

ABSTRACT

Pediococcus acidilactici is a non-pathogenic probiotic bacteria that can improve gut health by adhering to intestinal cells and inhibiting pathogen adherence. To create an easy-to-use product, probiotics are often produced in powdered form using spray drying. However, this drying method can affect the probiotic's viability and functionality. This study examined the impact of spray drying inlet temperature on *P. acidilactici*'s ability to adhere and inhibit pathogen adherence. The hydrophobicity of the cells was measured before and after spray drying, found that spray-dried *P. acidilactici* maintained high hydrophobicity (96.58-98.92%). The study also evaluated the adherence rate of *P. acidilactici* to HT-29 cells before and after spray drying, showing a decrease in adherence rate by 37.68%, 30.38%, and 32.64% (SD120, SD150, SD170) after spray drying. Additionally, *P. acidilactici*'s ability to inhibit pathogen adherence, specifically *Listeria monocytogenes* and *Staphylococcus aureus*, was assessed by counting pathogen attachment to HT-29 cells in the presence of *P. acidilactici*. Without *P. acidilactici*, *S. aureus* exhibited a low adherence rate ($1.19 \pm 0.008\%$), while *L. monocytogenes* adherence rate was $14.34 \pm 0.033\%$. The presence of free-cell *P. acidilactici* significantly reduced *L. monocytogenes* adherence to $88.16 \pm 0.07\%$. However, after spray drying, *P. acidilactici* increased *L. monocytogenes* adherence (ranging from 46.19% to 10.47%) possibly due to the presence of wall material like gum arabic and whey protein isolate. The inlet temperature during the spray drying process did not affect the cell surface hydrophobicity of the *P. acidilactici*, significantly impacting adherence and pathogen inhibition. Further research is needed to identify the effect of wall material on adhesion and inhibit pathogen adherence.

Keywords: *Pediococcus acidilactici*, spray drying, adherence, pathogen adherence inhibition, cell surface hydrophobicity