

Modern Methods of Plant Analysis

New Series Volume 1

Cell

Components

Edited by

H. F. Linskens and J. F. Jackson



Springer-Verlag Berlin Heidelberg New York Tokyo

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Modern Methods of Plant Analysis

New Series Volume 1

Editors

H.F. Linskens, Nijmegen

J.F. Jackson, Adelaide

Introduction

Modern Methods of Plant Analysis

When the handbook *Modern Methods of Plant Analysis* was first introduced in 1954 the considerations were

1. the dependence of scientific progress in biology on the improvement of existing and the introduction of new methods;
2. the inavailability of many new analytical methods concealed in specialized journals not normally accessible to experimental plant biologists;
3. the fact that in the methods sections of papers the description of methods is frequently so compact, or even sometimes so incomplete, that experiments are difficult to reproduce.

These considerations still stand today.

The series was highly successful, seven volumes appearing between 1956 and 1964. Since today there is still a demand for the old series, the publisher has decided to resume publication of *Modern Methods of Plant Analysis*. It is hoped that the New Series will be as acceptable to those working in plant sciences and related fields as the early volumes undoubtedly were. It is difficult to single out the major reasons for success of any publication, but we believe that the methods published in the first series were up-to-date at the time and the descriptions as applied to plant material so complete in themselves that there was little need to consult other publications.

Editorial

The earlier series of *Modern Methods of Plant Analysis* was initiated by Michel V. Tracey, at that time in Rothamsted, later in Sydney, and by the late Karl Paech (1910–1955), at that time at Tübingen. The New Series will be edited by Paech's successor H. F. Linskens (Nijmegen, The Netherlands) and John F. Jackson (Adelaide, South Australia). Like the earlier editors, we are convinced "that there is a real need for a collection of reliable up-to-date methods for plant analysis in large areas of applied biology ranging from agriculture and horticultural experiment stations to pharmaceutical and technical institutes concerned with raw material of plant origin". The recent developments in the field of plant biotechnology and genetic engineering make it even more important for workers in the plant sciences to become acquainted with the more sophisticated methods, sometimes originating from biochemistry and biophysics, which have

been developed in commercial firms, space science laboratories, nonuniversity research institutes and medical establishments.

Concept of the New Series

Many methods described in the biochemical, biophysical, and medical literature cannot be applied directly to plant material because of the special cell structure, surrounded by a tough cell wall, and the general lack of knowledge of the specific behavior of plant raw material during extraction procedures. Therefore all authors of this New Series have been chosen for their special experience in handling plant material, resulting in the adaptation of methods to problems of plant metabolism. Nevertheless each particular material from a plant species may require some modification of described methods and usual techniques. The methods are described critically, with indications as to their limitations. In general it will be possible to adapt the described methods to the specific needs of the users of this series, but nevertheless references have been made to the original papers and authors. While the editors have worked to plan in this New Series and made efforts to ensure that the aims and general layout of the contributions are within the general guidelines indicated above, we have tried not to interfere too much with the personal style of each author.

The First Volume – Cell Components and Organelles

The first volume in the New Series deals with *Cell Components and Organelles*. This has been planned so that many of the chapters contained in it will be useful as ground work for later volumes; the main point of the articles remains nevertheless plant analysis. Often with cell fractionation one must opt for either purity or maximum yield, as has been pointed out in the relevant chapters, relating as it does to methods which can be adopted for either analytical or preparative uses. In contrast to many other publications dealing with cell fractionation, we begin with two chapters on the cell wall, in the belief that it is this structure which sets most plant cells apart from their animal and bacterial counterparts. The tough, outer cell wall has made studies of plant cellular components extremely difficult in the past, and until the advent of protoplast formation, had rendered preparations for biochemical investigations extremely difficult. Perhaps the most significant breakthrough in plant cell fractionation in the past decade has been the use of enzyme breakdown of the cell-wall barrier, to produce protoplasts. This has allowed gentler techniques to be applied for functional organelle isolation. Protoplast formation is therefore dealt with in the third chapter, and is followed by a chapter giving practical guidance in the use of “markers” in cell fractionation. A treatment of the components and organelles then follows, from vacuoles to the various membranes of the cell, to the microtubules, chloroplasts, mitochondria, microbodies, protein and lipid bodies, and to the plant cell nucleus.

Finally, this New Series can be considered a continuation of the older one, brought up-to-date, so that the title *Modern Methods of Plant Analysis* remains justified. The continuity is demonstrated by the inclusion of a chapter by the son of the founder of the series, that by Dr. Christian Paech (Brookings, South Dakota).

The editors express their gratitude for the excellent cooperation with the publisher, with Dr. Dieter Czeschlik and especially with Ms. Linda Teppert.

Nijmegen and Adelaide, November 1985

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