

## Reply to the letter to the Editor "Reduction of radiocesium load" by Sergei V. Jargin

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### Letter to the Editor:

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The aim of the author of this letter is not quite clear, as is the term supplementation in the title.

A number of studies published since the sixties, indicate that the oral intake of different pectins in animals and humans reduces the load of radio-nuclides, such as strontium and cesium. The greatest efforts were made by the team of Illin in the former Soviet Union for developing a protection in case of a nuclear conflict. However, although pectin from algae appeared to be the most effective, apple-pectin was chosen for compliance reasons, as its taste is preferred by children.

Evidence based medicine requires strict protocols to prove the efficacy or absence of efficacy of any compound or drug in humans. One paper published in Swiss Medical Weekly (SMW) by Nesterenko and co-workers in 2004, quoted by Jargin, is one of the best trials performed in this field: it was a randomised, placebo-controlled, double-blind trial, performed among children of the same age and sex who were distributed into two groups; those receiving apple-pectin tablets and those receiving similar placebo tablets which contained no pectin. These school children were living in radiocontaminated communities. In both groups of 30 and 28 children, the mean value of the radiocesium load was identical: 30.02 Bq/kg bodyweight in the placebo group; and 30.07 in the group receiving the pectin preparation. During their stay in the sanatorium, the food was identical for all children and free of radiocesium. All ethical rules were respected in the study. After three weeks, the cesium load, which was measured prior to the intake of the tablets during meals, was measured for a second time. The mean drop of the Cs-137 load was 62.6% in children receiving the pectin tablets, and 12.9% in children receiving only the Cs-137-free food, but placebo

tablets. The difference was not only highly significant ( $p < 0.01$ ) but also relevant: none of the children in the placebo group had a Cs-137 burden below 20 Bq/kg bodyweight (which is considered the limit for irreversible organ damage in children). All children receiving tablets with 16% apple pectin had values after the three-weeks intake below 20 Bq/kg bodyweight. The anthropogammameter used, also indicated values for potassium, which did not significantly change in the previous safety studies. The WHO which studies food additives considered, in the 1980s, that pectins were among the safest additives from a toxicology point of view: pectin could be taken by all age groups, inclusive of pregnancy, and for many years.

The pectin-concentration in apple varies from tree to tree. In juice, it is always extremely low as the main concentration is present in the core of apple which is most often not eaten by children. The dry core after pressing is dried, milled, and is used for the preparation of apple pectin. Apple-pectin from Belrad was studied by the Laboratory of the European Commission, in Ispra, Italy, and was accepted for the use of such tablets for reducing the Cs-137 load in children.

Other publications by Nesterenko and co-workers quoted by the author of the letter to the editor are not phase two trials, but field trials. The results show that the pectin preparation is also active in children with an average load of Cs-137 in their bodies, ten times higher than in the group tested in the sanatorium. It was again significantly active in reducing the mean load from 320 Bq/kg bodyweight down to 181 Bq/kg body weight, within one course of apple-pectin.

Several critiques expressed in the letter to the editor make no sense, especially the one indicating that elimination of Cs-137 is only effective when the food continues to be contaminated with Cs-137. This is clearly wrong; the principal reason for the efficacy in this case is due to the important biliary excretion of Cs-137, where it would be immediately reabsorbed: in the absence of pectin in the bowel, the elimination of Cs-137 is only 13.9% within three weeks, which would allow the calculation of the biological half-life of radiocesium in these children; (The biological half-life of radiocesium varies from 60 to 150 days, depending on the publications, and could be calculated from the findings of the group receiving placebo). The elimination of Cs-137

was nearly three times more rapid when apple-pectin was taken (as demonstrated by the above sanatorium trial). Different recommendations, as well as the final recommendation expressed in the letter have no justification at all.

Seven years ago, the Ministry of Health of the Russian Federation registered pectin from algae for the same reasons – elimination of radiocesium – and the Russian government insist on vegetal fibres contained in their powder. The vegetal fibres represent about 50% of the weight of the apple pectin preparation used by Nesterenko. Why should

the author of the letter contest the work of Nesterenko? Should he criticise his own Ministry of Health, which now approves a pectin-preparation for reducing the body load of radionuclides?

*V. B. Nesterenko, the author of the papers S. V. Jargin is referring to, deceased in 2008. Therefore the Swiss Medical Weekly editorial board decided to publish the following reply from Prof. A. Nidecker.*