

# Residual Pesticide in the Liver of Rats after Poisoning with Galaxifop-R-Methyl Pesticide Check

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**Annotation:** Galaxyphop-R-methylgerbicide is administered once a day in a laboratory aqueous solution of white rats by probe method LD50 1/10 dose, and on the 5th, 10th, 20th, 30th, 40th, 50th days after poisoning, the residual pesticides in the liver of rats was determined using the APCI (Atmospheric pressure chemical ionization) method. According to the results, the highest concentration of residual pesticide was detected on day 5 after rat poisoning and was 0.0174 mkg / g. The High performance liquid chromatograph mass spectrum - HPLC MS (6420) Tripl Quad LC / MS (Agilent Ttchnologies, USA) was used for analysis.

**Keywords:** Galaxyphop-R-methyl, decapitation, per os, liver, accumulation, residual pesticide, chromatography method.

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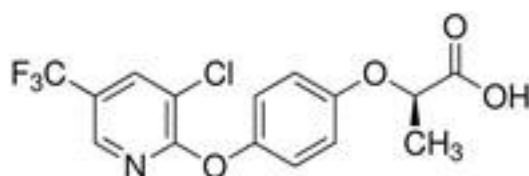
Pesticides are chemical compounds that are widely used in agriculture. Pesticides are rapidly absorbed into soil water and air and accumulate in living organisms as residues [3,4]. No matter how pesticides enter the body, they first accumulate in the liver tissue. It is known that, like any xeno biotic, pesticides affect the lipid layer of the cell and organoid membranes, causing changes in the activity of a number of enzymes. This is mainly due to the acceleration of peroxide oxidation of lipids and the proliferation of free radicals [1, 12, 13, 14].

Pesticides accumulate mainly in the adipose tissue of the body [5, 15]. In the literature, residual pesticides have been shown to affect the disruption of lipid peroxidation and the activity of a number of antioxidant enzymes [7,8,13]. When synthetic pyrethroid is poisoned by the tsis form of pesticides, the formation of lipid peroxidation products and free radicals increases. Increased peroxidation of lipids leads to disruption of the structure and function of membranes [10,11,12]. Increased peroxidation of lipids in acute poisoning with pesticides leads to the activation of antioxidant enzymes [7]. However, the slow utilization of pesticides from the liver reduces the activity of these enzymes. Residual pesticides can injure all systems of the human body and cause various pathological conditions [9,14,15].

Acute and chronic poisoning with pesticides is accompanied by damage to all tissues, morphological, structural changes in bone marrow elements and peripheral blood, endocrine glands, liver, kidneys, heart muscle, brain cells [2,6,9].

The purpose of studying the cumulative properties of the pesticide is to determine experimentally the storage properties of galaxyphop-R-methyl herbicide in rat liver tissue, which enters living organisms in different ways, and its effect on the functional state of a number of enzymes.

Galaxyphop-R-methyl-synthetic drug, herbicide  $C_{16}H_{13}F_3ClNO_4$ , emulsion concentration of 10.4%, belongs to the class of pesticides (chlorophosphorus) aryloxyphenoxypropionates.



Haloxypoph-R-methyl [Methyl ether P-2- [4- (3-chlorine-5-trifluoromethylpyridyl-2-oxy) phenoxy] propionic acid] - pesticide, post-herbicide [16].

Galaxyphop-R-methylbir and dicotyledonous plants are recommended as a herbicide during the germination period for one-time and perennial weed control. Zellek, Zellek super (active substance galaxyphop-R-methyl) drugs are used in the country in the fight against weeds [17].

$LD_{50}$  in rats (mg / kg) is 623 mg / kg. Humans are moderately toxic to warm-blooded animals and have a grade 2 toxicity level [16].

The research was conducted in the laboratory "Physical and chemical examination of substances" of the Institute of Bioorganic Chemistry of the Academy of Sciences of the Republic of Uzbekistan. The following research was performed to determine the residual amount of pesticides in the liver. In the experiment, 21 male, non-breeding white laboratory rats weighing  $200 \pm 2.0$  g were used. All examinations were performed on healthy, sexually matured rats that had passed the quarantine period of at least 10–14 days. [18] The experiments were carried out according to the following scheme: 3 rats were obtained in each group. detected. The pesticide studied was administered to the rats' stomachs at a dose of  $LD_{50}/10$  by per os. All of the experimental animals were kept in the same usual feeding regimen, with unrestricted access to water and food. During the experiment, the general condition of the animals of the research and control groups was observed every hour on the first day in the laboratory conditions, the state of vibration that may occur. Over the next few days, the general condition, activity, behavior, respiratory rate and depth, changes in body weight, and other parameters of the animals in all groups were monitored daily in a laboratory setting. No animal deaths were recorded during the entire experiment. For the

experiment, rat liver contaminated with galaxyphop-R-methyl was isolated on days 5, 10, 20, 30, and 50 by decapitation. In the experiment, the following work was performed with samples taken from the livers of rats. In order to dissolve the residual pesticides in the liver samples, each sample was extracted in acetonitrile solution containing 0.01 M of formic acid. In order to increase the extraction yield, the samples were kept in an ultrasonic bath for 10 min.

As a standard, a 0.1 molar solution of acetonitrile was prepared from a sample of galaxyphop-R-methyl (Sinakem, China).

HPLC MS(6420)(TripleQuadLC / MS (AgilentTechnologies, USA) was used for quantitative analysis of pesticides in liver samples. APCI (Atmosphericpressurechemicalionization) was used as the ionization method.

Mass spectrum registration was performed at the expense of positive ionized ions. The mass spectrum parameters were selected as follows.

Scanning range 50-2200 m / z,

The obtained results were calculated using the method of SIM-Single ion monitoring by comparing the surface area of the ion fragment  $[M + H]^+ = 376$  for galaxyphop-R-methyl with the standard. Gas consumption 4 l / min, gas temperature 300°C, gas pressure in the sprayer 20 psi, evaporator temperature 300°C, capillary voltage 4500 V, fragmentation voltage 30V.

Complete mass spectrometric analysis of each sample was performed using the pesticide quantitative analysis (EIC-extracted ion chromatogram) method.

Chromatographic analyzes of galaxyphop-R-methylbilane-poisoned rat liver extracted with acetonitrile using the APCI (Atmosphericpressurechemical ionization) method are presented in the table below (Table 1).

(Table 1).

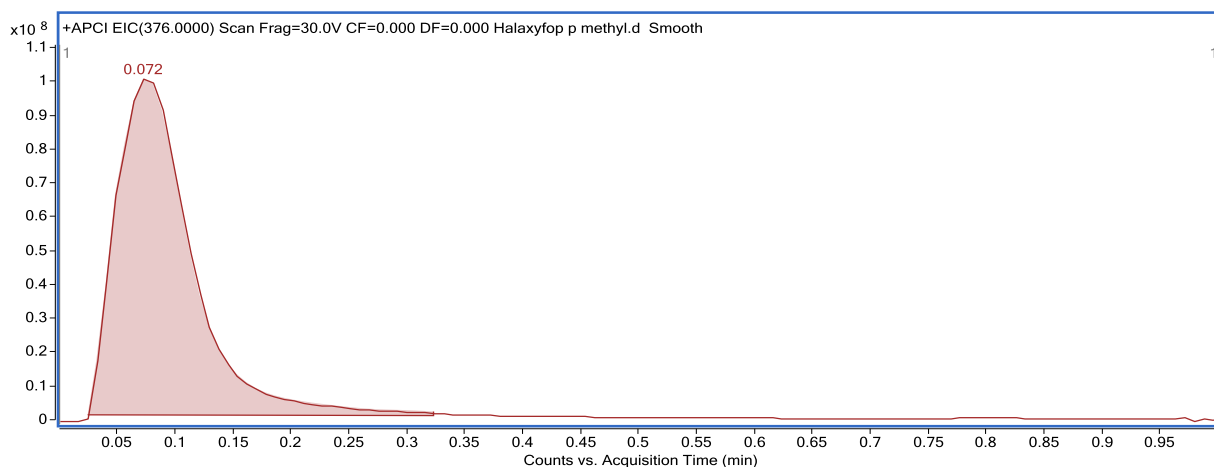
**Amount of residual pesticides in the liver of rats poisoned by galaxyphop-R-ethyl**

Time after poisoning, days	Residual amount of galaxyphop-R-methyl, Amount per 1 gram of sample (mkg)
5	0.0174
10	0.00159
20	0.000138
30	0.000164
40	-
50	-

According to the results, the highest concentration of residual pesticide was detected on the 5th day after rat poisoning and amounted to 0.0174 mkg / g.

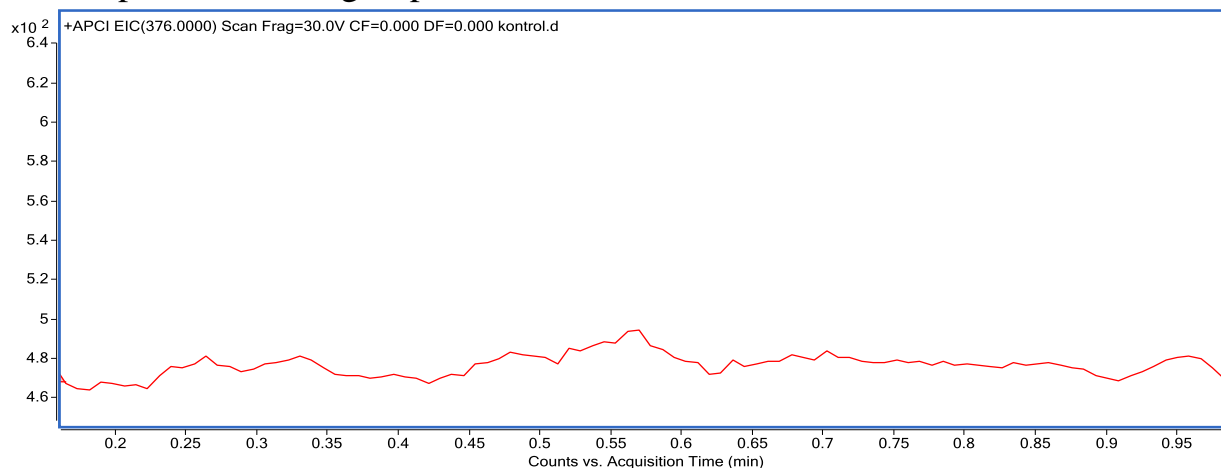
The standard galaxypho-r-methyl is 0.01 mg / ml

## Standard chromatogram of galaxyphop-R-methyl.



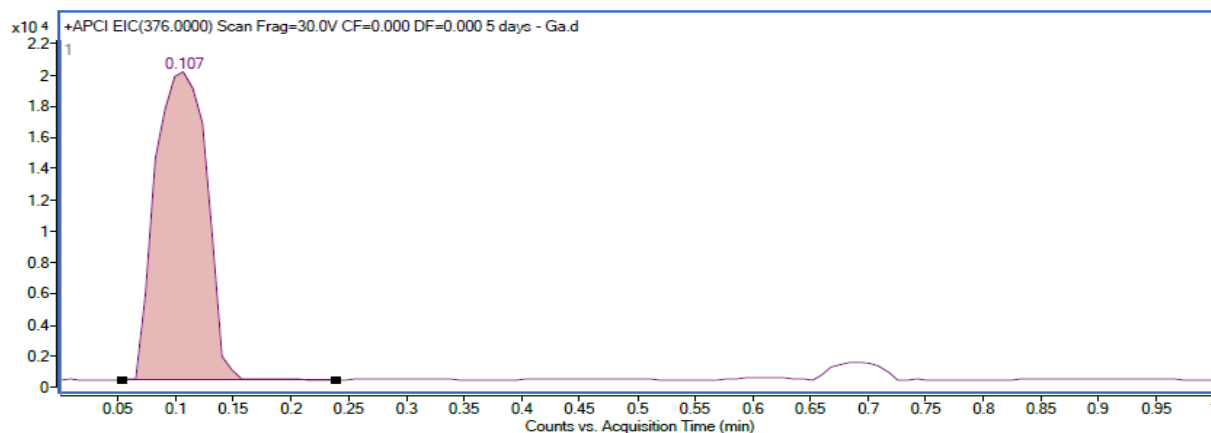
Control groups.  
Chromatogram of rat

liver samples in control groups.



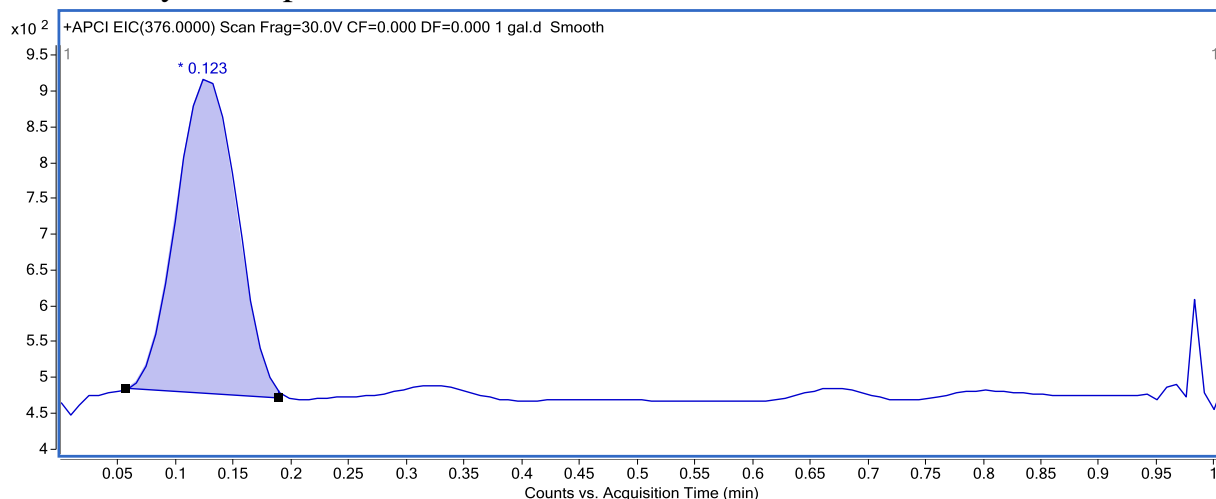
No galaxyphop-r-methyl residues were detected in rat liver samples from the control group.

5 day sample

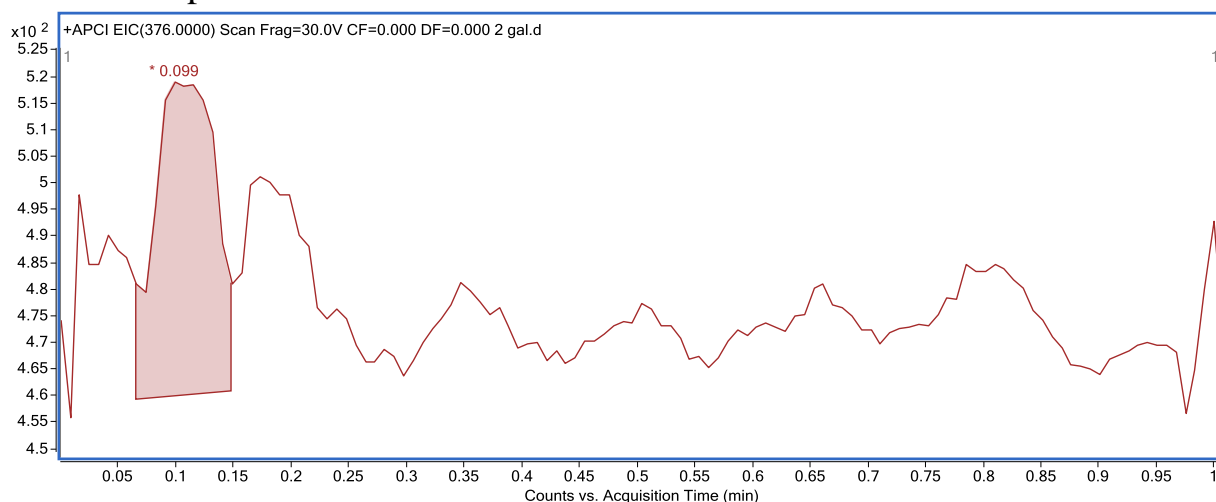


On the 5th day after ingestion, chromatograms of rat liver samples showed an average residue of 0.0000174 mg galaxyphop-r-methyl per 1 gram of sample, i.e. a residue of 0.0174 mkg.

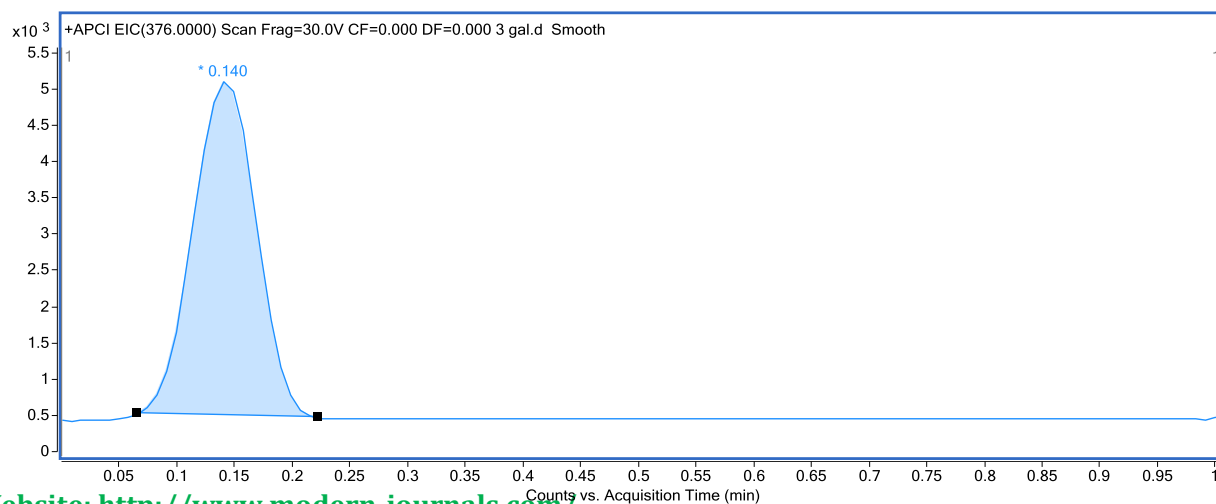
### 10-day 1<sup>st</sup> sample



### 2<sup>nd</sup> sample



### 3<sup>rd</sup> sample

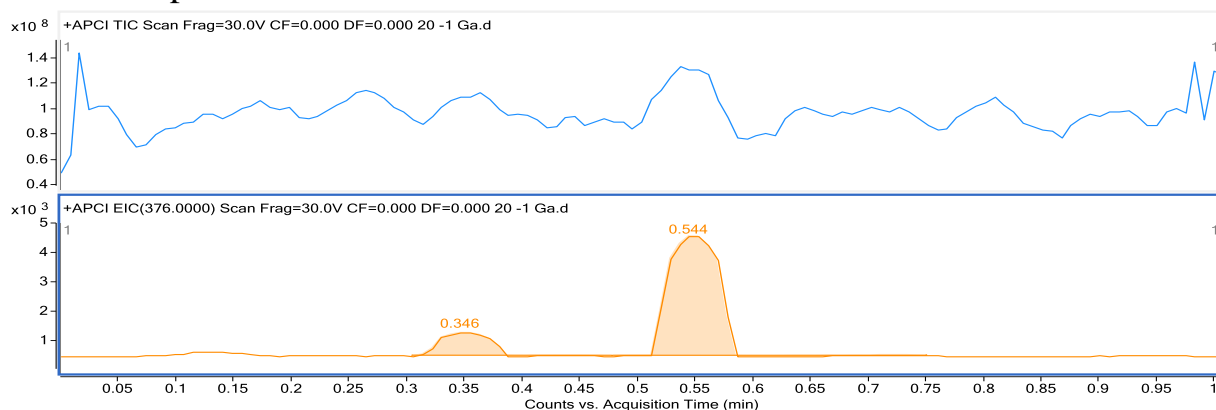


On the 10th day after ingestion, chromatogram

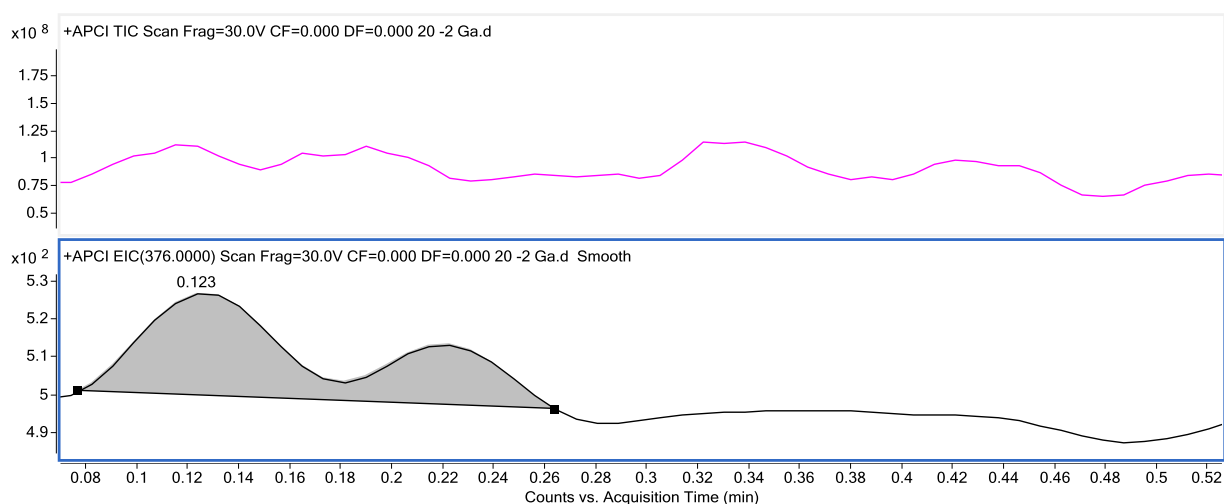
s of rat liver samples revealed an average of 0.00000159 mg of galaxypoph-r-methyl residue per 1 gram of sample, i.e. a residue of 0.00159 mkg.

The results of the 20-day analysis

1<sup>st</sup> sample



2<sup>nd</sup> sample



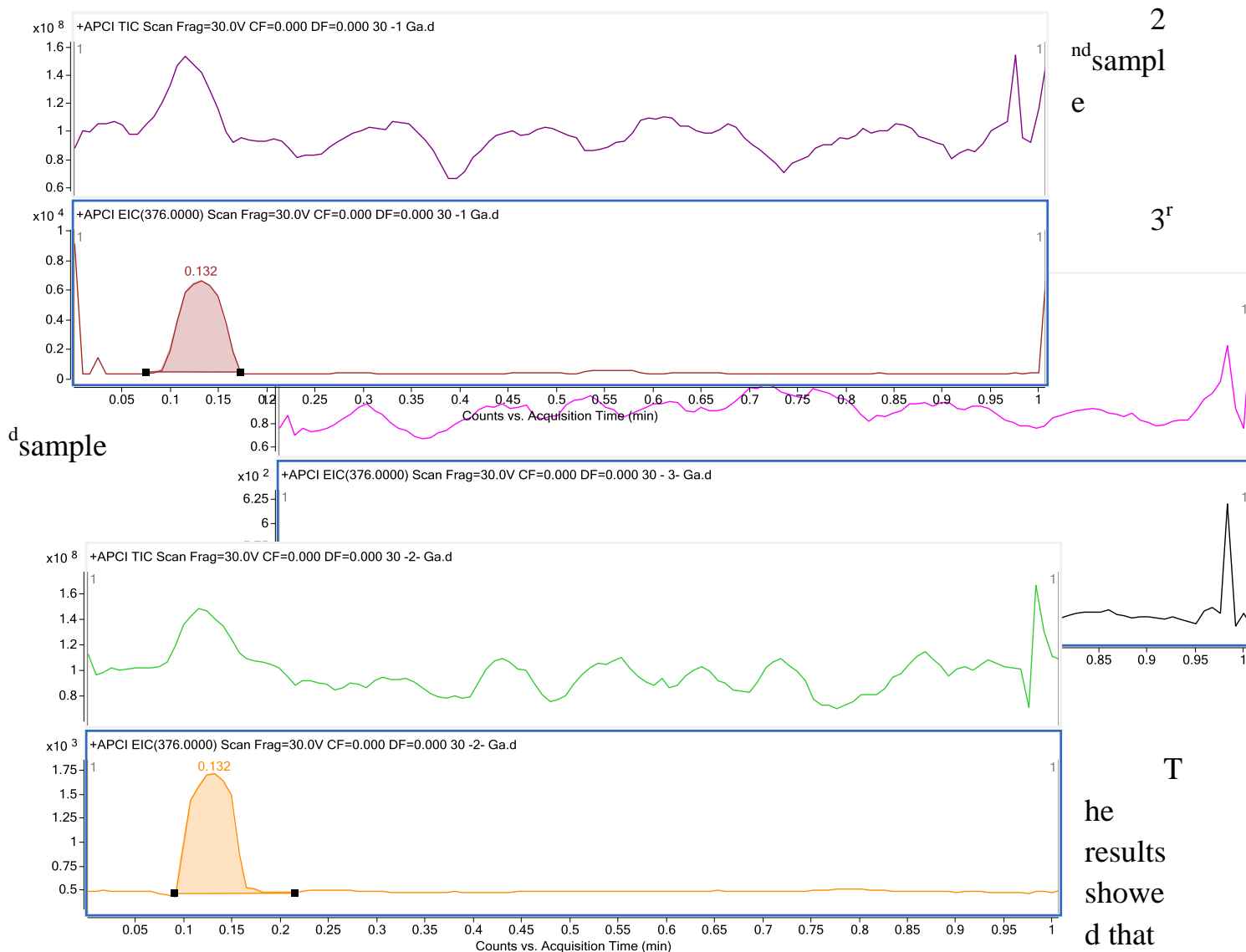
O  
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liver

chromatograms showed an average of 0.000000138 mg per 1 gram of the sample.

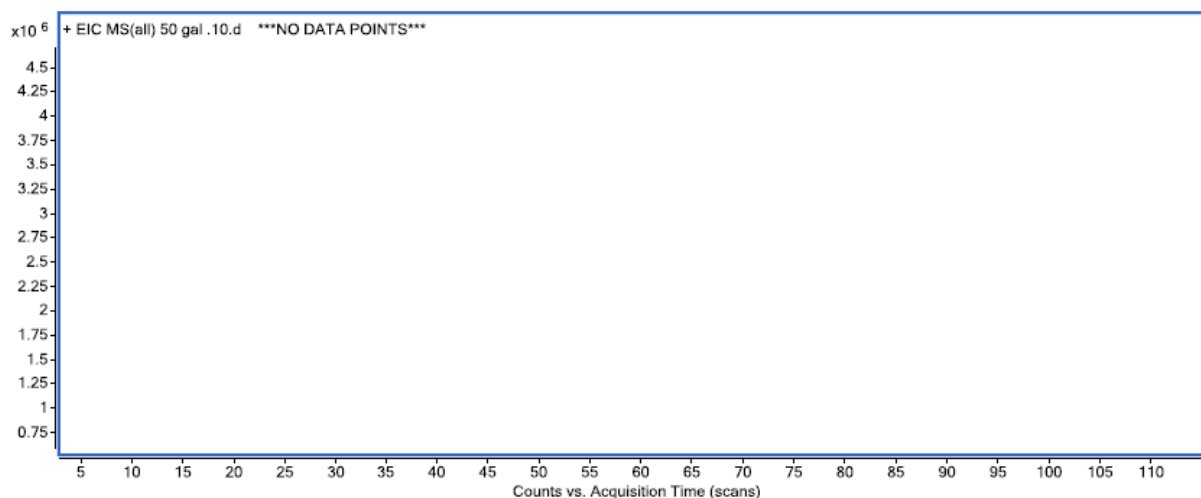
galaxypoph-r-methyl residue was detected i.e. a residue of 0.000138 mkg was detected. After 20 days of poisoning, a decrease in the amount of residual pesticides was observed.

30-day samples.

1<sup>st</sup> sample.



### 50 day sample



No residual pesticide was detected on rat liver chromatograms at 40–50 days of ingestion.

The results obtained are consistent with the data in the literature. A high amount of residual pesticide was detected 10 days after rats were poisoned with karate at a dose of LD<sub>50</sub> 1/10. No pesticide was detected on chromatograms at 50 days after intoxication. Residual pesticides revealed changes in the activity of a number of enzymes under the influence of karate [1,3, 5, 7].

Thus, high levels of residual pesticides were detected on the 5th day of intoxication. The residual pesticide accumulated significantly on day 5 after intoxication in rat liver was 0.0174 mkg. On the 10th day of intoxication, this figure was 0.00159 mkg. On days 20 and 30 of the poisoning, this figure decreased. No residual pesticide was detected on days 40 and 50 of the study.

The results of the study showed that the galaxyp-hop-r-methyl pesticide administered to rats slowly leaves the body by 40 days.

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