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Research Highlight

CHROMOSOMAL ABERRATIONS INDUCED BY PESTICIDES

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Pesticides are chemicals which have been used to kill pests including weeds since the past few decades. Along with benefits, pesticides also have drawbacks, such as pesticides are not eco-friendly and have toxic effects on human health and crops. Pesticides inhibit the cell division and induce various chromosomal abnormalities and these chromosomal abnormalities are used by the scientists as a marker of genetic damage.

The term pesticide includes herbicides, insecticides, nematicides, rodenticides, bactericides and fungicides. Fungicides are used to control fungi and these chemicals are responsible for mitotic anomalies. Fungicides and their derivatives have been reported to be both carcinogenic and mutagenic therefore, in order to avoid serious consequences; a rigorous testing should be done in order to evaluate their cytotoxic or mutagenic activity before their release[1,2].

Accordingly, amistar (azoxystrobin 25% EC) and score (difenoconazole 25% EC) are broad spectrum, foliar, systemic fungicides, yet to be released to the farmers and planters in India by Syngenta India Limited, Mumbai.

Considering these facts, a new research was conducted for studying their non-target effects with respect to cytotoxicity at concentrations ranging from 0.44 - 2.200 µg (a.i.) mL^{-1}. For both the fungicides, manufacturer's recommended dose for foliar spray is 2.2 µg (a.i.) mL^{-1}.

For this purpose, root meristem of onion (*Allium cepa)* was used as a test material. Allium species are considered as ideal cytological materials because they also have the advantage of being available around the year and can be easily handled and cultivated. In this study, the cytological influence of tested fungicides on the root cells were analyzed on the basis of changes in mitotic index as well as other induced abnormalities[3].

It is found that the amount of chromosomal abnormalities possesses a direct relationship with the concentration of the active ingredients and treatment time. Moreover, presence of binucleate cells in the interphase point out that the fungicides restrains the cell plate formation. But, the fungicide treated root meristems can recover from the cytotoxic effects after being transferred to distilled water.

However, the rate of recovery was noted by amplified mitotic index and reduced incidence of cytological abnormalities and this recovery was highly distinct in Azoxystrobin treated roots as compared to those treated with Difenoconazole.

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