Phytochemistry, 1975, Vol. 14, pp. 855–861. Pergamon Press. Printed in England.

PROCEEDINGS OF THE PHYTOCHEMICAL SOCIETY

A meeting of the Society was held at the University College of Swansea on 18–20 September 1974 when the following papers were presented, under the general title:

Nitrogenous Compounds of Current Interest in Plant Biochemistry

REVIEWS

Cytokinins

R. HORGAN

Department of Botany and Microbiology, University College of Wales, Aberystwyth

The cytokinins are plant growth hormones which can promote cell division in plant callus cultures. With the exception of diphenyl urea all the naturally occurring cytokinins have been shown to be derivatives of adenine.

By the use of several different chromatographic techniques in conjunction with bioassay, it has been possible to demonstrate that many plants contain a complex mixture of cytokinins. Preparative GLC and GC–MS have been used to isolate and identify some of the components of these mixtures. GC–MS has proved most useful in confirming the presence of known cytokinins [1]. The structure of a new cytokinin has been determined on the μg scale using a combination of GC–MS, preparative GLC, UV and direct insertion MS. This compound was shown to be N^6-(*o*-hydroxybenzyl)adenosine [2, 3]. Work on the identification of further unknown cytokinins as well as the results of studies on the metabolism of cytokinins in plants will be presented.

1. Horgan, R., Hewett, E. W., Purse, J. G., Horgan, J. M. and Wareing, P. F. (1973) *Plant Science Letters* **1**, 321.
2. Horgan, R., Hewett, E. W., Purse, J. G. and Wareing, P. F. (1973) *Tetrahedron Letters* (30), 2827.
3. Horgan, R., Hewett, E. W., Horgan, J. M., Purse, J. and Wareing, P. F. (1975) *Phytochemistry* (in press).

Biosynthesis and Catabolism of Caffeine

T. W. BAUMANN

Institut für Allgemeine Botanik der Universität Zurich, Switzerland

The metabolism of caffeine (1,3,7-trimethylxanthine), first isolated in pure form from tea leaves more than 150 years ago, is only partially known. It was shown in the early 1960s that the purine ring of this secondary plant metabolite is formed according to the purine nucleotide biosynthesis in animals. More recently, scientists have been attracted to the question of whether caffeine is synthesized *de novo*, or whether it arises as a breakdown product of nucleic acid metabolism. Recently we were able to follow caffeine biosynthesis stepwise as far back as the nucleoside, 7-methylxanthosine [1]. There are, however, experimental problems which still make it difficult to distinguish between these two hypotheses.

Although caffeine breakdown has been well studied in animals, the first steps in its degradation in plants is little understood. It is well documented in the literature that in coffee leaves this purine alkaloid is finally degraded to allantoin, allantoic acid and urea. Fortuitously, we have discovered three further purines in young leaves of different *Coffea* species. These compounds, identified as highly methylated uric acids, are considered to be first products of caffeine breakdown [2].

1. Looser, E., Baumann, T. W. and Wanner, H. (1974) *Phytochemistry* **13**, 2515.
2. Wanner, H., Pesakova, M., Baumann, T. W., Charumala, R., Guggisberg, A., Hesse, M. and Schmid, H. (1975) *Phytochemistry* (in press).

Occurrence and Metabolism of Adenosine 3′:5′-Cyclic monophosphate in Higher Plants

R. P. NEWTON

Department of Biochemistry, University College of Swansea, Wales

That cyclic AMP acts as a mediator of the action of several mammalian hormones is well established (see, e.g. [1]). The role of cyclic AMP in the regulation of bacterial gene activity [2] and as 'acrasin' in *Dictyostelium discoideum* [3] is also recognized. Until recently, the occurrence of cyclic AMP in higher plants was uncertain, since much of the evidence was purely presumptive and based on observed physiological effects of exogenous cyclic AMP [4, 5]. Reports that administration of phytohormones elevates cyclic AMP concentrations also exist (*inter alia*, [6]), but the identification procedures employed often lack sufficient resolution.

Unequivocal evidence for the occurrence of cyclic AMP in *Phaseolus* has recently been presented [7]. This method involved several chromatographic and electrophoretic purification steps, demonstrably sufficient to separate cyclic AMP from all other naturally occurring adenine nucleotides, before spectrophotometric estimation. Later work [8] has utilized the binding protein assay of Brown *et al.* [9]. Cyclic AMP has been