PAPER CHROMATOGRAPHY OF ALKALI SULPHATES & CHLORIDES

THE SEPARATION OF THE ALKALI METALS (Na, K and Li) by the one-dimensional, ascending method of paper chromatography has recently been reported[1]. This note reports the results of preliminary studies on quantitative chromatographic separation of alkali sulphates and chlorides.

The apparatus employed consisted of a glass cylinder (2 × 14 in.) open at one end and provided with a lid. The filter paper strip to be developed was rolled at its upper end around a piece of glass tubing and a wire clip was employed to hold the paper on to the tubing. The clip was held in position by fixing it to the bottom of the lid of the jar by means of plasticine. This apparatus was found to be more convenient to work with for quantitative work than the one described by Chakrabarthy and Burma[1]. Microgram amounts of sulphate and chloride could be detected on the chromatogram.

Filter paper strips (Whatman No. 1, 1 × 12·5 in.), on which 2-12 c.c. of 0·10 per cent solutions of alkali sulphates or chlorides had

been spotted, were presaturated for 30 min. with the vapours of rectified spirit which was used as the developing solvent. After the solvent had moved up the paper to a distance of 20-25 cm. from the base, the filter paper strip was taken out of the cylinder and the solvent removed by drying the strip at 100°C. for 5 min. For the detection of sulphate, a spray of a 0·2 per cent solution of lead acetate in 50 per cent alcohol (containing a few drops of glacial acetic acid) was applied to the chromatogram. The strip was kept at 100°C. for 15 min. and then immersed in a solution containing 1 g. of sodium sulphide and 5 g. potassium iodide in 100 cc. of 50 per cent alcohol. The method for the detection of chloride was similar to that for the detection of sulphate excepting for the substitution of the lead acetate reagent by a 0·2 per cent solution of silver iodate in a mixture of about equal volumes of rectified spirit and 0·4N ammonia.

No separation of the sulphates of sodium and potassium could be observed, the R_f values of both the salts being zero. Sodium, potassium and ammonium chlorides, however, could be separated from a mixture of the three chlorides (R_f values: NaCl, 0·20; KCl, 0·10; NH_4Cl, 0·33). The results suggest that the conditions for the separation of the alkali sulphates are different from those for the separation of the alkali chlorides, and are in accord with the observations of Burma *et al.* (personal communication) on the chromatographic separation of alkali metals. It would be interesting, in this connection, to detect the cations on the chromatogram and to find out if their R_f values differ from those of the anions.

Since the alkali metals in the ash of biological materials are usually in the form of mixtures of their sulphates or chlorides, the usefulness of methods for detection and separation of these anions is evident. Especially, the separation on filter paper of sodium, potassium and ammonium chlorides provides the basis for an elegant alternative to the admittedly unsatisfactory procedure described by Linderstrom-Lang[2]. Work on the quantitative aspects of this separation will be reported in detail elsewhere.

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1. CHAKRABARTHY, S. & BURMA, D. P., *Sci. & Cult.*, **16** (1951), 485.
2. LINDERSTROM-LANG, K., *C.R. Lab., Carlsberg, Ser. chim.*, **21** (1936), 111.