Studies on Spontaneous Transformation of Radioiodide in Horizontal Type of High Voltage Paper Electrophoresis (HVEP)

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It was recently reported by Taurog¹⁾ that extraneous ¹³¹I components appeared on filter paper chromatograms of carrier free radioiodide solutions when the samples applied to filter paper were allowed to dry in air before the strips were placed in the chromatography jars.

The present study was undertaken to observe similar findings in HVEP.

Materials and Methods

NaI-¹³¹I (purchased from the Radiochemical Center, Amersham, England) was diluted 1/2,000 with distilled water just before the experiment. The volume of the sample applied to the filter paper was 15 μ l. Samples were allowed to dry in air for 0, 20 and 60 min. HVEP and radioautography^{2,3)} of samples were carried out. Each section was identified by the R_J values (ratio of mobility of Extraneous ¹³¹I components/mobility of inorganic iodide) measured from their radioautograms. The paper strips were cut into appropriate sections for counting in well-type scintillation counter⁴⁾. Radioactivity in each section was expressed as a percentage of the total.

Results

In zero-time samples, from 3 to 7 different non-iodide components were found. The ¹³¹I presented as iodide contained 86.5–91.9% of the total ¹³¹I (Table 1). Drying for 20 minutes resulted in a decrease in ¹³¹I-iodide and an increase in non-iodide components. I-iodide contained 81.0–85.3% of the total ¹³¹I. The transformation of radioiodide was greatly increased when samples were dried for 60 min. From 4 to 10 non-iodide components were formed and ¹³¹I-iodide decreased to 64.4–81.6%.

It is evident from these results that radioiodide may be oxidized by air when the samples applied to filter are allowed to dry.

In support of this view, radioiodide was diluted 1/2,000 with 3% H₂O₂ 60 minutes before electrophoresis. When this procedure was applied to freshly diluted samples with distilled water, no extraneous ¹³¹I components were found as illustrated in Table 2. However, 10 different extraneous ¹³¹I components were found when iodide was diluted with 3% H₂O₂. ¹³¹I-iodide decreased to 46.6% of the total ¹³¹I.

References

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