

## Can We Identify the *Techeiles*?

### *Three Objections and Three Responses*

Mois Navon - 5772

---

#### 1) Gland Removal

##### **Objection:**

The current method of extracting dye from *murex trunculus* involves removing a gland from the snail, which would involve the melacha of *gozeiz*, removing part of a living creature. (According to many poskim, one violates this also by removing part of a creature that has since died.) Clearly, this could not have been the method of removing the dye from *chilazon* in earlier days, as can be proved from the *Gemara* (*Shabbos* 75a) since no mention is made of this prohibition in the *Gemara*, although it mentions other prohibitions.

##### **Response:**

*It is my understanding that gozeiz applies only to "yeteirot" (i.e., things that regenerate themselves, e.g., fur, hair, skin – see Minhag Hinuch 32, s"v gozez) and not to actual meat and organs (Avnei Nezer 131:4). See also R. Kaganoff (Nimla Tal, Vol 1-2, pdf pagination p.170). So whether one were to break the shell, remove the creature or cut its gland, no regrowth would occur since all of these actions would effect the immediate demise of the creature. So the Gemara wouldn't mention it because it is not a melacha d'oraita.*

*In any case, though you are correct that the "current method" consists of breaking the shell and then cutting out the gland, this was not the method done in ancient times. Aristotle and Vitruvius explain that they would simply smash the shells which effected the dye extraction in one fell swoop. This is in accord with the Gemara which talks about trapping followed immediately by petzia which, Rashi notwithstanding, R. Herzog says refers to smashing open something hard (e.g. the shell of the Murex). For more on this, please see my article: <http://tekhelet.com/pdf/Potzea3.pdf>*

#### 2) Snail Death

##### **Objection:**

Another objection is based on the fact that it can be demonstrated from the *Gemara* that the removing of the dye liquid from the *chilazon* kills it, although one would prefer that the *chilazon* remain alive for as long as possible. However, in the process used to remove the dye from *murex*, the snail can remain alive for several hours after the process is complete.

##### **Response:**

*The Gemara(75a) explains that in the process of extracting the dye the snail will die. This is indeed true of the Murex, for merely breaking its shell will cause its demise – what I believe can rightly be called "netilat neshama". And while it is true that the snail will remain alive, it is in what would be termed "goses" (in the throes of death).*

*As an aside, the Gemara states that one is not culpable for “netilat neshama” because: “One is more pleased that it should be alive, so that the dye should be successful.” We performed an experiment, wherein groups of snails were killed on 15 minute intervals, the being extracted dye after death. Thus we had samples of dye extracted from snails that had been dead for 15min, 30min, 45min, etc.. The results showed that the greater the elapsed time the more severely the dye was reduced until the dye was no longer viable. This was explained physiologically based on the fact that the dyestuff from the Murex is composed of two components extant in the gland - (1) the dye precursors, (2) the dye enzyme (purpurase). The enzyme acts on the precursors upon exposure to oxygen (i.e., when the gland is squeezed). The purpurase, however, deteriorates in a short amount of time subsequent to the death of the snail. So, if one tried to squeeze the gland after the snail was dead, the purpurase would no longer exist to act upon the dye precursors.*

### 3) Chemical tests

#### **Objection:**

A third problem with the current method of using murex trunculus requires an introduction. At the time of the *Gemara*, there were unscrupulous individuals who sold threads dyed with a coloring called *kla ilan*. This coloring is not kosher as *techeiles* and therefore someone wearing it on his *tzitzis* would not fulfill the mitzvah of wearing *techeiles*. According to the *Aruch*, *kla ilan* is indigo, a vegetable dye that has a blue color. Thus, the *Gemara* was concerned about someone selling indigo-colored threads as *techeiles* threads to an unsuspecting buyer. The *Gemara* describes a test that can be used to check whether the threads are *kla ilan* or *techeiles*, by testing the threads for colorfastness, whereby *kla ilan* would fade, whereas *techeiles* would remain fast. However, if the dye produced from murex trunculus is indigo, and the substitute is also indigo, how could a chemical test for colorfastness be used to determine what was the source of the indigo?

#### **Response:**

*The question regarding the chemical tests in the Gemara to distinguish Kela Ilan from Tekhelet is not a simple one. It should be clear that the tests are to show that the forgery dyestuff will fade as opposed to the real dyestuff, which will stay fast upon being subjected to the procedure. We have performed the tests and found that the Murex dye does not fade and as such it passes the test of the Gemara. It should be emphasized that the test is not a relative test, i.e., to test if the hillazon dye remains stronger than the vegetable dye, but rather, an absolute test, i.e., to test if the hillazon dye remains the color it was at the outset while the vegetable dye fades with respect to its own original color.*

*Today the process used for dyeing the plant based dye (kela ilan) is identical to that used for dyeing the snail based dye (i.e., both use a reduction vat) and as such there is no chemical test that will cause one to fade while the other stays fast. However, Professor Hoffman explains that in ancient times the chemicals necessary to achieve a reduction vat were as expensive as the snail itself and thus a reduction vat was not used for the cheap plant based dye. Rather, the plant itself was crushed and soaked into the wool without reduction. This process would create a very weak bond to the wool during which the chemical tests of the Gemara would indeed cause fading - as opposed to the snail based dye. For further details see my article on the subject: <http://www.divreinavon.com/pdf/ChemicalTestability.pdf>*