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The effect of ionized water on germination, sprouting vigour and microbial contamination of wheat sprouts

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Interest in sprouts as a super food is growing rapidly due to their palatability and nutritional properties. The potential microbiological risks however, are challenging producers in finding innovative ways to ensure product's safety while keeping quality high. One of the ways to achieve this is to employ ionized water in sprout production process. To determine the influence of ionized water on germination, sprouting vigour and safety of sprouts, common (bread) wheat (*Triticum aestivum*) seeds were chosen to soak and sprout for three days in the highest concentrations (in the safe range for human consumption) of ionized alkaline water (pH 9), acid (pH 3.8) and silvered (pH 9 + 0.011 / 0.51 mg / l silver ions). Ionized alkaline water, compared with control (tap water), increased sprouting vigour of wheat in 13.25% while the general germination improved in 57%. Ionized acidic (pH 3.8) water, compared to control (tap, distilled water) and other experimental samples (ionized alkaline, silvered water, hydrogen peroxide (8%)) effectively reduced microbial contamination of seeds: coliform bacteria was inhibited through 2.08 logarithmic units (lu) and the Total Bacterial Count (TBC) decreased over 0.71 lu. Silvered water improved sprouting vigor in 12.5% and reduced microbial contamination, but had no statistically significant effect on improving their ability to germinate. Ionized alkaline water can be beneficial for germination, growth and irrigation of seeds, as well as ionized acidic water can play a role of an effective and safe disinfectant in sprouts production.



Figure 1: Coliform Count Plates: A-tap water (control), B-distilled water (control), C alkaline, D-acidic, E-silvered, F-8% concentration of hydrogen peroxide (currently approved disinfectant)

Recent Publications

1. Kaškonienė, Vilma, Stankevičius Mantas, Bimbraitė-Survilienė, Kristina Naujokaitytė Gintarė, Šernienė Loreta, Mulkytė Kristina, Malakauskas Mindaugas and Maruška Andrius (2017) Current state of purification, isolation and analysis of bacteriocins produced by lactic acid bacteria. *Applied Microbiology and Biotechnology* 10(4):1323-1335.
2. Kudirkienė Eglė, Bunevičienė Jurgita, Šernienė Loreta, Ramonaitė Sigita, Olsen John E and Malakauskas Mindaugas (2013) Importance of the producer on retail broiler meat product contamination with *Campylobacter spp.* *Journal of the Science of Food and Agriculture* 93(9):2293-2298.
3. Novoslavskij Aleksandr, Šernienė Loreta, Malakauskas Alvydas, Laukkanen-Ninios Riikka, Korkeala Hannu and Malakauskas Mindaugas (2013) Prevalence and genetic diversity of enteropathogenic *Yersinia spp.* in pigs at farms and slaughter in Lithuania. *Research in Veterinary Science* 94(2):209-213.
4. Šernienė Loreta, Stimbirys Artūras and Daunoras Gintaras (2013) Trends in monitoring residues of pharmacologically active group B substances in products of animal origin in Lithuania from 1999 to 2008. *Food Additives & Contaminants Part B* 6(3):187-195.
5. Kudirkienė Eglė, Cohn Marianne Thorup, Stabler Richard, Strong Philippa C R, Šernienė Loreta, Wren Brendan W, Nielsen Eva Møller, Malakauskas Mindaugas and Brøndsted Lone (2012) Phenotypic and genotypic characterizations of campylobacter jejuni Isolated from the broiler meat production process. *Current Microbiology* 65(4):398-406.

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Biography

Loreta Semiene was involved in different scientific projects in her carrier such as COST activity feed for health, investigating the effect of liquid whey on productivity and udder health parameters of dairy cows; EU funded projects milk production and processing at small dairy farms and the use of novel enzymes in the production of traditional and innovative dairy products at SMS dairy enterprises, developing and updating traditional dairy technologies and implementing new ones at small scale level which also involved dissemination of findings across the territory of Lithuania. At the moment she is leading a national project screening of new *L. lactis* bacteria producing bacteriocins and investigation of their applicability for food preservation, funded by the Research Council of Lithuania. She is one of international technical experts in EUREKA programme and by now has supervised more than 40 graduate students.

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