil users in the research group, the invitation to participate may have alienated non-users, whose responses could have provided additional insights.

7.3 RECOMMENDATIONS

Further research is recommended, with a stronger team approach to methodology selection and questionnaire design to ensure that a more comprehensive analysis can be done. A larger sample size would ensure that a broader picture is captured. Using a stratified sample model could also provide the ability to target multiple market segments. Multiple research tangents could be launched from this exploratory research project.

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Appendix

Appendix 1. Consumption – Non-EU

CONSEIL CLECOLE INTERNATIONAL (NOVEMBRE 2019)
INTERNATIONAL OLIVE OIL COUNCIL (NOVEMBER 2019)

HUILES D'OLIVE - OLIVE OILS

Tableau 4: CONSOMMATION (1,000 tm) - Table 4: CONSUMPTION (1,000 tonnes)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)
	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	(prev.)	(prev.)
Albanie	7.0	27.0	30.0	25.0	17.5	36.0	50.0	31.5	44.0	42.0	26.0	25.0	21.0	60.0	38.0	35.0	23.0	4.5	7.0	6.0	9.0	8.0	13.0	11.5	12.5	11.5	13.0	12.5	12.5	12.5	12.5
Algérie	4.0	4.0	4.5	4.0	3.0	6.0	8.0	8.0	8.0	7.0	6.0	5.5	5.5	5.5	5.0	5.5	3.0	7.0	5.0	5.0	5.5	6.0	6.0	6.5	6.5	7.5	8.0	7.5	8.0	7.5	8.0
Argentine	2.0	2.0	2.0	3.0	3.0	2.5	3.0	2.5	2.0	2.5	4.0	5.0	5.5	6.0																	
Chypre																															
Croatie	1.5	1.0	2.0	1.5	2.0	2.5	1.0	1.0	1.5	1.0	1.5	3.5	2.0	2.5	2.0	8.0	7.0	5.0	7.0	6.5	7.0	6.0									
Egypte	2.5	3.0	2.5	3.5	2.5	5.0	3.5	4.0	2.5	2.5	3.0	2.0	1.5	3.5	5.0	6.5	5.5	7.5	7.0	6.5	7.5	11.0	8.5	10.0	9.0	10.5	10.0	10.5	10.0	10.5	
Iran																															
Irak																															
Israël	6.0	5.0	5.0	4.5	7.0	7.5	7.5	6.5	9.5	12.5	13.5	14.5	16.0	13.5	16.0	16.5	15.0	16.0	17.0	16.5	17.0	15.5	19.5	20.0	16.5	22.0	40.0	12.0	25.0		
Jordanie	9.5	11.5	17.0	15.5	21.5	16.0	22.0	19.0	19.0	9.0	17.0	20.0	25.0	24.0	25.0	19.0	21.0	23.5	23.5	20.0	20.0	17.0	20.0	25.0	22.0	19.0	22.0	21.0	21.0	25.0	
Liban	7.5	7.0	7.0	6.5	7.5	7.0	8.0	8.0	8.0	8.0	7.0	4.5	5.0	5.0	5.5	5.0	9.0	20.0	9.5	20.0	17.0	20.0	20.0	18.0	18.0	20.0	20.0	20.0	20.0	20.0	20.0
Libye	13.5	19.0	9.0	9.5	8.0	5.0	10.0	7.0	16.0	11.0	7.0	8.5	14.5	12.0	9.0	11.0	13.0	15.0	15.0	15.0	15.0	15.0	15.0	15.5	18.0	16.5	18.0	16.5	16.0	16.5	16.0
Maroc	37.0	49.0	40.0	46.5	43.0	26.0	50.0	56.0	55.0	45.0	60.0	60.0	60.0	70.0	38.0	56.0	65.0	70.0	90.0	10.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Monténégro	6.0	3.0	1.5	2.0	2.5	1.5	0.5	0.5	1.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Palestine																															
Tunisie	54.5	60.0	60.0	56.0	46.0	34.5	70.0	52.0	49.0	60.0	50.0	28.0	30.0	56.0	44.0	38.0	45.0	50.0	21.0	30.0	30.0	35.0	40.0	37.0	30.0	35.0	21.0	40.0	40.0	45.0	43.0
Turquie	55.0	50.0	50.0	54.0	55.0	63.0	75.0	85.5	85.0	60.0	72.5	55.0	50.0	46.0	60.0	50.0	80.0	100.0	110.0	131.0	150.0	130.0	165.0	125.0	116.0	150.0	176.5	163.0	170.0	170.0	170.0
UE	124.5	137.0	138.5	146.5	145.0	137.0	156.5	170.5	170.0	172.0	185.0	184.5	193.5	199.5	207.0	196.0	186.0	186.0	186.0	186.5	179.0	162.0	173.0	164.5	166.0	140.0	136.0	143.0	152.5	152.5	152.5
Uruguay																															
TOTAL A	140.5	158.5	162.0	167.5	166.0	168.0	181.0	193.0	201.5	204.0	212.0	214.0	218.0	234.0	244.5	217.5	220.0	217.0	223.0	221.5	231.0	228.5	240.5	248.0	268.5	283.5	288.5	296.5	303.5	312.5	312.5
A. Saoudite	6.5	7.0	7.0	5.0	5.0	4.0	5.0	5.0	5.5	4.5	4.0	5.0	7.0	7.5	5.5	4.5	6.0	7.5	6.5	6.5	15.0	16.0	21.0	22.0	25.0	25.0	28.0	33.5	37.5	38.0	38.0
Australie	13.5	12.5	16.0	16.5	19.0	16.5	21.5	17.5	24.0	25.5	31.0	27.5	31.5	34.5	32.5	34.5	47.5	35.0	37.0	44.0	44.0	40.0	37.0	37.0	37.0	42.0	45.0	48.0	50.0	51.0	51.0
Brazil	13.5	11.0	17.0	14.5	23.5	19.0	24.5	29.0	23.5	25.0	22.5	21.0	23.5	26.5	26.0	34.5	40.0	42.0	50.5	61.5	68.0	73.0	72.5	66.5	50.0	59.5	76.5	86.0	90.0	90.0	90.0
Canada	10.0	10.0	13.0	12.0	15.0	14.0	19.0	17.5	18.5	23.0	24.5	24.0	25.0	26.0	32.0	30.0	32.5	29.0	30.0	37.0	40.0	39.5	37.0	40.5	37.5	41.0	39.5	47.0	46.5	47.0	47.0
Chili																															
Chine	88.0	79.0	104.0	115.5	115.5	101.0	130.5	142.5	151.0	169.5	194.5	188.5	184.0	216.5	215.5	223.0	248.0	266.0	256.0	259.0	275.0	300.0	297.0	301.5	256.0	321.0	315.0	315.0	331.0	330.0	330.0
États-Unis	4.0	4.5	5.0	6.5	8.5	16.5	26.0	34.0	28.5	27.0	30.0	31.5	30.5	32.0	32.0	11.5	10.0	10.0	9.5	9.0	10.0	11.5	14.0	14.0	15.5	14.5	14.0	15.0	16.5	16.0	16.0
Japon																															
Mexique																															
Norvège																															
Russie	5.0	9.0	5.0	6.0	5.5	1.0	1.5	1.5	2.0	3.0	4.0	4.0	6.0	7.0	9.0	9.5	10.5	17.0	15.0	22.0	21.0	24.0	27.0	30.0	19.0	19.5	19.5	20.5	24.0	23.5	23.5
Syrie	62.0	66.0	67.0	69.0	78.0	78.0	85.0	95.0	88.0	90.0	110.0	86.0	128.5	150.0	135.0	79.0	110.0	80.0	110.0	120.5	130.5	135.5	160.5	170.5	126.0	104.0	96.0	80.0	75.0	86.0	86.0
Suisse	3.0	3.0	3.0	3.0	4.0	3.5	3.5	5.5	6.0	8.0	8.0	9.0	10.0	11.0	11.0	11.5	12.0	12.5	6.0	13.0	13.5	13.5	13.5	14.5	14.5	14.5	14.5	14.5	14.5	15.0	15.0
Taiwan																															
Turkey	15.5	17.5	9.0	10.0	10.0	6.0	13.0	11.5	12.5	13.0	14.0	14.5	13.5	13.0	10.0	13.5	13.5	13.0	13.0	13.0	13.0	13.0	11.5	11.5	12.0	12.5	12.5	12.5	12.5	12.5	12.5
Autres prod. ou pays	21.0	35.0	30.0	33.0	30.0	20.0	25.0	20.5	23.0	29.0	38.0	34.0	31.0	50.5	41.5	25.0	25.0	20.0	35.0	40.0	55.0	60.0	70.0	70.0	65.0	60.0	73.5	65.0	65.0	65.0	65.0
Autr. P. et imp.																															
TOTAL B	246.0	255.5	290.0	295.0	320.0	292.5	360.5	388.5	394.5	423.5	478.5	464.5	509.5	568.5	579.0	515.0	591.5	597.5	683.5	746.0	820.0	848.5	886.5	827.5	817.0	820.5	854.5	899.5	941.5	941.5	941.5
TOTAL MONDIAL WORLD	1,666.5	1,857.0	1,944.0	1,985.0	1,984.5	1,888.5	2,241.5	2,381.5	2,473.0	2,442.5	2,590.5	2,606.5	2,677.5	2,882.5	2,923.5	2,680.5	2,788.5	2,744.5	2,831.5	2,902.0	3,061.0	3,083.5	3,085.0	3,075.5	2,916.0	2,975.5	2,726.0	3,035.0	2,909.0	3,084.0	3,084.0

CONSEIL OLEICOLE INTERNATIONAL (NOVEMBRE 2019)
INTERNATIONAL OLIVE OIL COUNCIL (NOVEMBER 2019)

Tableau 4 : CONSOMMATION (1,000 tm) - Table 4 : CONSUMPTION (1,000 tonnes)

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CONSEIL OLEICOLE INTERNATIONAL (NOVEMBRE 2019)
INTERNATIONAL OLIVE OIL COUNCIL (NOVEMBER 2019)

Tableau 1: PRODUCTION (1,000 tm) - Table 1: PRODUCTION (1,000 tonnes)

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Appendix 4. Production – US

US Olive Oil Production, 2005/6 -2019/20	
Harvest Year	Olive Oil Produced (in 1000 tons)
2005/6	1.0
2006/7	1.0
2007/8	2.0
2008/9	3.0
2009/10	3.0
2010/11	4.0
2011/12	4.0
2012/13	4.0
2013/14	12.0
2014/15	5.0
2015/16	14.0
2016/17	15.0
2017/18	16.0
2018/19 (prov.)	16.0
2019/20 (prev.)	16.0

Appnedix 5. Questionnaire Original

Cooking Oil Knowledge and Perceptions of Consumers in the US

Hi! My name is Vickie Rectenwald, and I am conducting this exploratory survey as part of my thesis project for my Master's degree in Olive Oil through the University of Jaén in Spain. All data obtained will only be used for academic research purposes, and all responses will remain anonymous. This survey will only take a few minutes. Keep in mind that that there are no right or wrong answers - the important thing is that you answer according to your understanding and knowledge. Thanks for taking part in my research!

1. Do you currently reside in the US? *

Check all that apply.

- ☐ Yes
☐ No

2. Do you purchase food that is consumed by your household? *

Check all that apply.

- ☐ Yes
☐ No

3. On average, how many times WEEKLY does your household cook with or consume each type of cooking oil?

Check all that apply.

	Less than once per week	1-2 times weekly	More than 3 times weekly
Extra Virgin Olive Oil	☐	☐	☐
Olive Oil (not extra virgin)	☐	☐	☐
Olive Oil Blends (with canola or other oil)	☐	☐	☐
Seed or Vegetable oils (Sunflower, canola,...)	☐	☐	☐

4. Please estimate how much olive oil of any type (EVOO, OO, OO Blends) your household consumes over the course of a year. *

Check all that apply.

- ☐ Less than 34 oz (1 L) annually
- ☐ Between 34-68 oz (1-2 L) annually
- ☐ Between 68-136 oz (2-4 L) annually
- ☐ More than 136 oz (4 L) annually

5. Please estimate how much Seed or Vegetable oils of any type (Sunflower, Canola,...) your household consumes over the course of a year. *

Check all that apply.

- ☐ Less than 34 oz (1 L) annually
- ☐ Between 34-68 oz (1-2 L) annually
- ☐ Between 68-136 oz (2-4 L) annually
- ☐ More than 136 oz (4 L) annually

6. Indicate in which ways you use Extra Virgin Olive Oil. Choose all that apply. *

Check all that apply.

- ☐ Salad Dressings and sauces
- ☐ With bread
- ☐ Marinating
- ☐ Sauteeing
- ☐ Frying
- ☐ Baking
- ☐ I don't use Extra Virgin Olive Oil.

7. Indicate in which ways you use Olive Oil (not extra virgin). Choose all that apply. *

Check all that apply.

- ☐ Salad Dressings and sauces
- ☐ Dipping bread
- ☐ Marinating
- ☐ Sauteeing
- ☐ Frying
- ☐ Baking
- ☐ I don't use Olive Oil (not extra virgin).

8. Indicate in which ways you use Olive Oil Blends (with canola or other seed oils).
Choose all that apply. *

Check all that apply.

- ☐ Salad Dressings and sauces
- ☐ Dipping bread
- ☐ Marinating
- ☐ Sauteeing
- ☐ Frying
- ☐ Baking
- ☐ I don't use Olive Oil Blends.

9. Indicate in which ways you use Seed or Vegetable Oils (sunflower, canola...). Choose all that apply. *

Check all that apply.

- ☐ Salad Dressings and sauces
- ☐ Dipping bread
- ☐ Marinating
- ☐ Sauteeing
- ☐ Frying
- ☐ Baking
- ☐ I don't use Seed or Vegetable Oils.

10. How informed do you consider yourself about general nutrition?

Mark only one oval.

	1	2	3	4	5	
Not informed at all	☐	☐	☐	☐	☐	Very informed

11. How informed do you consider yourself about any health benefits of olive oils? *

Mark only one oval.

	1	2	3	4	5	
Not informed at all	☐	☐	☐	☐	☐	Very informed

12. How informed do you consider yourself about any health benefits of Seed or Vegetable oils? *

Mark only one oval.

	1	2	3	4	5	
Not informed at all	☐	☐	☐	☐	☐	Very informed

13. Rate the degree to which you feel each type of cooking oil is good for your health.

Mark only one oval per row.

	Not good for my health	Somewhat good	Very good for my health
EV00	☐	☐	☐
00	☐	☐	☐
00 Blends	☐	☐	☐
Seed or Vegetable Oils	☐	☐	☐

14. As far as you know, the following statements are true: *

Check all that apply.

	Yes	I am not sure	No
Olive oil contains mostly monounsaturated fat.	☐	☐	☐
Sunflower oil is high in polyunsaturated fat.	☐	☐	☐
Saturated and trans fats should be avoided.	☐	☐	☐
All fats should be avoided.	☐	☐	☐

15. As far as you know, the following statements are true: *

Check all that apply.

	Yes	I'm not sure	No
The smoke point of olive oil is a valid concern when considering its use for frying.	☐	☐	☐
Combining olive oil with canola oil creates a healthier product for frying than olive oil alone.	☐	☐	☐
EVOO should only be used for dressings and dipping bread.	☐	☐	☐
Using olive oil when baking helps avoid use of saturated fats.	☐	☐	☐

16. How knowledgeable do you consider yourself about what makes "extra virgin olive oil" different from "olive oil"?

Mark only one oval.

	1	2	3	4	5	
I have no idea	☐	☐	☐	☐	☐	Very knowledgeable

17. As far as you know, the following statements are true:

Check all that apply.

	Yes	I am not sure	No
All olive oil types are cold-pressed.	☐	☐	☐
Olive oil (OO) contains chemically refined oil mixed with extra virgin olive oil.	☐	☐	☐
Cold-pressing makes any cooking oil healthier.	☐	☐	☐
The process of refining any cooking oil removes all antioxidants.	☐	☐	☐

18. How knowledgeable do you consider yourself about which taste characteristics are considered positive for EVOO?

Mark only one oval.

	1	2	3	4	5	
I have no idea.	☐	☐	☐	☐	☐	I am sure I know.

19. As far as you know, the following statements are true:

Check all that apply.

	Yes	I am not sure	No
EVOO always has a strong peppery taste.	☐	☐	☐
A bitter taste in EVOO is a negative characteristic.	☐	☐	☐
Extra virgin olive oil does not have as long a shelf life as other cooking oils.	☐	☐	☐
Extra virgin olive oil is high in antioxidants.	☐	☐	☐

20. Age *

Mark only one oval.

- ☐ 20-39
- ☐ 40-54
- ☐ 55+

21. Gender *

Mark only one oval.

- ☐ Female
- ☐ Male
- ☐ Non-binary
- ☐ Prefer not to say

22. Education Level *

Mark only one oval.

- ☐ No college
- ☐ Currently attending college
- ☐ Completed bachelor's degree
- ☐ Completed post-graduate degree

23. Household size *

Mark only one oval.

- ☐ 1-2 people
- ☐ 3-5 people
- ☐ 5+ people

24. Monthly household income in USD *

Mark only one oval.

- ☐ less than \$1000
- ☐ \$1000-\$2000
- ☐ \$2001-\$3000
- ☐ \$3000+

25. And you are done! I greatly appreciate your contribution to my research project. If you would like to receive a summary of my findings, please include your email below.

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