

Phenoxy-phenoxypropionic Acid Derivatives and Related Compounds

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1. Introduction

Phenoxy-phenoxypropionic acid derivatives were detected to be a new class of grass herbicides in 1971. The selective activity of these compounds against monocotyledonous species is a surprising fact, as this group of substances may be regarded as a mere phenoxy homologous series of the predominantly broad-leaf herbicidal phenoxy fatty acids like, for example, dichlorprop, mecoprop, or fenoprop [1]. Furthermore, it is very surprising that this class of compounds was not investigated until 1971, in spite of the enormous amount of labor invested into the systematic structural variation of the auxin-like acting phenoxy-alkane-carboxylic acids since their discovery in 1941/42 [2].

Following the first report about the herbicidal properties of the phenoxy-phenoxypropionic acid derivatives in a patent application by Hoechst in 1972 [3], many companies have been starting research in this field. Nearly 140 patents and applications have been filed since, the majority of contributions originating from Hoechst, Ciba-Geigy, Ishihara Sangyo Kaisha, and Rohm and Haas¹.

It is estimated that about five to six thousand individual compounds have been synthesized and biologically tested within seven years after the first publication, providing a relatively wide field of experience and information about this scientifically and economically interesting new class of probably systemically acting herbicides.

2. The PPP System

The general structure of the phenoxy-phenoxypropionic acid system, which will be referred to as the "PPP" system throughout this report, is given in formula 1, to be compared with the corresponding general structure of the hormone-type broad-

1 Cf. Vol. 5 of this series, pp. 190–191; patent review suppl. Vols. 5 and 8, Sect. 5.7.3c