Lactic acid bacteria (LAB) produce a variety of compounds with antimicrobial activity. Bacteriocins have attracted great interests due to their antimicrobial effects on spoilage and pathogenic microorganisms and potential use as safe and natural biopreservatives. The objectives of our study were to isolate and characterize bacteriocinogenic LAB strains, and further explore their applications on fresh-cut produce. Different types of horticultural commodities were chosen to isolate LAB. The antimicrobial properties of cell-free supernatants from LAB isolates were determined using the agar diffusion bioassay with *Lactobacillus sakei* and *Listeria innocua* as indicator organisms. The presence of bacteriocins was indicated by inhibition zones following the neutralization of pH and elimination of H$_2$O$_2$, and further confirmed by the addition of proteolytic enzymes. The bacteriocin-producing LAB were identified using 16S rRNA gene sequencing. Molecular weight of bacteriocins was determined using SDS-PAGE technique. Antimicrobial effectiveness of LAB and bacteriocins were investigated against a range of bacteria and fungi including 6 bacteria and 3 fungi using agar diffusion bioassay and microtiter plate method, respectively. Results indicated that bacteriocins showed significant antimicrobial effects against *L. innocua* while acids and H$_2$O$_2$ had strong antimicrobial effects against other tested microorganisms. Challenge tests were conducted on fresh-cut vegetables inoculated with *L. innocua*. Results showed that bacteriocinogenic LAB significantly reduced *Listeria* sp. loads ($p=0.005$) during storage at 5°C. The addition of LAB also reduced the loads of yeasts and molds ($p=0.011$), *Pseudomonas* sp. ($p=0.01$) and total coliforms ($p=0.01$). LAB and bacteriocins have potential for use as biopreservatives and antimicrobial agents.