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Microflora of Oat and Rape Seeds Used for Germination

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Aim of the study: Nowadays seedlings germinated from seeds, grains, beans of cultural and wild-growing plant varieties find wide use in food industry, medicine, formulation of feed rations and fabrication of cosmetics Germinated grain-legume species are sources of proteins, vitamins, antioxidants, minerals and other bioactive substances characterized by high biological accessibility. However, germination environment promotes favorable conditions for propagation of microorganisms massively colonizing seed surface. As a consequence microbiological analysis of grain safety is the issue of special concern for seedling manufacturers. Aim of this study was to evaluate microbial parameters of oat and rape grain from cultivars selected in Belarus.

Materials and Methods: Microbial insemination of oat and rape seeds was estimated in accordance with National standards 10444.11, 10444.12, 30519, 31708, 32011. The titer of microorganisms from different groups was expressed as the number of colony-forming units in 1 g of substrate (CFU / g). Microbiological findings were compared with criteria set in Technological regulations of the Customs Alliance № 021/2011. The presented results are the mean values of 3 to 5 experiments conducted in triplicate.

Results: Microbiological investigation of oat grain has revealed that total number of mesophilic aerobic and facultative anaerobic species detected in this substrate equaled 0.8×10^3 CFU / g, lying below upper safety limit (5.0×10^4 CFU / g). In contrast, the tested rape seeds proved more heavily inseminated with the above – mentioned aerobic mesophiles and facultative anaerobes – 18.0×10^4 CFU / g). Insemination index in this case exceeded 3.6 times the normal value. The obtained data indicate that oat and rape seeds are not contaminated with coliform bacteria, pathogenic microorganisms, including salmonella, and mould fungi. Comparative examination of results evidences that microbiota of oat grain is represented by bacteria of 5 morphological types, whereas rape seeds are colonized by at least 6 bacterial species. Noteworthy that cultures synthesizing extracellular polysaccharides were detected on Sabouraud and Czapek media containing glucose and sucrose as carbon source, respectively. Summing up, the tested oat grain meets the established microbial safety standards. To raise efficiency of using this substrate on industrial scale it is proposed to carry out species identification of contaminating microflora.

Keywords: Oat, rape, microflora, contamination, seedlings.