Table 1. Emergence and shoot and root length of sugar-beet seedlings grown with water or with Dalapon solution. Mean values for three replications per treatment 6 days after planting.

	Check	Dalapon 4 ppm	Dalapon 8 ppm
Emergence (No. of plants from 40 seed balls)	54	54	53
Root length (mm)	49.6	47.4	47.4
Shoot length (mm)	52.9	51.8	53.5

able natural variation in growth of individual plants from seed balls within treatments, but there was no statistically significant difference in total measurements between treatments.

Following removal from the growth chamber, the dishes containing the seedlings were in some experiments placed intact on a slowly rotating shelf in a deep freezer. In other tests the shoots were first severed and their basal region pressed lightly in a horizontal position on widely spaced bands of 0.5-in. Scotch tape stretched across the top of a shallow box-shaped wire frame.

Dishes with contents were exposed for periods of the order of 30 min at −10°C. Isolated shoots required only about 5 min of rotation at this temperature to permit detection of the differences between survival of chemically treated and untreated plants. Appreciably longer exposures killed all plants.

Survival was recorded on a percentage basis within the first minute or two after removal of material from the freezer to room temperature. Frozen seedlings collapsed almost immediately, but unaffected ones survived for several days, either rooted in moist vermiculite without added nutrient or when transferred from the tapes to dishes of water kept at room temperature in the laboratory.

Table 2. Effect of Dalapon on low-temperature resistance of sugar-beet seedlings.

Expt.*		Replications	No. in each sample	Time†	Mean percentage survival after timed exposure at −10°C: Check	Dalapon 4 ppm	Dalapon 8 ppm
†1	1952 seed	3	30	*a*	43	76	77
2		3	20	*a*	45	80	80
3	1953 seed	8	25	*a*	52	81	—
				b	35	73	—
4		8	25	*a*	59	74	—
				b	44	65	—
				c	34	63	—

* Expts. 1, 2, 3: Tap water was used with these experiments; distilled water was used with expt. 4 for moistening the checks and for preparing the chemical solution.

† (*a*) Five minutes at −10°C before 2 or 3 min of observation at room temperature; (*b*) A second exposure of same material for 6 min at −10°C and removal to room temperature; (*c*) A third exposure for 7 min at −10°C.

Of the two freezing techniques, the tape procedure gave least variability in amount of improvement from chemical treatment in different experiments. This method was free from probable discrepancies occurring during cooling of entire dishes and contents.

Table 2 summarizes data from some representative statistically analyzed experiments employing the tape technique during freezing periods. The conclusion can be drawn that highly significant differences in low-temperature resistance existed between chemically treated and untreated seedlings within different seed lots and when either tap water or distilled water was used in preparation of the experiments. At the same time, quantitative growth of the seedlings was apparently unaffected

Limited preliminary experiments with similarly treated Saunders wheat, Polish rape, Earliana tomatoes, and Redwing flax have shown no increase in low-temperature resistance of seedlings treated with Dalapon.

Grateful acknowledgment is expressed to the University of Alberta, the National Research Council of Canada and the Federal Department of Agriculture who will provide assistance to extend this research. The Dow Chemical Co. has donated supplies of chemicals, and Canadian Sugar Factories Ltd. provided sugar-beet seed.

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Uranium Determination by Use of the Photodecomposition of Oxalic Acid

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The photodecomposition of oxalic acid in the presence of uranyl ion has long been used as a means of measuring light intensities. Leighton and Forbes (*1*) have shown that this reaction,

$$H_2C_2O_4 + (UO_2^{++})^* \rightarrow (UO_2^{++}) + H_2O + CO_2 + CO,$$

with photosensitized UO_2^{++} is very nearly quantitative. We have endeavored to determine microgram quantities of uranium by measuring the extent of decomposition of oxalic acid with varying quantities of uranium (*2*).

It has been reported in the literature (*3*) that 10^{-3} g/lit of uranium can be determined with the use of photoelectric photometers and spectrophotometers; 10^{-11} g/lit, by fluorometric means; and 10^{-3} g/lit, polarographically. These figures represent the limits of determination under optimum conditions. The method, as outlined here, has proved effective on solutions of known uranium concentration in the range

10^{-4} g/lit with a standard deviation of less than 10^{-5} g/lit.

Shallow pyrex dishes containing samples are placed in an enclosed space at a distance of approximately 4 in. from a battery of six Sylvania or G.E. 15-w germicidal lamps. The area of the light source is approximately 324 in.^{2}, and the area used for exposure of samples to this light is approximately 34 in.^{2} The germicidal lamps were chosen because 90 percent of the radiant energy is at the 2537 A line (*4*) where the quantum efficiency is about 0.60.

Five standards were prepared in 500-ml volumetric flasks as follows: 10 ml of 0.1*M* $H_2C_2O_4$ was placed in each flask, followed by the addition of 70, 50, 30, 10, and 0 ml of a standard uranyl nitrate solution (0.0117 mg U/ml), respectively. Each was diluted to the mark with demineralized water and thoroughly mixed.

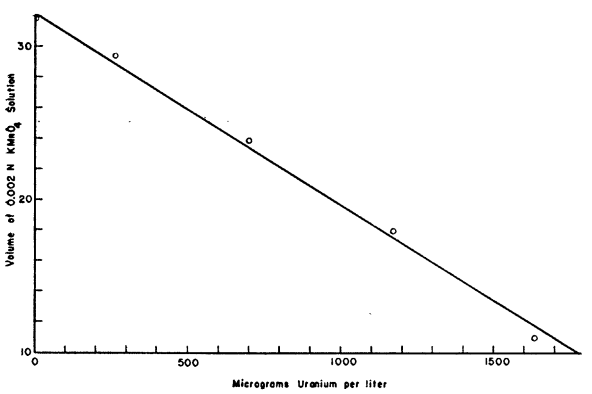

Fig. 1. Photodecomposition of oxalic acid as a function of uranium content of the solution (2-hr exposure; 2537 A radiation).

Eight 15-ml aliquots of each sample were exposed to the ultraviolet light for a period of 2 hr. After rinsing the samples into titration flasks, adding 5 to 10 ml 18*N* H_2SO_4, and diluting to 100 ml, the samples were titrated with a 0.002*N* solution of $KMnO_4$. The graph of Fig. 1 was made to serve as a standard curve. A new series of samples was prepared and treated as the others were, and the amount of uranium present was determined from this standard curve. Table 1 shows these data.

Although the accuracy and precision are good and the time required for a determination compares favorably with that of other methods, there are many variables yet to be studied, some of which are other light sources, time of exposure, ratios of uranium to oxalic acid, and interferences.

Table 1. Uranium concentration as determined by the photodecomposition of oxalic acid.

Uranium taken (μg/lit)	Uranium found (μg/lit)	Std. dev. in μg of uranium/lit
117	85	43
351	333	43
936	952	36
1287	1303	64
1521	1526	26

References and Notes

1. Leighton and Forbes, *J. Am. Chem. Soc.* **52**, 3146, 3148 (1930).
2. A part of the research performed under contract No. AT(10-1)-310. between the Atomic Energy Commission and Idaho State College.
3. C. J. Rodden, *Anal. Chem.* **25**, 1598 (1953).
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Synthesis of Hexosamine by Connective Tissue (*in Vitro*)

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Although labeled hexosamine has been found in streptococcal cultures (*1–3*), ovomucoid (*4*), and rat serum (*5*) following administration of C^{14} glucose, the synthesis of hexosamine has not been previously demonstrated in isolated animal tissue.

The method devised by Parker (*6*) for the study of antibody production *in vitro* was adapted to this problem. Using aseptic methods, dorsal subcutaneous connective tissue was obtained from rabbits that were sacrificed with ether. No attempt was made to obtain fat-free connective tissue, since fat did not interfere with determinations and the control samples used were of similar composition. Control samples were used to estimate the hexosamine content of the test samples before incubation (*7*). Tissue samples were cut into 1- to 2-mm fragments and incubated in 25-ml Erlenmeyer flasks after the medium was adjusted with 5 percent CO_2 in air to *p*H 7.8. Parker's ratio of 100 mg of tissue per 3 ml of medium was observed. Three-

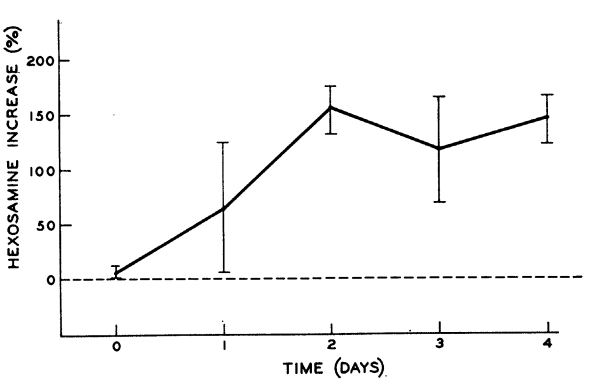

Fig. 1. Production of hexosamine by rabbit subcutaneous connective tissue cultured in Hanks' solution containing 25-percent ox serum ultrafiltrate. Vertical lines refer to standard error of the mean.