

What are "olives"?

On *halakhic* measurements

In this *shiur* we'll delve into the important topic of *halakhic* measurements:

- what are the most common measurements and what are they used for
- how are they defined
- what are the practical consequences of misusing them

Introduction

The *Written Law* (Torah, שבכתב) enumerates many positive and negative commandments concerning food. For example, we are commanded to [eat *maSah* on Passover](#) (Ex 12:18). Likewise, we are forbidden from eating meat [from non-kosher animals](#) (Lev 11:4). However, the *written* Torah does not tell us what amount of food is required or forbidden – or indeed, whether there is even a specific amount.

The *Oral Law* (תורה שבעל-פה) does establish specific measurements which are used to determine whether or not one has fulfilled a positive commandment or is, Heaven forbid, liable for punishment for having transgressed a negative commandment. These measurements, called *shiurim* (שיעורים) are the topic of this paper.

For example: in general, and regarding the most common forbidden foods, one is liable for punishment only after consuming the amount called a *kezayit* ([Laws of Forbidden Foods 14:1](#)). Nevertheless, consuming *any* amount of such food is forbidden. Likewise, one may not say a blessing after eating unless one has eaten *at least* this amount. One who did not eat a sufficient quantity of food, but nevertheless said an after-blessing transgresses the Biblical prohibition of taking God's name in vain ([Laws of Blessings 1:15](#))! It is clearly important to know what these measurements are in modern, practical terms.

What are the most common ones (and their uses)

In practical terms the most commonly used measurements are:

- *kezayit* (כזית): "olive's bulk", the minimum amount considered "eating"
- *beiSah* (ביצה): "egg's bulk", the minimum size of a "meal"
- *revi`it* (רביעית): "a quarter (of a *log*" [לוג])", the minimum amount considered "drinking"
- *tefaH* (תפח): "span", measure of distance: 4 "fingers", about 8cm. ([Laws of Sefer Torah 9:9](#))
- *amah* (אמה): "cubit", 6 *tefaHim*, just less than ½ meter (*ibid.*)

- *mil* (מיל): "Roman mile", 2000 *amah*, just less than 1 km ([Laws of Prayer and Priestly Blessing 4:2](#)); also used as a time measurement ("the time it takes to walk a *mil*" כדי הליכת מיל)

The first three are commonly used to determine whether one has fulfilled an obligation (e.g. of eating enough *maSah* on *pesaH*), and is thus required to say a blessing. Or conversely, has *not* eaten or drunk enough to require a blessing, thus rendering any blessing a "vain blessing" (ברכה לבטלה).

The latter three determine such things as the minimum (and maximum) sizes of a *sukkah*, what the kind of "domain" is for *shabbat* purposes, and how far one may travel on *shabbat*, among other things.

How are they defined?

Rambam defines the *revi`it* in [Laws of Bikkurim 6:13](#) *et. seq.*:

What is the full measure of a dough requiring (a blessing on, and separation of) *Hallah*? A full *omer* of flour – whether from one of the five grains or from a mixture of them – they all contribute to the measure. What is the measure of an *omer*? Two *qabin*, less one fifth. The *qav* is four *login*. The *log* is four *revi`iot*. And a *revi`it* is **two fingers by two fingers by two fingers and half a finger and a fifth of a finger**. All the "fingers" are the width of the thumb of the hand.

And how much does this measure (the *omer*) hold? About three and forty average eggs and a fifth of an egg. This is the weight of six and eighty *sela`im* and two thirds *sela`* of Egyptian wheat flour, which is the weight of five hundred and twenty *zuz* of the Egyptian *zuzim* of the present time (e.g. When the Rambam lived in Egypt). A measure which contains about this weight of this kind of wheat flour, may be used for measuring for (the obligation of separation of) *Hallah* in all locations.

The source for this is R' Hisda's view in the Talmud *pesaHim* 109a:

R' Hisda said, the Torah's *revi`it* [measures] two fingers by two fingers by two fingers and half a finger and a fifth of a finger.

It is clear then that a *revi`it* is a measure of *volume* rather than weight, because the comparison to weight is based solely on a specific kind of flour which was available in his location and at that time. His explanation also touches on the size of *beiSah*, but elaborates further in [Laws of Shabbat 8:6](#):

(for being liable for) heaping food, the measure is a *grogeret* (dried fig). The 'egg' spoken of everywhere is **a medium-sized chicken's egg**. Anywhere it says 'enough (fire/heat) to cook an egg', it means enough to cook a *grogeret* amount of the egg. The *grogeret* is one-third of an egg.

With all this discussion of measurements, and considering the importance of the *kezayit* in *halakha*, it is informative that Rambam does not give, anywhere, exact measurements for the *kezayit*. Nor in fact does he give an exact measurement for the *beiSah*! Instead, they were established by our Sages ז"ל as measurements because *everyone* knew how big an egg and an olive were. They were used by everyone, so *literally everyone* had an idea what was meant.

The "medium sized chicken's egg" according to R' Na'eh is 58cc, and according to Hazon Ish 100cc. So let's see: according to a calculator I found online, the *weight* of medium eggs in Israel is between 53g and 63g. Given that eggs are more dense than water (1.03g/cc), that equates to a *volume* between 51.5cc and 61cc. So R' Na'eh is at the top-end of that range, and H"l is *far* beyond it.

But perhaps our eggs are smaller than those of Talmudic times? The consensus I received from egg experts I contacted is that eggs today are most likely *larger* than in Talmudic times. Dr. Guy Barbato of Pennsylvania State Univ. wrote me:

I can say with considerable certainty that egg size has increased since the domestication of the chicken. This has been due, mostly, for direct selection for egg mass.

This is unsurprising, since we've long domesticated produce and animals for those features we find desirable, and the process takes some time. Given this information, it is probable that Talmudic "medium chicken eggs" were no larger than 55cc at most. Note that I give a volume rather than a weight, as per [Laws of HameS and MaSah 5:12](#):

"...and how much is the measure of *Hallah*? About forty-three and a fifth eggs – like the *volume* of a medium egg, *not* the weight."

What, then, about the *kezayit*? I wrote to several experts, but Dr. Mordechai Kislev gave me the most exhaustive and definitive answer. In the article he sent me, he states there are three major varieties of olive cultivated in Israel, whose sizes are different and can be categorized as "small", "medium" and "large" – just as the Mishnah and Talmud describe olive sizes! Of further interest is that the Talmud says the mid-sized olive is called *agouri*, meaning "one which holds onto", because it retains its oil. Of the three major olive varieties grown in Israel, the middle variety is the one which gives the best oil yield! The article also mentions that all three varieties of cultivated olives have been found in archaeological digs in Israel from about the period of the Sages. We can be quite confident that today's Israeli olives are *not substantially different* from those of ancient times.

These three varieties are the "*nabali*", averaging about 5cc; the "*suri*" at 3cc and the "*malisi*" at 1.75cc. These are indeed the "olives" mentioned in the Talmud, and therefore the measures with which we should be concerned. Therefore the *kezayit* is about 3cc (and not anywhere near the 27cc [or some say 33.3 grams (!)] given by modern *posqim*). A *suri* olive only weighs between 3-5 grams, depending on its ripeness.

Regarding the *revi'it*, using an average thumb of 2cm width (as per R' Na'eh; my thumbs are 2.3cm, which is squarely in the middle of the 2-2.5cm range of adult human male thumb widths). Based on his value, a *revi'it* is 86.4cc; based on Hazon Ish using a 2.4cm thumb, it is 149cc. This disparity in sizes is rather significant. Can we determine what an "average thumb" was in Mishnaic times?

Not directly, though humans in our region were slightly smaller then, so the range of thumb sizes might be 1.9-2.3cm instead. Given that we're measuring a volume, that still produces a wide range of values.

But if we refer back to the *omer* required for *Hallah* measurement, we get an interesting result. An *omer* contains 28.8 *revi'iot*, and it also contains about 43.2 eggs. If we assume a 55cc egg (as above), then an *omer* is 2,376cc and therefore the *revi'it* is about 82.5cc, which gives a "thumb" of 1.97cm, about correct for the era (and very close to R' Na'eh's values)!

Practical consequences

As mentioned, if one were to eat less than a *kezayit*, or drink less than a *revi`it*, and subsequently say a "final blessing", that would be a transgression of making a "blessing in vain", which is a Torah prohibition. Similarly, if on *pesaH* one were to drink less than a *revi`it* of wine (which can be mixed with water, but must contain at least 25% wine), then one did not fulfill the obligation of "drinking wine" for *pesaH*. If one ate less than a *kezayit* of *maSah*, one did not fulfill the obligation of eating *maSah*. Of course, given that we have determined that a *kezayit* is only 3cc, it's clear that one need not eat a third or a half of an entire *maSah*, and fulfilling the requirement is rather easy!

Regarding the distance measurements, 3 *tefaHim* is the distance below which a thing is considered "connected" to another thing. So it defines the maximum distance the bottom of a *sukkah* wall can be from the ground, for instance ([Laws of Sukkah 4:4](#)). Similarly if a *sukkah* is taller than 20 *amah* it is invalid.

On *shabbat*, one cannot walk 1000 *amah* beyond the city boundaries by Rabbinic Law; and if he walked 12 *mil* beyond the city boundaries, his punishment is stripes by Torah Law. On *pesaH* when mixing the dough for the *maSah*, if one left it without mixing for the time it takes to walk one *mil*, then it is defined as *HameS* and must be destroyed.

These measurements play a vital role in delimiting the permitted and forbidden according to *halakha*, and therefore are important for us to learn and to keep in mind.