PHYTO-BIOLOGICAL TESTING OF SOME FLAVONOID COMPOUNDS OF VEGETAL ORIGIN
Note 1. PHYTO-BIOLOGICAL TESTING OF RUTOSIDE AND QUERCETOL

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Key words: rutoside, quercetol, cytogenetic effects

Abstract. The paper presents some aspects regarding the phyto-biological effects induced by treatments with rutoside and quercetol on *Triticum aestivum* L.

INTRODUCTION

The recent research area regards the reactive oxygen species (ROS) also named free radicals, responsible for a large range of degenerative processes that can lead to human disease progression. Excessive generation of ROS in biological systems include membrane lipids peroxidation, nucleic acids and carbohydrates oxidative damage. All these lead to important long- term dysfunctions and ageing. (Ohshima *et al., 1998*). There is a correlation between ROS level in human organism and health, which is why it is believed that most of human diseases are ROS determined. To cancer also belongs to this category. (Jovanovic *et al.,* 1997).

The enzymatic system involved in ROS inactivation, capable of preventing the oxidative damage, it is composed of three components: superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPO) (Van Acker *et al.,* 1997).

These oxidative processes can be controlled or reduced with exogenous antioxidants.

Recently, it has been identified a group of so-called “phytochemicals” active principles with free radical-scavenging activity. The most important are polyphenols and flavonoids which act against the peroxidative effect of ROS. Both groups protect the unsaturated fatty acids from peroxidative degradation or initiated by oxygen singlet and also inactivate the oxidative enzymatic systems (lipoxygenases, xanthine oxidases and mono oxidases) which lead to oxidative stress (Kähkönen *et al.,* 1999)

The two substances used in our experiments are rutoside and quercetol which belong to flavonoid class, principles of vegetal origin and with recognized antioxidative effects.

MATERIALS AND METHODS

In our experiments, we used seeds of *Triticum aestivum* L. (*Dropia* cultivar). Seeds were treated with rutoside and quercetol (Merck) in 0, 01% and 0, 1% concentrations, for 24 hours. The flavonoids were dissolved in distilled water at 80^0C.

The following parameters were analyzed: the frequency of ana-telophases in root meristems with chromosomal aberrations; caryopsis germination percent; root and stem length; the fresh and dried weight of roots and stems, respectively.

RESULTS AND DISCUSSION

We have analyzed the following experimental variants: 1. Control (24 h in distilled water); 2. R1 (24 h); 3. R2 (24 h); 4. CV1 (24 h); 5. CV2 (24 h).

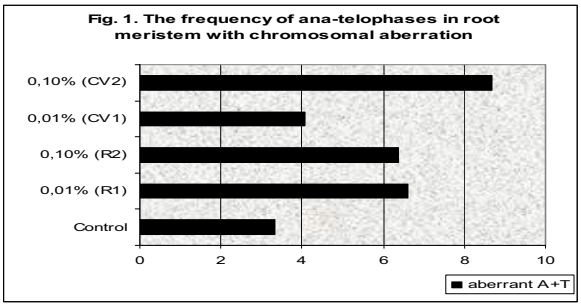
Table 1- Experimental variants

Variants	Experimental time
0,01% Rutoside - R1	24 h
0,1% Rutoside - R2	24 h
0,01% Quercetol - CV1	24 h
0,1% Quercetol - CV2	24 h
Control in distilled water	24 h

1. The frequency of ana-telophases in root meristems with chromosomal aberrations

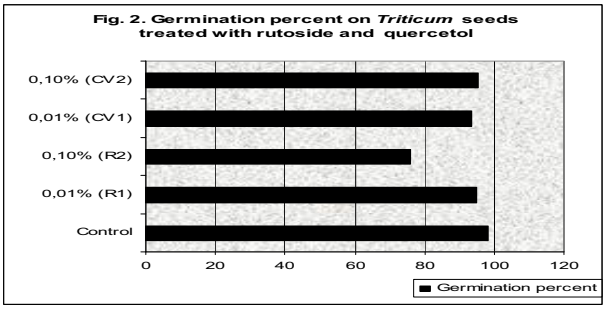
Rutoside and quercetol have a cytogenetic effect, especially at maximum concentration (0,1%), rutoside also at minimum concentration (0,01%): the number of abberant cells was double compared to control – 6,36 - 6,59% – or even higher (8,69% with CV2 instead of 3,33% in control) (fig. 1).

The higher rate of chromosomal aberrations frequency was noted in variant treated with quercetol (maximum concentration).



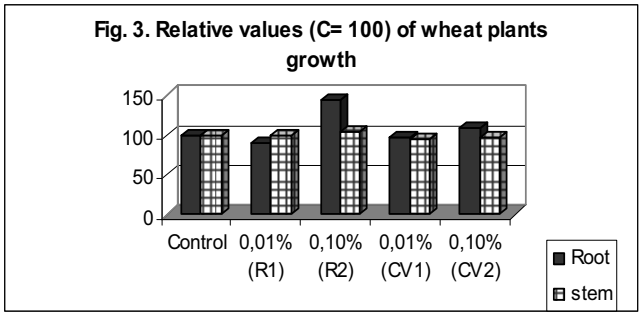
2. Caryopsis germination percent

In our experiments, rutoside and quercetol have inhibitory effects on seeds germination, but not very important: 93,33 - 95,33% germinated seeds compared to 98,33% in control (fig. 2); seed germination was profound alterated only for at the maximum concentration of rutoside.



3. Root and stem length

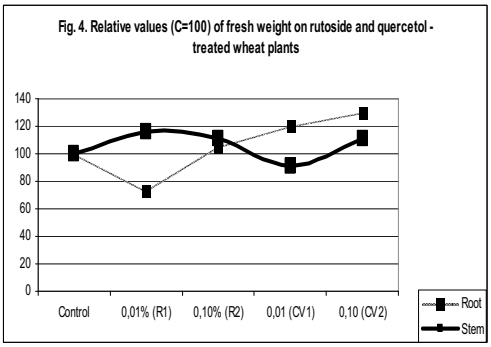
The growing procceses of wheat plants treated with flavonoids were slightly influenced. In case of treatment with 0.1% rutoside, the growth of roots was stimulated with 44% and in case of 0.1 % quercetol with 9%; concerning the stem growth we can observe that rutoside at maximum concentration has a stimulatory effect about 4%; quercetol both at maximum and minimum concentration lead to a growth reduction with 6 % and 2% respectevely, compared to control (fig. 3).

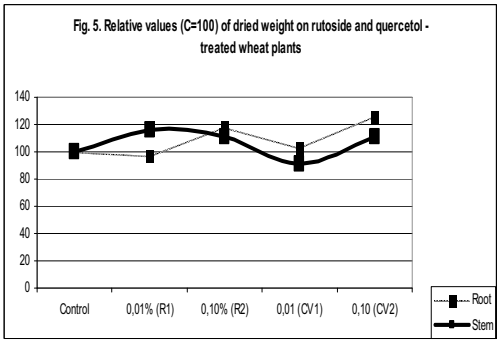


4. The fresh and dried weight of roots and stems

The fresh and dried weight of roots and stems -test results are presented in fig. 4 an 5.

In case of wheat plants treated with flavonoids, this sequence of variable data for fresh and dried weight, respectively, even if we compare it to control, does not provide us enough information about biomass accumulation, because the obtained values are not comparable, the number of plants in each variant being different.





CONCLUSIONS

The investigations on *Triticum aestivum* seeds and plants can be included in the research area regarding the screening and use of some vegetal products as therapeutics and supplements (extracts, specific chemical compounds). The issue can become very important in the large area of "mutagenesis and carcinogenesis" and „functional foods” respectively, concepts that are reconsidered and accepted by the scientific community.

Regarding the chromosomal aberrations in ana- telophasis of the root meristem on wheat we can observed that the studied flavonoids have a slightly cytogenetic effect - 4,07 - 8,69% aberrant ana - telophasis, compared to 3,33% in control.

The treatment with flavonoids has sligtly reduced the germination percent of wheat seeds in case of quercetol. But rutoside at maximum concentration (0.1%) has strongly inhibated the seeds germination.

The flavonoids used in our experiments have influenced the growth in a different way, depending on their chemical structure and the level of concentration. We have not observe distinct correlations between the above- mentioned parameters, but we can conclude that rutoside

has benefic effects on root and stm growth, compared to quercetol that slightly inhibated stem growth.

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Acknowledgments. We thank professor Ion I. Băra from the University of Iasi. We also thank Elvira Gille and Roxana Mihailescu for helpful discussions and the members of S.C "PLANTAVOREL S.A. and "STEJARUL" Research Center.

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