

**PHYTOTOXIC CROTONIC ACID FROM CARROT SEEDS  
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Plants are known to produce secondary metabolites that affect germination and growth of other plants. This is one of a variety of ways in which certain plant can reduce interspecies competition in their natural habitats. Some of these compounds may play an important role in chemical mediation of growth and development of natural plant communities. Over many years, various types of allelochemicals have been isolated and characterised from hundreds of plants and their organs. Such compounds might be considered as constituents of plant defence system and could be treated as a kind of chemical weapon. These chemicals are not specific only for toxic plants but they can be also finding in the tissues of common vegetables.

The results of our preliminary study have shown that the spectrum of weeds in carrot cultivars in the rural region of Opole is limited to 12 species from among 100 weeds commonly observed in this area. Our observations that carrot (*Daucus carota* L.) is accompanied by a limited number of weeds and on the other hand that too dense sowing of carrot seeds results in delay and inhibition of their germination could be affected by the action of specific allelochemicals. It was therefore of interest to assess the allelopathic potential of the water extracts of carrot seeds under laboratory conditions.

In presented work we show that water extracts from the carrot seed (*Daucus carota* L.) ver. Perfekcja exhibit strong plant growth inhibitory properties against cress, cucumber, onion and carrot in a dose-dependent manner. This property results from the action of low- and high-molecular components of the extract. Low-molecular component was identified by means of GC-MS and  $^1\text{H}$ ,  $^{13}\text{C}$  NMR as crotonic acid ((*E*)-2-butenic acid). Its presence was also confirmed in other late varieties of carrot. The determined strong herbicidal properties of crotonic acid and its high level in seeds suggest that it might play an important role in the allelopathic and autotoxic activity of carrot.

It is worth to notice that remaining extract, after the crotonic acid isolation, still exhibited strong allelopathic activity. This activity is attributed to a fraction probably containing most likely glycoproteins of molecular mass lower than 10 kDa.