LIQUID SCINTILLATION COUNTING OF RADIOAUTOGRAMS

John W. Geiger and Lemuel D. Wright

Graduate School of Nutrition
Cornell University
Ithaca, New York

Received March 31, 1960

A recent communication to this journal (Wang and Jones, 1959) described a technique for the liquid scintillation counting of paper sections from radioautograms involving the use of custom-made vials that hold paper sections in rigid vertical position. No consideration was given to any necessity for uniformity with respect to the angle of rotation of the paper sections as seen by the photo tubes of the scintillation spectrometer. It would appear, therefore, that if valid radioautographic data could be obtained by a procedure where the rotation of paper sections was uncontrolled, equally good results could be obtained without rigid suspension of the paper sections. Accordingly, sections of paper containing applied radioactive material were merely inserted into scintillation vials, scintillation solution added, and counts obtained at various angles of rotation as seen by the photo tubes. Although slightly lower counts were obtained when the paper sections were at 90° to the light path as opposed to parallel to it, such differences were quite small. Thus for most radioautographic work the more elaborate procedure of Wang and Jones is superfluous and areas of radioactivity may be located on paper sections with precision adequate for the purposes intended without the use of special vials. Similarly, the angle of rotation need not necessarily be controlled, thus permitting the use of a scintillation spectrometer equipped with an automatic sample changer where the vials are subjected to a certain amount of spin as the sample is placed in counting position. Data supporting the conclusions made are summarized in the table.

Liquid Scintillation Counting of Labelled Compounds Applied to Paper as Influenced by Several Variables

Sample	CPM at Indicated Degree of Turn[a]					
	0°	45°	90°	135°	180°	Without Paper[b]
	40 Lambda Na Acetate-C^{14} Solution[c]					
1	18,070	18,187	16,733	16,764	17,277	12,639
2	16,568	16,204	15,163	16,048	15,933	12,589
3	17,746	17,756	17,055	16,941	16,480	13,872
4	17,723	17,349	16,653	16,931	16,997	13,499
5	17,206	16,871	15,723	15,650	15,921	13,419
	20 Lambda Na Acetate-C^{14} Solution[c]					
1	10,243	10,116	9,890	10,088	10,077	8,149
2	9,837	9,744	9,157	9,120	9,602	7,848
3	9,650	9,573	9,059	9,991	9,309	8,111
4	10,190	10,181	9,736	10,062	10,045	8,426
5	10,087	10,031	9,446	9,096	9,536	7,711
	20 Lambda Glucose-1-C^{14} Solution[d]					
1	68,630	61,109	63,733	69,373	67,253	29
2	63,549	65,255	58,366	62,862	65,751	61
3	65,731	62,196	59,899	60,115	65,514	41
4	68,802	63,171	57,829	62,978	68,937	33
5	67,951	60,452	59,873	66,079	66,032	48

a 0° signifies paper parallel to light path, 90° signifies paper perpendicular to light path. Paper sections were 3.5 cm.x 1.5 cm. 5 dram counting vials with plastic screw tops were employed. Counts obtained with a Packard TRI-CARB model 314 "manual" liquid scintillation spectrometer where the rotation of the vial could be controlled.

b Count obtained following removal of paper from vial.

c Counted with a scintillation mixture containing 20% ethanol. This is an example of a compound eluted by the scintillation mixture. Samples counted for 10 mins.

d Counted with a scintillation mixture using toluene as the only solvent. This is an example of a compound that is not eluted by the scintillation mixture. Samples counted for 1 min.

Reference

Wang, C.H., and Jones, D.E., Biochem. and Biophys. Res. Comm., 1, 203 (1959).