MISCELLANEOUS

Storage of Standardized Radioactive Solutions

THERE is considerable interest in the storage of radio-nuclide solutions in polythene bottles. Keith, in a recent communication¹, indicated the losses of solvent through the walls of polythene ampoules. The experience of our laboratory is comparable in this respect, but it might be noted that the rate of loss was extremely high from concentrated hydrochloric acid solutions where apparently gaseous hydrochloric acid was being transferred through the walls. We believe that the following information on other types of losses will be of interest.

The stability of nuclide solutions in polythene bottles and possible losses through adsorption on the walls have been questioned many times. A series of tests was performed to determine if appreciable losses occurred in the normal use of these bottles for solution storage and handling. The results obtained should be considered only as a guide and appropriate tests carried out as needed.

Six nuclides (caesium-137, cerium-144, zirconium-95, iodine-131, ruthenium-106 and barium-140) were obtained from Oak Ridge, aliquots taken, diluted and stored in sealed polythene ampoules (6 ml. capacity) for a period of from 10-63 days.

Fig. 1. A, *Lycoris radiata*, somatic metaphase with 33 rod-shaped chromosomes ($\times c. 1,100$); B, *L. radiata*, somatic metaphase with 31 rod-shaped, 1 V-shaped and 1 B or supernumerary chromosome. V and B or supernumerary chromosome shown by arrows ($\times c. 1,100$)

with 31 R + 1 V + 1 B chromosome had leaves like those in *L. radiata* but none of these has flowered yet.

With regard to the finding of a V chromosome in *L. radiata* the mechanism of the formation of a V chromosome from two rods with subterminal constrictions through reciprocal translocation or fusion can be taken into account. The formation of a V chromosome by these methods has been suggested by Cave and Bradley⁹ in *Miersia chilensis*. Although the exact nature of the origin of a B or supernumerary chromosome is not known, Darlington's¹⁰ idea regarding the origin of this type of chromosome from an A seems relevant.

This new chromosome number and altered karyotype observed in *L. radiata* once more shows the role of structural change in speciation and in the formation of chromosome races in *Lycoris* (Table 1).

Table 1. CHROMOSOME NUMBER AND KARYOTYPE IN *Lycoris*

<i>Lycoris</i> taxa	Types of chromosomes	Chromosome No.	Possible potentialities in rod chromosomes
	V	R	
<i>aurca</i>	10	2	22 R
	9	4	22 R
	6	8	22 R
	7	8	22 R
<i>'sperryi'</i>	7	8	22 R
<i>traubii</i>	10	2	22 R
	9	4	22 R
<i>chinensis</i>	7	9	22 R
<i>straminea</i>	6	10	22 R
<i>albiflora</i>	5	12	22 R
<i>elsae</i>	5	12	22 R
<i>haywardii</i>		22	22 R
<i>radiata</i>		22	22 R
<i>sanguinea</i>		22	22 R
<i>sprengeri</i>		22	22 R
<i>caldwellii</i>	6	21	33 R
<i>squamigera</i>	6	21	33 R
<i>incarnata</i>	4	25 1 B	33 R + 1 B
<i>houdyshelii</i>	3	27	33 R
<i>radiata</i>	1	31 1 B	33 R + 1 B
		33	33 R

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SMRITIMOY BOSE*

Blandy Experimental Farm,
University of Virginia, Boyce.

* Present address: Department of Agriculture, Calcutta University, Calcutta 19.

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Nuclide	Carrier	Acid	Percentage retained after rinse	
			Water	Acid
¹³⁷ Cs	—	—	0	
	×	—	0	
	—	×	0	
¹⁴⁴ Ce	—	—	5	0.6
	×	—	0	
	×	—	0	
	—	×	0	
	—	×	0	
⁹⁵ Zr	—	—	48	33
	×	—	0*	
	—	×	1.2	0.8
¹³¹ I	—	—	26	25
	×	—	17	17
	—	×	26	26
¹³¹ I with Na ₂ SO ₃ at pH 8	—	—	0	
¹⁰⁶ Ru	—	—	35	15
	×	—	26	26
	—	×	29	28
¹⁴⁰ Ba	—	—	0	
	×	—	0	
	—	×	0	

* With either zirconium or niobium or with both as carriers.

In each case, duplicate samples were prepared in water, with carrier (1 mg/ml.) and with 0.1 N hydrochloric acid solution, except in the case of iodine-131 where sodium sulphite (pH at 8) was used, and zirconium-95 where oxalic acid was used.

The samples were γ -counted in a 3.25 in. $\times$ 5 in. sodium iodide well-crystal, with a 1 in. $\times$ 1.75 in. well surrounded by a stainless steel, mercury-filled shield. All samples were counted for 5 min and a counting error of at least 1 per cent was maintained. The average counter background was 225 c.p.m. After the initial count, the drawn stems of the ampoules were cut off, the bottles rinsed four times with warm water, and re-counted. In the case of residual activity, the bottles were re-washed four times in a 1 N hydrochloric acid solution and re-counted.

The results are shown in Table 1. In every case except one, the nuclide may be kept in solution by addition of appropriate acid or carrier. Ruthenium adsorbs appreciably on polyethylene and even at best 25 per cent will remain on the walls.

J. H. HARLEY
N. A. HALDEN
I. M. FISENNE

U.S. Atomic Energy Commission,
Health and Safety Laboratory,
New York 14.

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