Heatmap reveals level of microbial contamination and points out the impact of sector segregation in a fruit juice processing plant in Zona da Mata Mineira

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The importance of incorporating barriers to control food safety, especially, to prevent the spread of microbiological contamination, is recognized in the industrial scenario. In this context, one of the main routes of contamination by microorganisms is through air, which can contain bacteria, filamentous fungi and yeasts. Thus, structurally, one of the strategies adopted by the food industries is the segregation of sectors, which reflects on quality and also allows reducing risks associated with safety, economy and sustainability. Therefore, the objective of this work was to evaluate the level of air contamination, by different microorganisms and sectors of a juice processing plant, located in the Zona da Mata Mineira, Minas Gerais, Brazil. An air sampler (MAS-100) was used and the collection was performed during production, at different points in the sectors of the industrial environment. The equipment operated with a flow rate of 100 L per minute and was disinfected with ethanol between the different sampling points. The samples were collected at a height of 1.5 meters from the ground, at the same level as the workstations. Sterile Petri dishes containing non-selective (PCA) and selective (DRBC, VRB, BPA and YSG) media were used. Plates were incubated for a specific time and temperature, and after incubation, the number of colonies on each plate was counted and reported as CFU/m³. The level of microbial contamination was classified as <100 CFU/m³, 100 to 300 CFU/m³ and >300 CFU/m³. A total of 40 points were collected in the juice processing plant. The results confirmed the importance of sector segregation, due to the high levels of contamination found outside the industrial environment and also at sanitary barriers. In contrast, the areas where the product is handled had lower levels of microbiological contamination. It is known that airborne microorganisms are ubiquitous and are naturally part of almost all environments, but the adoption of measures contributes to the reduction of hazards and associated risks. Still, the heatmap reveals that, among the evaluated microorganisms, the majority, present in all sectors, were filamentous fungi and yeasts, indicating a concern, since these microorganisms can cause spoilage and, therefore, affect the quality of the food. Thus, interesting information was observed about microbial contamination of the air. Allied to this, it was possible to reinforce the importance that should be given to the creation of barriers, as a measure to minimize the entry of contaminants into operational areas and, consequently, increase safety and optimize quality control in the food industry.

Key words: **S**anitary barrier; Microbiological contamination of the air; Quality control; Food industry.

Heatmap revela nível de contaminação microbiana e aponta impacto da segregação setorial em fábrica de processamento de suco de frutas na Zona da Mata Mineira

A segurança dos alimentos é um desafio para os gestores das indústrias. Nesse sentido, estratégias têm sido adotadas a fim de controlar a qualidade, embasadas na criação de barreiras para possíveis fontes de contaminação. Sendo assim, com o objetivo de investigar o nível de contaminação microbiana do ar, este estudo revelou informações importantes que nos fazem discutir sobre a segregação dos setores de uma planta de processamento de sucos de frutas. Altos níveis de contaminação microbiana foram observados nas áreas externas e nas barreiras sanitárias comparado com as áreas de processamento. Portanto, reforçando a importância da adoção de medidas de controle de qualidade para aumentar a segurança do produto final.

Palavras-chave: Barreira sanitária; Contaminação microbiológica do ar; Controle de qualidade; Indústria de alimentos.

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