

Q. Institute and Control

THE STUDIES ON AUTOMATION OF THE RADIO-IMMUNOASSAY

using RIA total systems (the fifth report)
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The accuracy and efficiency of Radio-immunoassay has been studied, using a Micromedic's total system. The following three points were especially examined.

1. The comparison between the dispensing accuracy of the automatic pipetting and of the manual one.
2. The contamination of the triple bore tip.
3. The fluctuation of the Automatic Multiple Gamma Counting System.

The Methods

1. The Dispensing accuracy of the automatic and the manual pipetting were compared, using both Gamma ray counting of I-131-solution and weighting of distilled water.
2. The contamination of the triple bore tip was mesured, counting the gamma ray of fifty tubes of R1 and distilled water, for one minute alternately sampling and dispensing the R1 and distilled water.
3. The fluctuation of the Automatic Multiple Gamma Counting System was studies, repeating one-minute-counting of one sample for 100 times.

The Results

- 1) The coefficient of variation obtained by the automatic pipetting and manual one were 0.922% and 2.699% respectively, using gamma ray counting, 0.169% and 1.941% respectively, using weighting method.
- 2) The contamination of triple bore tip was 2.56%.
 (average countings; R1 25,232 C.P.M., distilled water 646 C.P.M.)
- 3) The coefficient of variation was 0.676%
 (average countings; 24,588.560 C.P.M.)

INCINERATION OF LIQUID SCINTILLATOR AS WASTE DISPOSAL

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The waste of liquid scintillator consisting of Toluene or Dioxan is regulated as the dangerous objects of the first group of the 4th class petroleum by the fire service law. These scintillators cannot be collected and treated by the official waste disposal system at the present time, then, these wastes are accumulated year^{by year} in many RI laboratories and it must be obligated to build the storage depot according to the fire service law. Also research activities using ³H or ¹⁴C labelled compounds are strictly limited by this unreasonable factor. The author reports the results of the construction and the operation of the incinerator, by which the waste of liquid scintillator (organic solvent) is burned up and exhausted perfectly into inorganic gas and water.

The incinerator can treat 2ℓ of scintillator per an hour and operate 5 to 6 hours per a day. The design is referred to the laws concerning prevention from radiation hazards due to radioisotopes, etc in point of leakage or contamination of radionuclides.

The important regulations problems^{are} as follows:---

1. As the legal regulations which are concerned with this work, there are many laws or acts such as a) the law concerning prevention from radiation hazards, b) the fire services law, c) the law of air pollution, d) the local regulation of nuisance control, e) the acts of water pollution control, f) the building standards act and so on. So it is possible to construct the incinerator under very strictly limited conditions such as its location, structure and environmental condition or inhabitant's feeling.
2. It is necessary to burn up those organic solvent perfectly, so that 2 or 3 burners are set up to incinerate seriously.
3. Tritium is trapped into the water 60-90 % in various conditions of burning, ¹⁴C is trapped into the alkali approximately 10-30 % as the gas of CO₂, but it is better to exhaust into the air to avoid the secondary waste disposal of ¹⁴CO₂ containing alkali agents.
4. The safety control, the prevention of contamination or the endurance of the unit are most important points for the safety operating.

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