DETERMINATION OF GENOTOXIC EFFECT OF INSECTICIDE DELTAMETRINE WP 250

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Abstract

Micronucleus (MN) assay is an ideal monitoring system that uses aquatic organisms to assess the genotoxicity of water in the field and in the laboratory.

The aim of this study it was to determinated the genotoxic effect of insecticide deltametrine 250 WP through micronucleus in erythrocytes of golden fish (Carassius aureus), after in vitro treatment in aquarium for 8 days in 4 aquaria and 1 aquaria used as control. Frequency of micronuclei at treated fish it was higher compared with control group.

Key word: insecticide, deltametrine, micronucleus, erythrocyte, fish

Introduction

Various industrial and agricultural activities increase pollution, particularly in the aquatic environment, which is contaminated by various toxic chemicals from the discharge of waste waters and agricultural drainage(Isani, 2009). These are responsible for multiple effects at the organisms, including humans, affecting organ function, reproductive status, species survival, population size and ultimately biodiversity. Among these, carcinogenic and mutagenic compounds are the most problematic as their effect may exert a damage beyond that of individual and may be active through following generations. Epizootic neoplasm has been found in a variety of ectothermic species, such as shell fish, echinoderms, jawless fish and bony fish. Various investigations using fish for screening the clastogenic effects of xenobiotics indicate that these fish represent good experimental models for genotoxicity studies (Pantaleao et al., 2006).

Material and methods

Fish Carassius aureus were placed in five different aquaria, each one containing tap water(negative control) and four different aquaria containing different dilution of fungicide propineb-triadimenol: (0.02ml insecticide /l water, 0.03ml insecticide /l water, 0.04ml insecticide /l water, 0.05ml insecticide /l water ). The fish was cut in caudal region and smears of peripheral blood were made on grease free clean slides. For each fish prepare four slides. Slides were coded, for each fish. The smears are air-dried and fixed in absolute ethanol for 25 minute. The next day, the slides were stained in giemsa(diluted in distilled water in ratio 3:1 ) for 30 minutes (Schmid1975). The fish was cut in caudal region and smears of peripheral blood were made on grease free clean slides. For each fish prepare four slides. Slides were coded, for each fish. The smears are air-dried and fixed in absolute ethanol for 25 minute. The next day, the slides were stained in giemsa(diluted in distilled water in ratio 3:1 ) for 30 minutes (Schmid1975).

Results and discussion

The results of average number of micronuclei (per aquarium) in peripheral erythrocyte in fish species Carassius aureus treated for 8 days, are summarised at the table 1. According to investigation (Tab.1) in fishes treated in concentration 0.05 ml fungicide/ l water is proved high frequency, statistically significant, compared with control group of fish.
Also it was verified that frequency of micronuclei in peripheral erythrocyte of Carasius aureus, increase proportionality with increase of concentration of insecticide. Frequency of micronuclei at fish Carasius aureus in first aquarium with concentration 0.05 fungicide/ l water was about fivefold high compared with control fish. Frequency of MN in second(with concentration of insecticide 0.04 ml/l water) was about fourfold higher and threefold in third aquarium compared with control fish.

According to these results (tab.1) it can be conclude that C.aureus exposed in different concentration of insecticide deltametrine WP 250 is verified the high frequency of micronuclei in insecticide deltametrine concentration ratio 0.05 ml insecticid: 1l water(36.33MN), 0.04 ml insecticid:1l water ( 31.25MN), 0.03 ml insecticid:1l water and 0.02 ml insecticid:1l water (27.15 MN), which are statistically significant compared with controll group(7.65 MN).

Statistical analysis is done by statistical software SigmaStat version 3.4, 2004 year.

Tab.1. Average number of micronuclei( MN) in 2000 erythrocytes of peripheral blood of fish Carasius aureus after 8 days treatment in different dilution of insecticide deltametrine WP 250 / and statistical analysis between treated aquarium and control aquarium

<table>
<thead>
<tr>
<th>Average number of MN per aquarium</th>
<th>Significancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquarium-1: 0.05 fungicide/ l liter water</td>
<td>36.33</td>
</tr>
<tr>
<td>Aquarium -2: 0.04ml/l</td>
<td>31.25</td>
</tr>
<tr>
<td>Aquarium -3: 0.03ml/l</td>
<td>27.15</td>
</tr>
<tr>
<td>Aquarium -4: 0.02ml/l</td>
<td>21.47</td>
</tr>
<tr>
<td>Aquarium -5: cotroll group</td>
<td>7.65</td>
</tr>
</tbody>
</table>

Legend: s-significant Ns- not significant

Conclusion
Based on this investigation we can conclude that insecticide deltametrine WP 250 is genotoxic, as it were damage the chromosome of fish, seeing that chromosome are fragmented, and formed the small nucleic body called micronuclei.

The averge number of micronuclei it was higher, at treated fish, statistically significant compared with control group( P<0.001).

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References: