# On the influence of bioresonance exposure

# on the parameters of filling radish seeds with water molecules

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#### Introduction

The process of changing the characteristics of conditionally free and bound water on the seeds of "radish heat" (hereinafter radish) after their treatment with the bioresonance drug "BRP" was investigated in comparison with the control by the NMR method.

Abbreviations used:

BRP is a bioresonance preparation of 3-day germination of radish seeds, obtained by recording information processes of radish seed germination on a carrier (sugar crumbs).

NMR oneH - nuclear magnetic resonance of nuclei oneN.

## Materials and methods

In this work, the study was carried out on 14 separate radish seeds selected from the same batch of packaging, which were divided into two groups. One group of 7 seeds was the control. The second group of 7 seeds, immediately before soaking, was exposed to the PRP for 30 minutes using the "IMEDIS-BRT-A" apparatus with a gain of 7.0.

Recording of individual NMR spectra oneN individual radish seeds was carried out with an interval of 30 min. - 1 hour for 4 hours in the experimental and control groups.

After the first measurement, control and PDU- simultaneous soak treated seed pairs were carried out. but (control and experiment) arranged in two rows in a damp gauze cloth and placed in a Petri dish in a water bath at a temperature of 35 oWith a duration of 4 hours.

# Results and discussion

NMR spectra oneH individual radish seeds consist of two main signals: line-1 and line-2 with chemical shifts of 4.3 and 7.6 ppm, respectively (Fig. 1). The widths of lines 1 and 2 at half-height are  $\Delta v = 400-600$  Hz (for comparison, for ordinary water,  $\Delta v = 6-8$  Hz), which indicates a lower mobility of water molecules in the structure of radish seeds by two orders of magnitude in comparison with pure water. Before soaking the seeds, the relative integral intensities of lines 1 and 2 are 80–82% and 20–18%, respectively. After an hour of soaking, the intensity of line 1 increases slightly (by 5–10%), and line 2 increases to a much greater extent (by 100– 200%). Line 1 with chem. a shift of 4.3 ppm. can be attributed to water molecules bound to terminal OH- and

NH<sub>2</sub>- groups of bioorganic compounds of seed cells, and line 2 with chem. a shift of 7.6 ppm. can be attributed to water molecules not bound to OH- and NH<sub>2</sub> groups of bioorganic compounds (conditionally "free" water within cell structure of seeds). When soaking radish seeds, water molecules mainly occupy empty positions of "free" water, and only a small fraction of water molecules occupy positions that are partially left unfilled. "Bound" water. Thus, when radish seeds are soaked, the intensity of line 2 (the intensity of "free" water) generally increases.

After analyzing the changes in the integral intensities (I) lines 1 and 2 of radish seeds, treated and not treated with BRP using the "IMEDISBRT-A" apparatus, depending on the soaking time (t) the following patterns were obtained (Fig. 2):

1) The intensity of "bound" water (line 1) increases linearly with increasing soaking time in the interval t = 0-4 hours, and the growth rate of the seeds of the experimental group is higher than in the control group:

I = 88.1 + 4.52 t (experiment)

Line 1

I = 91.3 + 1.37 t (control).

2) The intensity of "free" water (line 2) first increases, then reaches "saturation" in the interval t = 0-4 hours and is described by a polynomial of the second degree, and the rate of growth of intensity during the first two hours of soaking in treated seeds is higher than in untreated ones:

I = 45.8 + 133 t - 23.3 t<sub>2</sub> (experiment)

Line 2

 $I = 60.9 + 98.7 t - 18.9 t_2$  (the control).



Rice. one.NMR spectra oneH (300.13 MHz) radish seed before soaking (lower spectrum) and after soaking for an hour (upper spectrum).



Rice. 2.Dependences of the integrated intensities (I) of line 2 (L2) of the NMR spectra oneH seeds from the time of soaking: radish seeds treated with BRP using the device "IMEDIS-BRT-A" (T) and control (K).

### Conclusions:

1) Treatment of radish seeds with BRP using the device "IMEDIS-BRT-A" increases the rate of filling seeds with water molecules in the first two hours of soaking, while mainly water molecules fill the positions of "free" water in the structure of seeds, while the positions of "bound" water are almost not filled during the soaking process, apparently due to the fact that these positions are already occupied by water molecules before soaking.

2) Further study of the development of the radish seed embryo will make it possible to change characteristics of development and germination of seeds for the purpose of their selection, and will also allow the development of a final experimental model for the study of NMR effects of bioresonance effects on living systems.

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