

April 11, 1997

Solubilization of Insect Larvae

Problem:

A researcher was using Packard's Soluene®-350 (part number 6003038) to solubilize insect larvae. The larvae were about 1 cm long and 2 mm wide. The larvae were cut up into three or four pieces before they were solubilized. The researcher observed that the cuticle of the larvae would become clear, but would not solubilize. The researcher was concerned that the remaining artifact of the cuticle could cause physical quenching. The nuclide of interest was ^{14}C .

Discussion:

The cuticle is the exoskeleton which supports the body of the larvae, and will not be solubilized by Soluene-350. To solubilize the cuticle, an acid solubilization should be performed as described in Counting Solutions CS-003.

The researcher could try one of the acid methods recommended in the Counting Solutions — probably the perchloric/nitric mixed acid system — to solubilize the entire larvae. However, this could lead to a potential loss of ^{14}C as $^{14}\text{CO}_2$ during such a solubilization procedure.

Fortunately, since this researcher is looking at ^{14}C , and the cuticle is transparent after solubilization, there should not be any physical quench problem when counting. This is especially true since ^{14}C is a high energy beta emitter.

Recommendation:

The primary concern is the potential loss of signal due to physical quenching. To verify proper counting conditions, the researcher should utilize one of the following recommendations:

1. Stay with the present procedure and confirm recovery by arranging to have a larva checked by combustion in an Oxidizer.
2. After solubilization with Soluene-350 and counting, remove the cuticle and carefully wash it. Add the cuticle to another vial, then add Hionic-Fluor™ and count to see if there is any activity originating from the cuticle. It could be that the cuticle has not assimilated any ^{14}C in this experiment.