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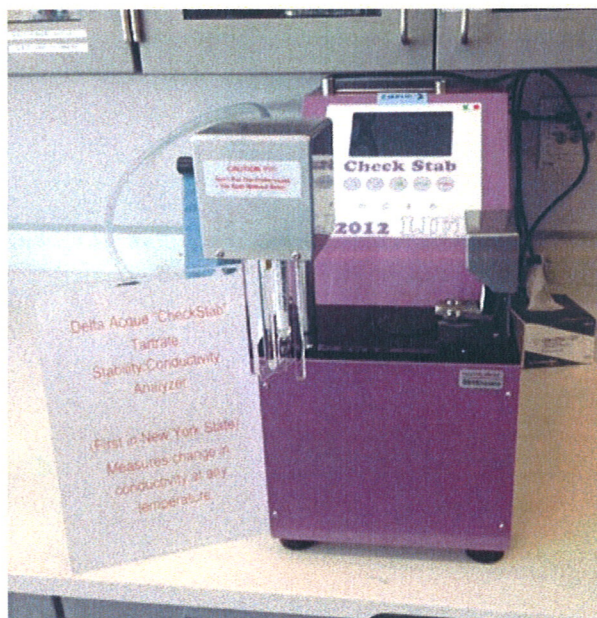
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New Equipment at Teaching Winery

How a specialized laboratory tool helps Cornell viticulture and enology students understand chemical wine stability at Cornell's new Teaching Winery

By Patricia Howe and Tim Martinson

*Editors note: As part of the recently-completed **Phase 1 renovation of Stocking Hall**, the College of Agriculture and Life Sciences now has a fully equipped teaching winery on campus in Ithaca, in addition to the research **Vinification and Brewing Laboratory** at the New York State Agricultural Experiment Station in Geneva. The teaching winery boasts a complete suite of small-scale winemaking tools, geared towards providing students with hands-on experience in addressing whatever winemaking issue or technique that they are likely to encounter in the 'real world'. I ran across winemaking lecturer **Patricia Howe** this spring, just as she had tried out a new machine called **Checkstab** that can provide on-the-spot measurements of tartrate stability, and she told me what a great teaching tool it turned out to be for her students. Here's her story: - Tim Martinson*



The CheckStab Tartrate stability/conductivity analyzer is one of many new pieces of equipment available in the new Teaching Winery at the newly-renovated Stocking Hall on Cornell's campus.

Tartrates and wine stability.

Cream of tartar is a harmless byproduct of the winemaking process and is even used in cooking, yet if it appears in bottles wine it can be easily confused with shards of glass and is therefore considered a wine fault. Predicting and controlling the appearance of these tartrate instabilities in winemaking requires an understanding of the chemistry of saturation along with an appreciation of the physics and kinetics of crystal formation and growth.

Understanding and testing potassium tartrate (cream of tartar) stability is one of the big challenges in modern winemaking, because many factors can affect whether or not crystals actually form in any given situation. For example, even when solutions are saturated and dissolved solutes should precipitate out, this chemistry can be overruled by physical limitations that impede crystal formation.

Checkstab Wine Stability

Tester. Teaching the complexity of this instability is a challenge, as

these are molecular levels reactions. But now, demonstrating that these seemingly obscure theoretical reactions which have real implications in winemaking is facilitated by a new piece of laboratory equipment at the Teaching Winery. The *Checkstab* wine stability testing unit, made by the Italian company Delta Acque and distributed by Alpine Scientific in Davis, CA combines a precisely controlled heated/chilled water bath, several monitoring thermometers, and a sensitive conductivity probe with a computer controlled recording ability.

Conductivity of a sample changes as ionic species are added or removed—if cream of tartar forms a solid and precipitates, the charged salt particles are no longer in solution and no longer conduct electricity. Thus, precipitation of microscopic crystals can be "observed" by following the conductivity levels—which is exactly what the CheckStab unit does.

Students measure conductivity. Now that we have this piece of equipment, students can observe real time changes in the conductivity of a wine sample as the cream of tartar precipitates out, and can manipulate the factors which affect this precipitation. This measurement of conductivity is an immediately observable effect of the more difficult to see molecular level events of crystal formation, growth, and precipitation. As I demonstrated this to my students, I could virtually see the light bulbs going off in their heads. This is what specialized analytical tools can do to illustrate concepts to students in a practical and immediate way.

Pat Howe is enology lecturer in the department of food science at Cornell, and proprietor of the smallest winery in Napa County, California.