To Eat or Not to Eat: Pesach/Chag Matsot Dietary Restrictions

<u>Introduction</u>

The Passover/Feast of Unleavened Bread [בֶּּמַח/תֵג הַמֵּצוֹת] occurs in the first month of the Israelite year, and commemorates the exodus of our ancestors from Egypt. The feast, which lasts for seven days, starts with Passover, or *Pesach* [בְּּמַח], which falls at dusk on the 14th day of the first month. The 15th day marks the first day of the Feast of Unleavened Bread, or *Chag Matsot* [תַּג מַצוֹת], and is a sacred occasion, or *miqra qodesh* [מִקְרָא קֹדֶש], in which work is forbidden. The last day of the feast - the 21st of the month - is also a *migra qodesh*.

During Chag Matsot, Israelites are instructed to eat unleavened foods called *matsot* [מֵבְיֹת]. We are also forbidden from eating *se'or* [שְׁאֹר], *chameits* [חָמֵץ], and *machmetset* [מַרְיָּבֶעַת]. The meanings of these three words have been heavily debated in our congregations and communities, and to date, there is still much confusion as to what is allowed in our Chag Matsot diet. Do the words refer only to baked goods? Are fermented products allowed? Are we only to avoid yeast, and not other leavening agents? Can we eat rice and beans, or drink wine?

As a response, many of us avoid rice, legumes, corn (called *qitniyot* [קּטְנִיּוֹת] as a group), and all fermented and processed foods, such as cheese, wine, and pre-packaged snacks, during *Chag Matsot*. It's unclear, however, whether abstaining from these foods is a matter of tradition, or a matter of law (Torah), and this lack of clarity contributes to the ongoing confusion as to what foods are permitted, what foods are forbidden, and why.

This paper will attempt to clarify the *Chag Matsot* dietary law, by examining the three key words we know for sure are forbidden - *se'or*, *chameits*, and *machmetset* - in the contexts in which they are used throughout the *Tanach*. Studying all instances of each word's use, rather than just those pertaining to the feast, will provide a greater understanding of its meaning.

¹ Leviticus 7:12 shows that *matsot* refers to the unleavened version of a food that can be leavened. I.e. *chalot* means cakes, and *chalot matsot* means unleavened cakes. Likewise *r'qiq* means wafer, and *r'qiqei matsot* means unleavened wafers.

Se'or Word Study

The word se'or [שְׁאר] appears five times in the Tanach. The verses are copied below in Hebrew, and translated into English, with the exception of the three key words. Se'or will appear in **bold** in both the Hebrew and English, and chameits and machmetset will be italicized in the English.

1. Exodus12:15

שִׁבְעַת יָמִים מַצּוֹת תּאכֵלוּ אַדֵ בַּיּוֹם הָרָאשׁוֹן תַּשְׁבִּיתוּ **שְׂאֹר** מִבָּתֵיכֶם כִּי כָּל אֹכֵל חָמֵץ וְנִכְרְתָה הַנָּפֶשׁ הַהָּוא מִיּשְׂרָאֵל מיּוֹם הראשׁו עד יוֹם השׁבעי.

Seven days shall you eat unleavened [foods]; from the first day, banish the *se'or* from your houses, for all who eats *chameits* from the first day until the seventh day, his soul shall be cut off from Israel.

2. Exodus 12:19

ּשִׁבְעַת יָמִים שְׂאֹר לֹא יִמָּצֵא בְּבָתַּיכֶם כִּי כָּל אֹכֵל מַחְמֶצֶת וְנִכְרְתָה הַנֶּפֶשׁ הַהִּוֹא מֵעֲדַת יִשְׂרָאֵל בַּגֵּר וּבְאָזְרַח הָאָרֶץ. For seven days, *se'or* shall not be found in your houses, for anyone who eats *machmetset*, his soul shall be cut off from the community of Israel, whether he is a stranger or a citizen of the land.

3. Exodus 13:7

ָמַצוֹת יָאַכֵּל אֵת שִׁבְעַת הַיַּמִים וִלֹא יֶרָאֵה לְּךָ חַמֵץ וִלֹא יֵרָאֵה לְּךָ שִׂאֹר בְּכַל גְּבַלֶּךָ.

You shall eat unleavened [foods] for the seven days, and there shall not be seen unto you *chameits*, and there shall not be seen unto you *se'or*, in all your borders.

4. <u>Leviticus 2:11</u>

ָּבֶּל הַמִּנְחָה אֲשֶׁר תַּקְרִיבוּ לַיהוה לֹא תֵעָשֶׂה חָמֵץ כִּי כָל שְׂאֹר וְכָל דְּבַשׁ לֹא תַקְטִירוּ מִמֶּנוּ אִשֶׁה לַיהוה. Every meal offering that you bring to Adonai shall not have *chameits* because all *se'or* and all honey you may not offer by fire to Adonai.

5. <u>Deuteronomy 16:4</u>

ָוְלֹא יֵרָאֶה לְּךֶ שְּׂאָר בְּיִוֹם הָרְאשׁוֹן לַבּקֶּר. And there shall not be seen unto you *se'or* in all your borders for the seven days, and you shall not leave over any of the flesh that you slaughtered in the evening of the first day, until the morning. These passages suggest that *se'or* and *chameits* can be used interchangeably, and seemingly refer to the same thing. For instance, Lev. 2:11 cautions against using *chameits* in a meal offering, and explains because neither *se'or* nor honey can be placed on the altar. Another verse, Ex. 12:15, instructs us to rid our houses of *se'or*, because anyone who eats *chameits* will be punished. The instruction in the same verse to eat *matsot*, as well as in Ex. 13:7, shows us that *matsot* are contrasted with *se'or* and *chameits*. Put simply, *se'or* and *chameits* are opposites of *matsot*. Since *matsot* are unleavened versions of leavened foods, we can infer that *se'or* refers to leavening agents, and/or the products that contain them.

Chameits Word Study

The word *chameits* [מְמֵץ] appears 17 times in the *Tanach*; in 3 instances, the meanings are not related to food (Psalms 71:4, cruel; Psalms 73:21, grieved; and Isaiah 63:1, crimson). The remaining 14 verses are copied below in Hebrew, and translated into English, with the exception of the three key words. *Chameits* will appear in **bold** in both the Hebrew and English, and *se'or* and *machmetset* will be *italicized* in the English.

1. Exodus 12:15

שִׁבְעַת יָמִים מַצוֹת תּאַכֵלוּ אַךְ בַּיּוֹם הָרָאשׁוֹן תַּשְׁבִּיתוּ שְׂאֹר מִבָּתִּיכֶם כִּי כָּל אֹכֵל **חָמֵץ** וְנִכְרְתָה הַנָּפֶשׁ הַהְוא מִיּשְׂרָאֵל מִיּוֹם הַרָאשׁן עַד יוֹם הַשִּבְעִי.

Seven days shall you eat unleavened [foods]; from the first day, banish the *se'or* from your houses, for all who eats *chameits* from the first day until the seventh day, his soul shall be cut off from Israel.

2. Exodus 12:34

וַישַא הַעַם אֶת בָּצֵקוֹ טֶרֶם יֶחָמַץ מִשְאַרתַם צְרָרת בַּשְּמְלֹתַם עַל שְׁכָמַם.

And the people carried their dough from their kneading-troughs before [it was] *yechmats*, wrapped in their garments on their shoulders.

3. Exodus 12:39

ַוּיֹאפּוּ אֶת הַבָּצֵק אֲשֶׁר הוֹצִיאוּ מִמִּצְרַיִם עֻגֹת מַצּוֹת כִּי לֹא **חָמֵץ** כִּי גֹרְשׁוּ מִמִּצְרַיִם וְלֹא יָכְלוּ לְהִתְּמַהְמֵהַ וְגַם צֵדָה לֹא עַשׂוּ לַהֶם.

And they baked the dough that they brought out of Egypt, unleavened cakes, for it did not *chameits*, because they were driven out of Egypt, and were not able to tarry, and also did not make for themselves provisions.

4. Exodus 13:3

ַוּאמֶר מֹשֶׁה אֶל הָעָם זָכוֹר אֶת הַיּוֹם הַזֶּה אֲשֶׁר יְצָאתֶם מִמִּצְרַיִם מִבֵּית עֲבָדִים כִּי בְּחֹזֶק יָד הוֹצִיא יְהוָה אֶתְכֶם מִזֶּה וַלֹא יאכל **חמץ**.

Remember this day when you left Egypt, the house of bondage, for with strength of Hand did Adonai bring you out from there, and you shall not eat *chameits*.

5. Exodus 13:7

ַמַצוֹת יַאָכֵל אֵת שִׁבְעַת הַיָּמִים וְלֹא יֵרָאֵה לְךֶ חָמֶץ וְלֹא יֵרָאֵה לְךֶ שִּׂאֹר בְּכָל גְּבֶלֶךְ.

You shall eat unleavened [foods] for the seven days, and there shall not be seen unto you *chameits*, and there shall not be seen unto you *se'or*, in all your borders.

6. Exodus 23:18

לא תִזבַּח עַל **חַמֵץ** דַם זבְחִי וִלֹא יַלִין חֲלֶב חַגִּי עַד בּקֵר.

You shall not offer with *chameits* the blood of my sacrifice and you shall not leave over the fat of my feast until the morning.

7. Exodus 34:25

לא תשחט עַל חָמֶץ דַם זבחי ולא יַלִין לַבּקֵר זַבַח חַג הַפַּסַח.

You shall not offer with *chameits* the blood of my sacrifice and you shall not leave until the morning the sacrifice of the Passover feast.

8. Leviticus 2:11

בּל הַמִּנְחָה אֲשֶׁר תַּקְרִיבוּ לַיהוה לֹא תֵעֲשֶׂה חָ**מֵץ** כִּי כָל שְׂאֹר וְכָל דְּבַשׁ לֹא תַקְטִירוּ מִמֶּנוּ אִשֶׁה לַיהוה. Every meal offering that you bring to Adonai shall not have *chameits* because all *se'or* and all honey you may not offer by fire to Adonai.

9. Leviticus 6:10

ַלא תָאַפֶּה **חַמֶץ** חֶלָקָם נַתַתִּי אֹתַהּ מָאָשֵׁי קדֵשׁ קַדַשִּים הוא כַּחַטַאת וְכַאַשַּם.

You shall not bake *chameits*, their portion I have given of My offering of fire; it is most holy, like the sin offering and like the guilt offering.

10. <u>Leviticus 7:13</u>

עַל חַלּת לֶחֶם חַמָץ יַקְרִיב קַרְבָּנוֹ עַל זֶבַח תּוֹדַת שְׁלַמַיוֹ.

With the cakes of *chameits* bread shall he bring up his offering with his thanksgiving sacrifice of well-being.

11. <u>Leviticus 23:17</u>

. מִמּוֹשְׁבֹתֵיכֶם תָּבִיאוּ לֶחֶם תְּנוּפָּה שְׁתַּיִם שְׁנֵי עֶשְׂרֹנִים סֹלֶת תִּהְיֶינָה הָמֵץ תֵּאָפֶינָה בִּכּוּרִים לַיהוה. From your dwellings you shall bring two loaves of bread to be waived, each made of two-tenths of a measure of fine flour, *chameits* it shall be baked, as first fruits to Adonai.

12. <u>Deuteronomy 16:3</u>

ָלֹא תֹאַכַל עָלָיו **חָמֵץ** שִׁבְעַת יָמִים תּאַכַל עָלָיו מַצּוֹת לֶחֶם ענִי כִּי בְחַפָּזוֹן יָצָאתָ מֵאֶרֶץ מִצְרַיִם לְמַעַן תִּזְכּר אֶת יוֹם צֵאתָרָ מֵאֶרֵץ מִצְרַיִם כֹּל יִמֵי חַיִּירָ.

You shall not eat with it *chameits*; for seven days you shall eat unleavened [foods], the bread of affliction, [all your days] because in haste you left the land of Egypt.

13. <u>Hosea 7:4</u>

פַלָם מְנַאֲפִים כִּמוֹ תַנוּר בערה מֵאפֶה יִשְבּוֹת מֵעִיר מְלוֹשׁ בַּצֶק עַד חִמְצָתוֹ.

They are all adulterous, like an oven fired by a baker, who stops kneading the dough until *chumtsato*.

14. Amos 4:5

ָוְקַשֵּׁר **מֵחָמֵץ** תּוֹדָה וְקַרְאוּ נְדָבוֹת הַשְּׁמִיעוּ כִּי כֵן אֲהַבְּתֶּם בְּנֵי יִשְׂרָאֵל נְאֻם אֲדֹנַי יְהוה.

And offer a thanksgiving offering of *chameits*, and call out your freewill offerings and proclaim them, for this is what you Israelites love, says Adonai.

Chameits is an interesting word because unlike se'or, it is also used as a verb, which may help clarify its meaning. Ex. 12:34 explains how the Israelites, being rushed out of Egypt, took their dough terem (before) yech'mats; in Hoshea 7:4, Adonai condemns Israelites for their adulterous ways, out of control like dough in a hot oven that reaches chumtsato. These two passages suggest that chameits refers to the leavened condition of dough. Simply put, chameits is caused by se'or, or we can say that se'or creates chameits.

If we look at Lev. 2:11 again, which forbids *chameits* in an offering because *se'or* is not allowed on the altar, this conclusion makes sense. We cannot have leavened bread (an example of *chameits*) as part of a sacrifice, because yeast (an example of *se'or*) is forbidden in an offering. The same goes for other *chameits*/leavened products (cakes, wafers, muffins, etc), and other *se'or*/ leavening agents (baking powder, baking soda).

There are some Biblical Hebrew dictionaries that translate *se'or* as "sour dough," and this further clarifies the definition of *se'or* as a leavening agent. In ancient times, Israelites (and other nations) would capture wild yeast from the air through a week-long process, creating what's called a sour dough starter. A slurry of flour and water would be left to sit for several hours, attracting wild yeast and bacterium that would begin to ferment the mixture. Flour and water would be added each day - a process called "feeding" the starter - allowing the yeast to multiply. After about a week, the Israelites would be able to use some of this *se'or*, or sour dough starter, to bake leavened bread; this would behave just like the commercialized yeast that we buy in the store today. Starters could be fed and kept without refrigeration for a long time, so Israelites would be able to bake leavened goods whenever they desired. Thus, the idea of "sour dough" within the concept of the Tanach falls right within the definition of *se'or* as a leavening agent, along with commercialized yeast, baking powder, etc.

Machmetset Word Study

The word *machmetset* [מַּחְמֶּצֶת] is used twice in the *Tanach*: Exodus 12:19 and 12:20. The verses are copied below in Hebrew, and translated into English, with the exception of the three key words.

Machmetset will appear in bold in both the Hebrew and English, and *se'or* and *chameits* will be italicized in the English.

1. Exodus 12:19

. שִׁבְעַת יָמִים שְׂאֹר לֹא יִמָּצֵא בְּבָתַּיכֶם כִּי כָּל אֹכֵל **מַחְמֶּצֶת** וְנִכְרְתָה הַנֶּפֶשׁ הַהִּוֹא מֵעֲדַת יִשְׂרָאֵל בַּגַּר וּבְאָזְרַח הָאָרֶץ. For seven days, *se'or* shall not be found in your houses, for anyone who eats *machmetset*, his soul shall be cut off from the community of Israel, whether he is a stranger or a citizen of the land.

2. Exodus 12:20

ַבַל מַחמֵצת לא תאכָלוּ בַּכל מושבתיכֶם תאכָלוּ מַצות.

All *machmetset* you shall not eat; in all your settlements you shall eta unleavened [foods].

The word chameits [מְחִמצַח] is present in the word machmetset [מְחִמצַח], suggesting the words are synonyms, much like the Hebrew words ochel [אֹבֶל] and maachal [מַאָבָל] which both mean food. In the two instances that machmetset is used in the Tanach, it's used in exactly the way chameits is used in similar verses copied above. Thus, we can conclude that like chameits, machmetset refers to leavened foods.

Based on the study of *se'or*, *chameits*, and *machmetset* in the *Tanach*, it is safe to conclude that during *Chag Ha-Matsot*, Israelites are forbidden from eating any leavened products, or products that contain any leavening agents. But what is a leavening agent? A dictionary search reveals that leavening agents are substances added to dough that cause fermentation, which makes the dough rise.² These leavening agents may be biological, or chemical. Yeast is an example of a biological leavening agent. It consumes sugar, and releases byproducts of carbon dioxide, alcohol, and gas. Baking powder and sodium bicarbonate (baking soda) are examples of chemical leavening agents. When combined with certain liquids, these agents release carbon dioxide very quickly, causing the dough to rise much more rapidly than if yeast was used. Note that sodium bicarbonate can be found in food items beyond baked goods, such as bottled water or iodized salt. Another lesser-known leavening agent is tricalcium phosphate, which is typically added to store-bought breads and baked goods to help them rise before and during baking. Since it also doubles as an anti-caking agent, tricalcium phosphate can also be found in powdered seasonings, such as Lawry's Seasoned Salt.³

Fermentation is the chemical breakdown of a substance caused by bacteria, yeast, or other microorganisms.⁴ Since the process of fermentation creates leavening - *chameits* and *machmetset* - it raises the question of whether other fermented products, such as wine and yogurt, are also forbidden during the seven days of *Chag Matsot*. In reviewing all the passages that reference *se'or*, *chameits*, and/or *machmetset*, they all seem to be related to dough, but it's worth examining other fermented and typically questioned products just to be sure.

² New Oxford American Dictionary, 2009.

³ https://www.mccormick.com/lawrys/flavors/spice-blends/seasoned-salt

⁴ New Oxford American Dictionary, 2009.

Food Study

Food	How It's Made	Verdict
Beer	Beer is made of dried, mashed grains that are mixed with hot water, then fermented with yeast. Sake, a fermented Japanese drink made from rice, is also made with yeast.	Forbidden: processed with yeast, which is <i>se'or</i>
Buttermilk	Buttermilk refers to the liquid byproduct of churned whole milk, which would be left to ferment overnight; a bacteria (not a yeast) called <i>Lactobacillus</i> converts the sugars into lactic acid, giving the buttermilk its tangy, sour taste.	Permitted: does not contain <i>se'or</i>
Cheese	Cheese is made by first pasteurizing filtered milk to kill any harmful bacteria. Bacteria is then added to ferment the milk sugars (lactose) into lactic acid. The added bacteria are usually <i>Lactobacilli</i> (not a yeast) or <i>Lactococci</i> (not a yeast), but dozens of microbes can be used.	Likely permitted , but only with confirmation that yeast microbes were not used.
Chocolate	Chocolate is made from cacao seeds, harvested from cacao pods that grow on the Cacao tree. The seeds (also called cocoa beans) are cleaned, and left out in an open, hot environment to ferment. The fermentation is caused by wild yeast, which feeds on the natural sugars of the cacao seeds for several days.	Forbidden: processed with yeast, which is <i>se'or</i>
Citric Acid	Citric acid is a naturally occurring acid found primarily in citrus fruits. However, most citric acid found in foods is produced by a fungus called <i>Aspergillus niger</i> (not a yeast).	Permitted: does not contain <i>se'or</i>
Coffee	Coffee seeds (commonly called coffee beans) are extracted from the fruit of coffee trees, called coffee cherries. There are three methods of this extraction process - dry, semi-washed, and wet (washed). In the dry process, the coffee cherries are spread out to dry in the sun. In the semi-washed process, pulp is removed from the cherry, and the beans are sundried. In the wet process, the beans are removed from the cherries, and fermented by wild yeast in open tanks; most commercial coffee is processed using this wet method.	Permitted, except for wet-processed coffee. One should avoid prepared coffee drinks (Starbucks, DD, etc.) and purchase dry processed coffee beans or ground coffee.
Pectin	Pectin is a gelling agent that's naturally found in fruits, especially citrus, and is used as a thickening agent for jams, jellies, and sauces. Pectin is extracted from its natural sources, then filtered and purified with ethanol, which is alcohol. Alcohol is produced by fermenting sugar with yeast. Note that it is possible to make pectin at home without any forbidden ingredients; there are plenty of recipes available online.	Forbidden, unless homemade with permitted ingredients: processed with ethanol (alcohol), which uses yeast, which is se'or
Soy Sauce	Soy sauce is made from mashed soybeans, wheat, and salt, and are fermented with <i>Aspergillus</i> molds, <i>Lactobacillus</i> bacteria, and yeast.	Forbidden: processed with yeast, which is <i>se'or</i>
Tea	Tea leaves are dried, rolled and broken into thin shapes, then left out to oxidize for up to two hours. After oxidation, the teas are heated to dry. Oxidation occurs when a product's natural enzymes react to the air, i.e. when a cut apple or banana turn brown.	Permitted: does not contain <i>se'or</i>
Vinegar	Vinegar can be made from any product containing sugar, which is fermented with yeast to convert the sugars into alcohol.	Forbidden: processed with yeast, which is <i>se'or</i>
Wine/ Alcohol	Wine is made from grapes or other fruits that are fermented with yeast, mold, and other bacteria. Even wines that are labeled as Kosher for Passover contain yeast; the yeast is simply taken from fruit as opposed to grains. Other alcohols are made in similar fashion (fermented with yeast), including but not limited to vodka, rum, and gin.	Forbidden: processed with yeast, which is <i>se'or</i> (this includes "Kosher for Passover" wines)

Food	How It's Made	Verdict
Yogurt	Yogurt is made by adding <i>Streptococcus thermophilus</i> or <i>Lactobacillus bulgaricus</i> bacteria (not yeasts) to heated milk. The bacteria converts the milk sugars into lactic acid, which gives yogurt is thicker texture and tart flavor.	Permitted: does not contain <i>se'or</i>

Food Study Conclusions

Leavening is **a** result of fermentation, not **the** result. For example, oxidation is a type of fermentation that affects plants and plant products, such as tea leaves and fruit. An apple or banana that has started to turn brown (through oxidation) does not suddenly become *chameits* or *machmetset*. The evidence suggests that only leavening - the fermentation caused by *se'or*, or leavening agents - is forbidden. As such, fermented foods that do not contain leavening agents, such as yogurt, teas, buttermilk, and some cheeses, appear to be permissible during the week of *Chag HaMatsot*.

It's even more clear that *qitniyot* - rice, beans, legumes, corn - are certainly permitted during the feast, as they don't contain leavening agents, nor are fermented (although fermentation isn't necessary a problem, as discussed above). A product that swells (i.e. rice) or pops (i.e. popcorn) is very different from a product that rises due to the addition of a leavening agent.

Furthermore, there's no need to discard food after a 24-hour period, as practiced in some communities. There is no possibility of leftover chicken or potatoes or even *matsot* suddenly becoming leavened; if it's not *chameits*, then it's not *chameits*, and if it doesn't contain *se'or*, then it will never be considered *chameits* or *machmetset*.

References

- Alfaro, D. (2018, February 23). *The 3 main types of leavening agents and how they work*. Retrieved from https://www.thespruceeats.com/main-types-of-leavening-agents-and-how-they-work-4125705
- Animal Smart. (n.d.). *How is yogurt made?* Retrieved from http://animalsmart.org/kids-zone/jr- animal-scientist-e-news/how-is-yogurt-made-
- Bell Chem (n.d.). *Product spotlight: Tri-calcium phosphate FCC kosher*. Retrieved from https://www.bellchem.com/news/product-spotlight-tri-calcium-phosphate-fcc-kosher#:~:text=Breads%20and%20baked%20goods%20require,bubbles%20before%20and%20during%20baking.
- Bernot, K. (n.d.). *Yeast and bacteria 101: Brettanomyces*, *lactobacillus*, *pediococcus*. Retrieved from http://draftmag.com/brettanomyces-lactobacillus-pediococcus-beer/
- BiologyWise. (n.d.). What is fermentation. Retrieved from https://biologywise.com/what-is-fermentation
- Brones, A. (2014, September 22). *Did you know that your coffee is (probably) a fermented food? Learn how coffee is made*. Retrieved from https://www.thekitchn.com/yes-coffee-is-a-fermented- food-208726
- Cabot Cheese. (n.d.). *The art of making the world's best cheddar*. Retrieved from https://www.cabotcheese.coop/cheese-making-process
- Dairy Good. (n.d.). *How is cheese made*. Retrieved from https://dairygood.org/content/2016/how-is-cheese-made
- Dairy Goodness. (n.d.). *How yogurt is made*. Retrieved from https://www.dairygoodness.ca/yogurt/ how-yogurt-is-made
- Daley, J. (2016, March 28). *The secret behind your favorite coffee could be yeast*. Retrieved from https://www.smithsonianmag.com/smart-news/secret-behind-your-favorite-coffee-yeast-180958583/
- Frank, J. (2021, November 5). *Tricalcium phosphate for food formulations*. Retrieved from https://www.ulprospector.com/knowledge/297/tricalcium-phosphate-food-formulations/
- Group, E. (2017, November 16). *What is citric acid?* Retrieved from https://www.globalhealingcenter.com/natural-health/what-is-citric-acid/

- How Products Are Made. (n.d.). *Soy sauce*. Retrieved from http://www.madehow.com/Volume-3/Soy-Sauce.html
- International Cocoa Organization. (1998, August 28). *How does the fermentation process work on the cocoa bean and how long does it take?*. Retrieved from https://www.icco.org/faq/59- fermentation-adrying/132-how-does-the-fermentation-process-work-on-the-cocoa-bean-and- how-long-does-it-take.html
- Lemm, E. (2017, September 28). *How tea is made: From plant to pot*. Retrieved from https://www.thespruceeats.com/how-tea-is-made-4149601
- Moncel, B. (2018, April 2). *Citric acid and how it's used in your food*. Retrieved from https://www.thespruceeats.com/what-is-citric-acid-1328465
- Moncel, B. (2018, February 22). *How chocolate is made: From raw beans to cocoa butter and bakers chocolate*. Retrieved from https://www.thespruceeats.com/how-chocolate-is-made-1328617
- National Coffee Association. (n.d.). *10 steps from seed to cup*. Retrieved from http://www.ncausa.org/ About-Coffee/10-Steps-from-Seed-to-Cup
- Nick, J. (2017, July 19). *How to make your own homemade vinegar*. Retrieved from https://www.goodhousekeeping.com/food-recipes/a20705772/how-to-make-vinegar/
- Twinnings. (n.d.). *How is tea made*. Retrieved from https://www.twinings.co.uk/about-tea/how-is-tea-made