

The statistics for aggregate residues found in tomatoes at three market stages shows that both fungicide and insecticide/miticide residues diminish as the product moves through the market channel. The average level of fungicides found in tomatoes at the distributor stage are less than a tenth of those from the grower stage. Insecticide residues at the distributor stage are reduced to almost one fourth the levels found at the grower stage. A complimentary trend, though not as strong, is apparent for the frequency of occurrence of tomatoes found with no detectable residues. T-tests in Table 4 confirm these inferences, with highly significant differences found between average residues at the grower and packer stages, and grower and distributor stages. The reduction in residues at the packing stage is most likely due to the washing and rinsing processes performed at this stage. The fact that tomatoes are optimally stored at relatively higher temperatures than strawberries (near 60 degrees Fahrenheit compared to slightly above freezing) could account for the continued decline in residue levels through the distribution stage.

Although the number of observations for strawberries at the packer and distributor market stages is small, pesticide residues, particularly fungicides, were found to occur at significantly higher levels at these downstream stages. Since most strawberries are packed into retail containers at harvest and subsequently refrigerated at temperatures slightly above freezing, there is apparently little opportunity for residues to be removed or break down in this fruit between harvest and retail merchandising. Survey results found no packers or distributors applying pesticides to strawberries or tomatoes. While it is not impossible that residues could concentrate in strawberries during packing and distribution, it is strongly suspected that if tests were conducted using larger more randomly selected samples, then this relationship would disappear.

Table 4. T-tests and P-values for Statistical Differences in Average Pesticide Residue Levels between Market Stages for Strawberries and Tomatoes (2 tailed test).¹

		Strawberries			Tomatoes		
		Fungicide residues	Insecticide residues	Pesticide residues	Fungicide residues	Insecticide residues	Pesticide residues
Grower -	Test	-1.0605	1.0622	-1.0836	-1.6282	-4.0049	-4.4537
Packer	P-value	0.2940	0.2938	0.2836	0.1072	0.0001	<0.0000
Packer -	Test	2.3896	-0.7904	2.8884	-1.2981	-0.9541	-1.4464
Distributor	P-value	0.0268	0.4402	0.0088	0.1967	0.3419	0.1507
Grower -	Test	1.7315	-0.5054	2.0675	-1.6659	-3.7776	-4.2520
Distributor	P-value	0.0895	0.6158	0.0438	0.0994	0.0003	0.0001

¹ A negative test value indicates that the average downstream market stage pesticide residue level was less than the upstream market stage (t = downstream - upstream).