Abstract

Dominant fungal microflora of three apple cultivars (Eliza, Rubin and Szara Reneta) originated from three Polish regions (Świętokrzyskie region, Małopolska region and Mazovian region) was analysed in the current study. The same analysis was carried out for Koksa Górska cultivar (Małopolska region), however, the research was carried out in two subsequent harvesting seasons. The latter stage was aimed to verify whether fruit microflora was dominated by *Aureobasidium pullulans* as in the case of three apple cultivars mentioned above. Then I tested if powdered biomass of *Arthrospira platensis* could inhibit the growth of *A. pullulans* strain (LW14) in apple drinks. That microorganism was the most potent exopolysaccharide producer obtained from Koksa Górska fruit. The experiments were carried out in model solutions (sterilised apple juice) and real solutions (unpasteurised apple juice). The experiments involved whole cyanobacterium biomass and its protein and/or polysaccharide fractions.

It seemed that geographic origin of fruit did not have significant impact on the composition of fungal microflora, while mycobiota varied among tested cultivars. I also observed significant qualitative differences in microflora among fruit collected in subsequent years. *Aureobasidium pullulans* (yeast-like fungi) dominated apple mycobiota in all tested cases. Moreover, the presence of mould belonging to *Penicillium*, *Cladosporium* or less frequently *Alternaria* and *Fusarium* genera was noted. It was demonstrated that WL agar applied in the research was very useful due to its differentiating properties. Mature colonies varied in colours and texture. On the other hand, the feasibility of that medium for the storage of active cultures was limited.

Moreover, it was reported that the sequencing of ribosomal DNA by Sanger method enabled fungal identification at the species level (most of tested cases). However, the analysis of amplicons obtained after PCR with ITS1 i ITS4 primers did not demonstrate diagnostical value. Phylogenetic analysis demonstrated strong heterogeneity among strains of the same species (*A. pullulans*) or genus (*Penicillium*). Probably polymorphisms present in 5.8S gene were responsible for that phenomenon.

Results of preliminary studies demonstrated that cyanobacterium biomass concentration 1.15% (w/v) effectively inhibited fungal growth in unpasteurised apple drink. Due to the fact

that fruit mycobiota was dominated by *A. pullulans*, I decided to verify if its growth could be inhibited by *A. platensis*. It was shown that cyanobacterium biomass inhibited growth of *A. pullulans* LW14 in sterilised apple drinks and this effect could be mainly assigned to the protein fraction of *A. platensis*. That phenomenon was also confirmed in real solutions since growth inhibition of LW14 was noted in experimental variants containing cyanobacterium biomass or its protein fraction. The same observation was made for lactic acid bacteria. Obtained results suggest that the addition of *A. platensis* biomass to the unpasteurised apple juice could effectively increase microbiological stability of the obtained apple drink.

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