Title	Variability of Virus Attachment Patterns to Butterhead Lettuce
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Abstract

Enteric viruses are a major cause of foodborne illness in the United States. The objective of this study was to determine whether the isoelectric point (pl) of viruses such as Feline Calicivirus (FCV). Echovirus 11, and bacteriophages phiX174 and MS2 had any effect on their attachment to Butterhead lettuce. The adsorption of virus particles o the lettuce was variable. Bacteriophage MS2 was the only virus showing maximal attachment at its critical pH and was the only virus fitting the DLVO model of virus attachment. Echovirus 11 had the highest affinity to lettuce surface. Echovirus 11 exhibited reversible attachment above its pl, whereas below the pI, a strong adsorption was observed. At low salt concentrations, Echovirus adsorption was strongly influenced by its pI, indicating that at intermediate salt concentrations both electrostatic and hydrophobic forces are responsible for Echovirus adsorption. Adsorption of FCV was at its maximum above the viral pI. Bacteriophage phiX174 exhibited the most complex adsorption pattern with attachment occurring only at the pH extremes (pH 3.0 and pH 8.0). These results suggest the current model for virus adsorption to sediment does not adequately explain the attachment of virus to lettuce. Importantly, the results suggest that current sample processing methods to recover viruses from lettuce can differentially select for certain viral types and that a pathogenic human virus has a high affinity to lettuce.