Method & Materials:

The methodology developed involves the detection of methadone and its principle metabolite, EDDP. In fly larvae samples reared on spiked liver (average concentration of 4mg/Kg). The method used was gas chromatography – mass spectrometry (GC-MS). One batch of fly larvae were reared on spiked liver throughout, one batch was reared on spiked liver until day six (after hatching) when the liver was substituted for blank liver and a third batch was reared solely on blank liver.

The fly larvae were sampled everyday between days five and twelve. They were sacrificed by dropping them into a beaker of recently boiled water and then stored in 70% methanol until analysis. Prior to homogenisation, the fly larvae were washed with copious amounts of deionised water and dried on filter paper. Deionised water was used to make 1 in 10 dilutions of single fly larvae. The samples were run in SIM mode with pyribenzamine as the internal standard.

Some of the fly larvae from all three batches were allowed to develop into adult flies. The flies were identified as Calliphora Vicina (Figure 3) by microscopy.

Results:

Results of the analysis, the cause of death was given as methadone overdose. The aim of this research was to determine whether methadone could be detected in fly larvae reared on methadone spiked liver.

Conclusions:

This study has shown that fly larvae are able to bioaccumulate methadone (confirmed by the presence of EDDP) and that both these analytes can be detected in a single fly larva by GC-MS. It has been shown that fly larvae take approximately seven days to begin to metabolise methadone to EDDP. In fly larvae that have been removed from the methadone-spiked food source, methadone can still be detected for up to three days where as EDDP can be detected for at least five days. The negative results for methadone and EDDP in the fly larvae reared on blank liver indicate that fly larvae are unable to bioaccumulate methadone and EDDP. The appearance of the adult flies suggests that methadone slows the development rate of fly larvae. The flies from the larvae reared on blank liver were bigger and appeared to be at a more advanced stage of development.