Choosing the Right Preventive-Control Training in Food Manufacturing

Chuck Zona, Vice President and Dean, Hooke College of Applied Science and Cheryl Murley, Quality Manager, McCrone Associates

Students practice techniques during the Hooke College course *Microscopic Particle Handling: Particle Isolation, Manipulation, and Mounting.*

The passage of the Food Safety Modernization Act (FSMA) provided the U.S. Food and Drug Administration with a higher level of control over safety procedures utilized in food production facilities. The agency is now allowed to inspect facilities more frequently, and is permitted expanded access to records, granting legal authority to review food production facilities' safety records. FDA inspectors can request access to and evaluate all safety records they determine necessary to complete their investigation.

Food production facilities are required to implement a Hazard Analysis and Critical Control Points (HACCP) plan. Generally, a thorough HACCP plan will identify hazards, specify the steps put in place to prevent or minimize those hazards, identify monitoring procedures, record monitoring results and specify actions taken to correct problems that arise.

A persistent problem in the food industry is the presence of foreign material (e.g. metal wear products from machinery, latex glove fragments and production machinery oil) from ingredients, processing equipment and the environment. Physical contamination can occur at any point during production. To establish the correct preventive measures and develop a successful program that withstands FDA scrutiny, food quality employees need specialized materials analysis training that enables them to characterize and identify raw material and processing contaminants and their sources.

Training Helps Ensure Appropriate Preventive Controls

Training quality professionals to identify hazards can ensure preventive controls are appropriate for the risk and not over-engineered. For example, incompatible gasket materials commonly cause contamination in the food processing industry. Identifying the offending material so it can then be replaced with a more compatible material is a simple step, and an easier solution than installing filters or screens downstream and implementing routine QC checks of those controls. It is also more cost-effective.

To develop proficiency in the identification of food contaminants — specifically, contamination from extraneous materials and particles — food quality employees regularly attend microscopy courses at institutions such as Hooke College of Applied Sciences (HCAS).

Blended Learning is a Proven Training Methodology

HCAS has found that using a blended learning approach, which combines the strengths of classroom training and distance learning, gives students an advantage when learning to use specialized research-grade microscopes.

Blended learning offers opportunities to build knowledge beyond the capabilities of traditional classroom-based courses. In a 10-year study conducted by Babson Survey Research Group and the College Board, a leading barometer of online learning in the United States, nearly 70 percent of chief academic leaders said online learning is critical to their long-term strategy.

A study by the U.S. Department of Education’s Office of Planning, Evaluation and Policy Development, which focused mainly on post-secondary and adult learners, found that blended learning produced a larger advantage in learning outcome relative to purely face-to-face instruction than did only online instruction.

In training programs at HCAS, students begin by accessing pre-course online content consisting of 25- to 35-minute narrated modules and fully functional virtual microscopes. Because each student has access to a microscope during the in-class portion of the course that may differ from instruments used in their own workplace, these virtual microscopes allow students to explore and engage all of the microscope parts and simulate the instrument’s function. These interactive tools ensure each student arrives at the classroom equally prepared.

Training continues with hands-on, three-day or four-and-a-half day courses taught in a traditional classroom format. All instructors are subject matter experts who currently work in laboratories where they use the techniques they teach the students. Each student’s station is outfitted with a microscope and the laboratory supplies necessary to successfully complete a variety of tasks related to the lecture material presented. Students are encouraged to analyze samples brought from their workplace. In addition to lectures, classroom sessions include hands-on practice, laboratory exercises, identifications of unknowns and competency checks.

During training, students learn how to use a stereomicroscope or polarized light microscope to get a better view of contaminants for basic characterization purposes. Is the contaminant glass, metal or plastic? Does the material look corroded or thermally degraded? These initial evaluations narrow down the detective work needed and allow the investigator to collect the appropriate reference materials from the manufacturing process to compare against the unknown sample. A contamination source may be identified without definitively naming the components of the offending material. Basic characterization methods can help determine whether to evaluate a sample using further complex techniques, such as Fourier transform infrared spectroscopy (FTIR) to identify thermally degraded sugar or starch compounds, or scanning electron microscopy (SEM) to assess the type of metal.

Shifting Learned Skills from the Classroom to the Workplace

Strong support for students' growing skills is provided with post-course, online sessions. Soon after students return to their workplace, their instructor sends them unknown samples, giving students the chance to practice the skills learned during the course utilizing equipment available to them at their own facilities. After participating in this self-directed process, students login to access the instructor-led post-course session, a professional learning environment that fosters collaboration and encourages the exchange of ideas, such as alternative approaches and techniques used to identify the unknowns. These sessions allow participants with little experience to build confidence, while those with more experience can share insights with their less-experienced colleagues.

All Training Programs Are Not Equal

An important consideration, and one that will help document participation in a credible, quality training course, is whether or not the course has been certified by a recognized organization, such as the International Association for Continuing Education and Training (IACET). The requirements set forth by IACET create transparency in course structure, enabling learners to know who is teaching their course, the instructor's experience level, the type of equipment to be used in class and the expected student learning outcomes upon completion of each course. Organizations like HCAS offer CEUs for its programs that qualify under the American National Standards Institute ANSI/IACET Standard.

To ensure food quality professionals are well-trained, choose materials analysis courses that utilize a traditional educational setting augmented with an online component to be completed in the student's own laboratory with materials specific to their facility and industry. Ask questions to evaluate course quality: Consider the instructor's experience level, the age and type of equipment used in the classroom, learning resources available, and material expected to be learned upon course completion. Undergoing proper training will ensure you and your organization are prepared to face increased regulatory scrutiny.

Chuck Zona is vice president and the dean of Hooke College of Applied Science. Zona has an MS in forensic science from the University of Illinois at Chicago, and

has published papers on the analysis of gunshot residue, organic paint pigments, and the identification of white powders. He can be contacted at czona@hookecollege.com [1]*. Hooke College of Applied Sciences provides microscopy education and training to government and industry scientists and technicians worldwide, offering a wide variety of specialized short-courses in materials analysis. Topics covered include light and electron microscopy, sample preparation and microspectroscopy. The 40,000 square foot learning center at Hooke College of Applied Sciences contains classrooms and laboratories with state-of-the-art analytical instrumentation. For more information, please visit www.hookecollege.com.*

Cheryl Murley is a quality manager at McCrone Associates, the analytical division of The McCrone Group, Inc., Westmont, Ill. Please visit www.mccrone.com [2]*.*

Links:
[1] mailto:czona@hookecollege.com
[2] http://www.mccrone.com