P5.134

Comparison of the growth kinetics of Chryseobacterium pennae sp. nov., isolated from feather waste and Chryseobacterium carnigallinarum sp. nov., isolated from chicken portion

Lum Nde A., Hugo C., Steyn L., Charimba G.

Microbial food spoilage causes great loss in the poultry industry with about 25% of all poultry products produced globally being lost. Temperature plays a crucial role in the microbial growth and enzymatic production activities; hence microbial food spoilage. The effect of temperature on the growth of two novel strains of Chryseobacteria, strain 1_F178 (Chryseobacterium pennae sp. nov.) and 5_R23647 (carnigallinarum sp. nov.) isolated from poultry (feather waste and chicken portions respectively) was investigated. Chryseobacterium carnipullorum and Pseudomonas fluorescens (a major spoilage organism in the poultry industry) were used as reference strains. Growth-temperature studies were carried out in a temperature gradient incubator with temperatures ranging from 4°C to 47°C. A linear regression analysis using Arrhenius model was used to describe the linear relationship between maximum specific growth rates ($\mu_{\text{max}}$) at each temperature interval. The results showed P. fluorescens having the highest $\mu_{\text{max}}$ of 0.60 h$^{-1}$ at an optimum temperature of 30.6°C. C. carnipullorum had the highest $\mu_{\text{max}}$ (0.55 h$^{-1}$) for the Chryseobacteria at an optimum temperature of 32.5°C followed by strain 1_F178 (0.44 h$^{-1}$) and stain 5_R23647 (0.37 h$^{-1}$) at optimum temperatures of 31.5°C and 26.3°C respectively. Growth was observed at 4°C for all stains indicative of growth at refrigeration temperature with possibly food spoilage. The high growth rates of P. fluorescens confirm why they outgrow Chryseobacteria in spoilt poultry samples. The optimum temperature (≤ 37°C) for growth and enzyme production of the Chryseobacterium strains will play an important role in the feather degrading process which the poultry industry is facing. Chryseobacterium species produce keratinases which degrade keratin (main component of poultry feathers) thus capable of degrading poultry waste. This could replace the chemical degradation process for poultry waste which is not ecofriendly and energy dense.

Keywords: Chryseobacterium, Temperature, Growth, Poultry, Food spoilage