Strong Workforce Program
Cross-Sector Industry Advisory: Agriculture, Water, Environmental Technologies & Business, and Entrepreneurship
Fermentation Sciences, Brewing & Viticulture Careers
Regional Workforce Advisory Meeting Proceedings
April 30, 2025
Virtual

Introduction

The Los Rios Community College District, in partnership with Valley Vision and in collaboration with Sierra College, Yuba Community College District, and Lake Tahoe Community College, invests in Strong Workforce funding to organize and convene Regional Advisories. The objectives of the Regional Advisories are to build strong relationships between employers, educators, and the workforce that:

- Provide timely information on skills gaps and workforce needs, informing partners on major industry trend information
- Improve the efficiency of the advisory process for educators and employers
- Reflect a regional view of workforce needs and assets
- Provide opportunities for more systemic, ongoing engagement, including workforce partners in key industry sectors

Regional Advisory meetings provide crucial insights for guiding investments and improvements in Career Education (CE) programs to meet the rising demand for middle-skill positions. This report summarizes the Spring 2025 Regional Advisory meeting, which focused on careers in the Agriculture, Business, and Entrepreneurship sectors, with an emphasis on fermentation sciences, brewing, and viticulture positions. It includes key findings and detailed minutes from the discussions.

Valley Vision supports a robust talent pipeline through our multiple 21st Century Workforce initiatives. We prepare our regional workforce for the future by addressing skills gaps, advancing research, aligning efforts, and strengthening systems. Valley Vision's workforce efforts are supported by the Sacramento Employment and Training Agency (SETA), the Golden Sierra Workforce Development Board (WDB), the North Central Counties Consortium, the Yolo Workforce Development Board, the Los Rios Community College District, and other organizations.

The Strong Workforce program offers career education opportunities to enhance social mobility and fuel regional economies with skilled workers.

Key Findings

- The Greater Sacramento region is strategically positioned as a hub for fermentation-based industries due to its fertile agricultural base, established industrial infrastructure, and top-tier educational institutions, notably UC Davis. Across a seven-county area, fermentation-related sectors currently support approximately 7,100 jobs with projected growth of 11% through 2028, translating into 800+ new positions.
- The food and beverage manufacturing sector remains one of the largest employers in the greater Sacramento region, but faces modest declines, whereas craft beverage production (breweries, wineries, distilleries) and high-growth fields such as pharmaceuticals and biotechnology R&D show strong upward trends.
- Key in-demand occupations include machine operators, quality control inspectors, technical sales reps, and roles requiring pharmaceutical and biotechnology knowledge, alongside foundational skills in teamwork and communication. Increasingly, software proficiency—especially in diagnostic and production management systems—is becoming essential across fermentation industries.
- Approximately half of the workforce is employed in production, food preparation, and transportation roles, with over 50% of jobs requiring middle-skill qualifications or higher.
- Recruiting for key behind-the-scenes roles such as equipment maintenance, cleaning, packaging, and production support is challenging due to low visibility and perceived lack of appeal. Regulatory restrictions, particularly age limits in the alcohol sector, tighten entry-level hiring pools and restrict younger workers' access to industry experience. Informal hiring in craft brewing and small-batch fermentation makes it difficult to collect accurate labor market data and plan the workforce.
- Fermentation businesses require multi-skilled employees able to handle diverse tasks. Essential training involves sensory analysis, off-flavor detection, aseptic processing, and equipment maintenance for quality and safety. Additionally, soft skills like problem-solving, communication, and teamwork are crucial for workforce resilience.
- Flexible, hands-on education via internships, apprenticeships, and modular classes caters to working adults. Bilingual, culturally responsive programs boost equity and access. Career ladders with stackable credentials aid skill development and retention amid industry changes. Regional labor market research clarifies emerging skills and certification needs. Structured internships and apprenticeships enhance practical training and recruitment. An inclusive, flexible education-to-employment pathway strengthens the talent pipeline, supporting industry growth and competitiveness.

Meeting Proceedings

Welcome and Introduction

Caitlin Blockus, Project Manager at Valley Vision, welcomed participants to the advisory convening focused on Fermentation Sciences, Brewing, and Viticulture Careers. Liz Kilkenny, 21st Century Workforce Coordinator at Valley Vision, followed with a brief introduction and shared the session's goals: to align workforce development efforts across industry and education in support of the Capital Region's growing food and beverage sector. The meeting featured keynote presentations, labor market insights, and an employer panel discussion, highlighting opportunities for collaboration and program alignment. Valley Vision acknowledged the support of the Los Rios Community College District, California Community Colleges, Centers of Excellence, and regional Workforce Development Boards.

Fermentation Basics

Dr. Jessica Coppola, Professor of Nutrition, Food Science, and Beer Brewing at Sacramento City College, delivered a presentation on the science and significance of fermentation—an ancient process that continues to shape modern industries and public health. With a PhD in Nutritional Biochemistry from UC Davis and a background in appetite and aging research, Dr. Coppola now leads coursework such as "Introduction to Beer and Brewing," bridging rigorous academic science with real-world application in one of California's fastest-growing sectors.

Opening with a global and historical lens, Dr. Coppola traced the roots of fermentation back thousands of years, highlighting its origins as a vital method for food preservation before the advent of refrigeration. She emphasized that fermentation is a key entry point for understanding the intersection of biology, chemistry, and technology.

Coppola's scientific overview clarified the cellular mechanics of fermentation, positioning it as a fundamental form of anaerobic energy production. She explained how, in the absence of oxygen, cells rapidly convert carbon-based substances like sugars into usable energy, producing a variety of byproducts that have commercial and nutritional value. These range from everyday foods such as yogurt and cheese to beverages like beer, wine, and vinegar, as well as lesser-known products like nail polish remover and rubbing alcohol, illustrating fermentation's broad utility across sectors.

Beyond its industrial relevance, Dr. Coppola stated that there is a growing recognition of fermentation's health benefits. She cited emerging research linking fermented foods to enhanced microbiome health, improved digestion, immune regulation, and even potential mental health impacts. In doing so, she positioned fermentation as not only a biological process but a tool for improving public well-being.

Throughout her presentation, Dr. Coppola emphasized the importance of integrating foundational scientific literacy into workforce pathways that support both innovation and economic growth. Her remarks reinforced the critical role of community colleges in equipping

students with cross-cutting knowledge and practical skills, preparing them to thrive in evolving fields such as food science, biotechnology, and craft brewing.

The Brewing Industry

Dr. Glenn Fox, an Anheuser-Busch Endowed Professor of Malting and Brewing Science at UC Davis, delivered a presentation on the evolving role of brewing in both community and workforce development. With a PhD in barley genetics and decades of research leadership, including at the Sierra Nevada Brewing Research Laboratory, Dr. Fox also serves as Academic Director for UC Davis's Continuing and Professional Education brewing programs. His remarks highlighted how brewing has long been a unifying cultural force while also adapting to meet modern economic and educational demands.

Framing his talk in both historical and contemporary contexts, Dr. Fox noted that beer has played a vital role in human civilization for over 10,000 years, often serving as a central element of communal celebration and social cohesion. He drew connections between this rich legacy and today's breweries, which continue to act as community hubs by hosting events and participating in local initiatives. He provided specific examples of industry collaboration in times of crisis, such as Sierra Nevada's Resilience IPA initiative, which supports wildfire recovery, and other breweries' engagement in disaster relief efforts in North Carolina and with Indigenous communities.

Dr. Fox then turned to current industry dynamics, noting that while the craft brewing sector has reached a point of stabilization after a period of rapid growth and volatility, California continues to lead the nation with more than 1,000 craft breweries. As consumer preferences shift, many breweries are diversifying into adjacent markets such as cider, kombucha, and other alternative beverages, demonstrating the sector's adaptability and entrepreneurial spirit.

In discussing the UC Davis brewing program, founded in 1958 and recognized as the oldest university-driven brewing program in the country.Dr. Fox highlighted its interdisciplinary strength. Students experience a thorough curriculum that integrates biochemistry, fermentation science, and recipe creation with practical problem-solving and operational expertise. He pointed out that careers in brewing require much more beyond technical fermentation skills; they encompass knowledge of equipment upkeep, sanitation procedures, production scheduling, and team leadership. He also mentioned that maintaining quality and consistency while adapting to market changes is vital for long-term success in the industry.

Throughout his remarks, Dr. Fox painted a portrait of brewing as both a deeply rooted cultural tradition and a dynamic, future-facing industry. His insights reinforced the need for integrated workforce strategies that prepare learners not only to succeed in today's brewing environment but also to lead innovation within it. In doing so, he illuminated the unique role of the brewing

sector as a bridge between science, community, and economic development, affirming its significance to both regional identity and workforce resilience.

Labor Market Information and Workforce Needs

Ebony Benzing, Director of the North/Far North Center of Excellence for Labor Market Research, delivered a labor market analysis focused on the industrial fermentation sector across the Greater Sacramento region. Drawing on the Centers of Excellence research methodology, Benzing and her team conducted a review of 16 distinct industries that utilize fermentation processes, covering a seven-county footprint that includes El Dorado; Nevada; Placer; Sacramento; Sutter; Yolo; and Yuba counties. Her research framed industrial fermentation as the intentional, large-scale use of microorganisms, such as bacteria, yeast, or fungi, to produce a wide range of commercial products. These applications extend far beyond traditional food preservation, encompassing diverse sectors such as food and beverage production, pharmaceuticals and vaccines, biofuels, bioplastics, chemicals, and industrial enzymes.

Benzing emphasized that the Capital Region holds key strategic advantages, positioning it as a strong contender for growth in these emerging bio-based industries. These include the region's fertile agricultural land, existing industrial infrastructure, and three major public higher education systems, with UC Davis standing out as a global leader in fermentation and biotechnology research. Together, these assets create a favorable environment for innovation, production, and workforce development in fermentation-based sectors.

Her analysis broke the industry into five key segments. The largest food and beverage manufacturing sector supports approximately 2,600 jobs in the region, although this sector has seen a modest decline in recent years. It includes activities such as fruit and vegetable canning, dairy product manufacturing, and commercial baking, with regional employers like Viet Kieu Sauce, Kikkoman Foods, and Pepsi Beverages playing a significant role (Figure 1.1). The craft beverage segment—encompassing breweries, wineries, and distilleries—represents another major component, employing 2,100 workers across 88 breweries, 137 wineries, and 13 distilleries. This sector is on a strong upward trajectory, with projected growth of 18% by 2028 (Figure 1.2).

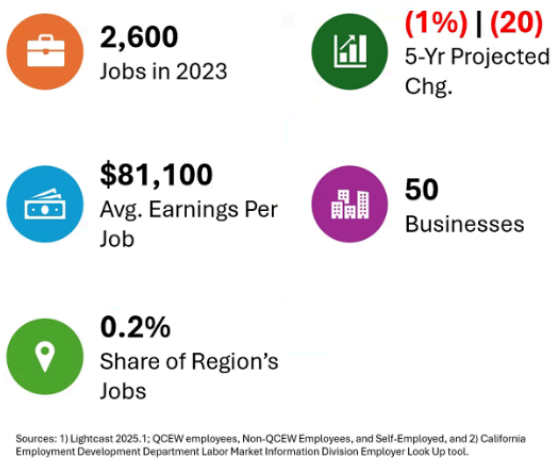

Figure 1.1 Fermented Foods and Beverages

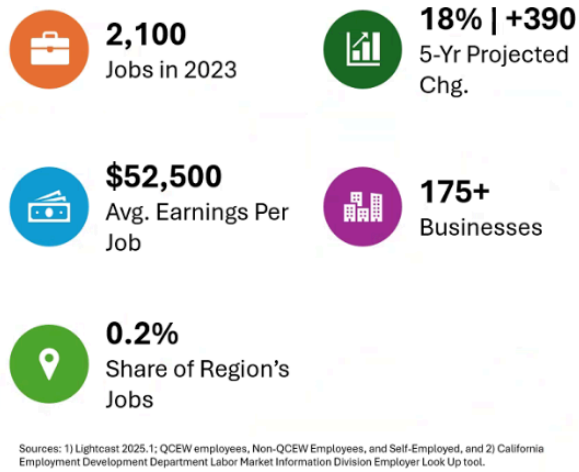

Figure 1.2 Breweries, Distilleries, and Wineries

Other high-growth areas include biofuels manufacturing, which accounts for approximately 700 jobs and includes ethanol production used as industrial feedstock. Pharmaceutical manufacturing, responsible for producing vaccines, antibiotics, and insulin, employs roughly 930 workers and is expected to grow by 17% (Figure 1.3). Additionally, biotechnology research and development, driven by companies like Gemini Bio, Orca Bio, and BioConsortia, represents one of the most promising areas, with 1,200 jobs and projected growth of 17%.

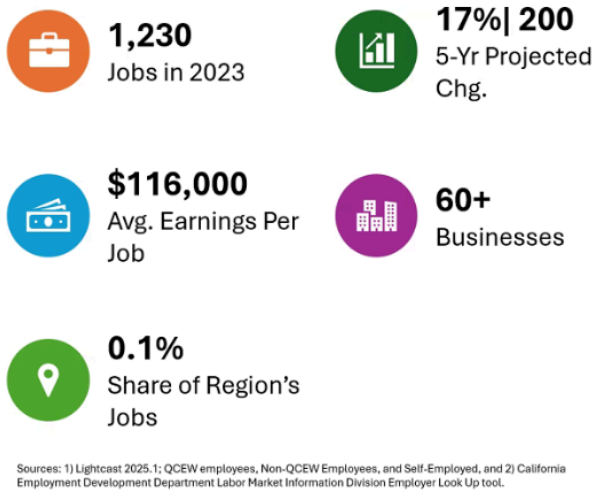

Figure 1.3 Biotechnology Research & Development

Altogether, these sectors account for approximately 7,100 jobs across the Capital Region, with projected job growth of 11% by 2028—translating to more than 800 new positions. Average annual earnings for these roles are estimated at $87,800, highlighting the economic value of this industry cluster (Figure 1.4). Benzing noted that approximately 50% of the workforce is employed in production, food preparation, and transportation-related occupations, while over

half of the jobs require middle-skill qualifications or higher. This mix creates opportunities for a wide range of job seekers, from those entering the field through short-term training programs to those pursuing advanced degrees in biological sciences or engineering.

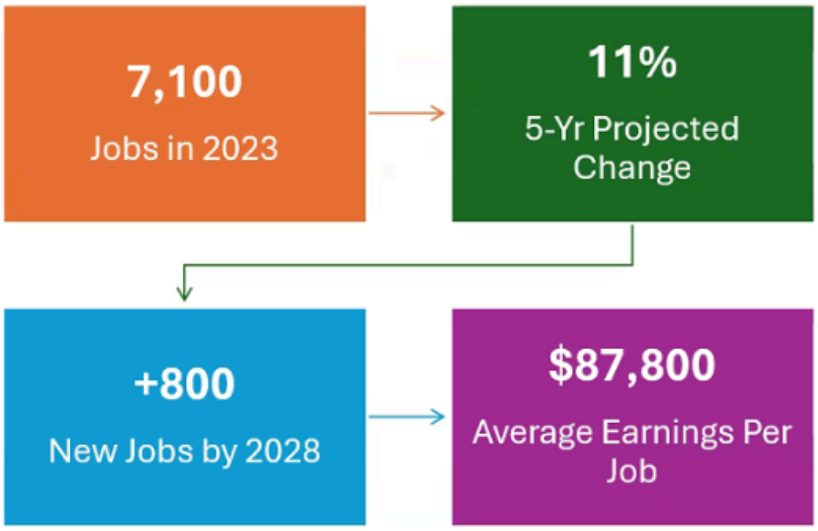

Figure 1.4 Greater Sacramento 5-Year Projected Change

Benzing also spotlighted the specific occupations in demand, including separating and filtering machine operators, quality control inspectors, and technical sales representatives (Figure 1.5). Employers are seeking a combination of specialized skills, such as knowledge in pharmaceuticals and biotechnology, alongside foundational competencies in teamwork, communication, and problem-solving. Software proficiency, particularly in diagnostic and production systems, is increasingly important across all sectors.

Career Education Targets & Industry Specific

Occupation	2023 Jobs in Sector	Median Hourly Earnings
Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	285	$24.74
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	165	$33.53
First-Line Supervisors of Production and Operating Workers	126	$35.49
Inspectors, Testers, Sorters, Samplers, and Weighers	104	$23.26
Chemical Equipment Operators and Tenders	66	$23.12

STEM-Focused

Occupation	2023 Jobs in Sector	Median Hourly Earnings
Life, Physical, and Social Science Technicians, All Other	45	$30.41
Biological Technicians	38	$24.56
Chemical Technicians	36	$27.30
Food Science Technicians	21	$27.36
Clinical Laboratory Technologists and Technicians	13	$36.64

Sources: 1) Lightcast 2025.1; QCEW employees, Non-QCEW Employees, and Self-Employed, and 2) COE SOC to Skill Level Crosswalk.

Figure 1.5 Key Middle Skill Occupations

Benzing's analysis also highlighted a diverse set of in-demand skills across the industrial fermentation sector, reflecting the complexity and interdisciplinary nature of the work, as shown in Figure 1.6. Specialized technical skills,particularly in pharmaceutical manufacturing, biotechnology, and fermentation science,are essential, with employers seeking candidates who understand microbial processes, quality control protocols, and the principles of sterile production environments. Software skills are increasingly critical, especially familiarity with manufacturing systems, laboratory information management systems (LIMS), and diagnostic tools used in biotech and pharmaceutical settings. In addition to these technical competencies, employers consistently emphasized the importance of common employability skills such as problem-solving, communication, teamwork, and adaptability, traits that are especially valued in fast-paced and regulated production environments. The convergence of these skill sets highlights the need for both foundational training and upskilling opportunities that integrate technical knowledge with soft skills, preparing workers for a diverse range of roles within the fermentation economy.

Specialized	
Pharmaceuticals	28%
Marketing	23%
Project Management	14%
Selling Techniques	14%
Biotechnology	12%
Business Operations	10%
Medical Devices	10%
Merchandising	9%
Biology	9%
Clinical Trials	9%

Common/Soft/Employability	
Communication	46%
Sales	42%
Management	38%
Leadership	32%
Customer Service	25%
Research	24%
Operations	22%
Problem Solving	20%
Planning	19%
Telecommuting	17%

Software	
Microsoft Excel	16%
Microsoft Office	13%
Microsoft PowerPoint	13%
SAP Applications	4%
Microsoft Outlook	4%
Microsoft Word	3%
Microsoft Access	2%
R (Programming Language)	2%
Salesforce	2%
Dashboard	2%

CENTER OF EXCELLENCE FOR LABOR MARKET RESEARCH

Figure 1.6 Regional Fermentation Science's Most Desired Skills

Educational institutions in the region are already making significant contributions to the pipeline. Community colleges award an average of 38 certificates annually in relevant programs, alongside nearly 400 associate degrees, 110 associate transfer degrees, and more than 375 bachelor's and graduate degrees combined (Figure 1.7). However, Benzing noted that more targeted programming may be needed to fully align with emerging industry needs, especially as the pace of innovation accelerates.

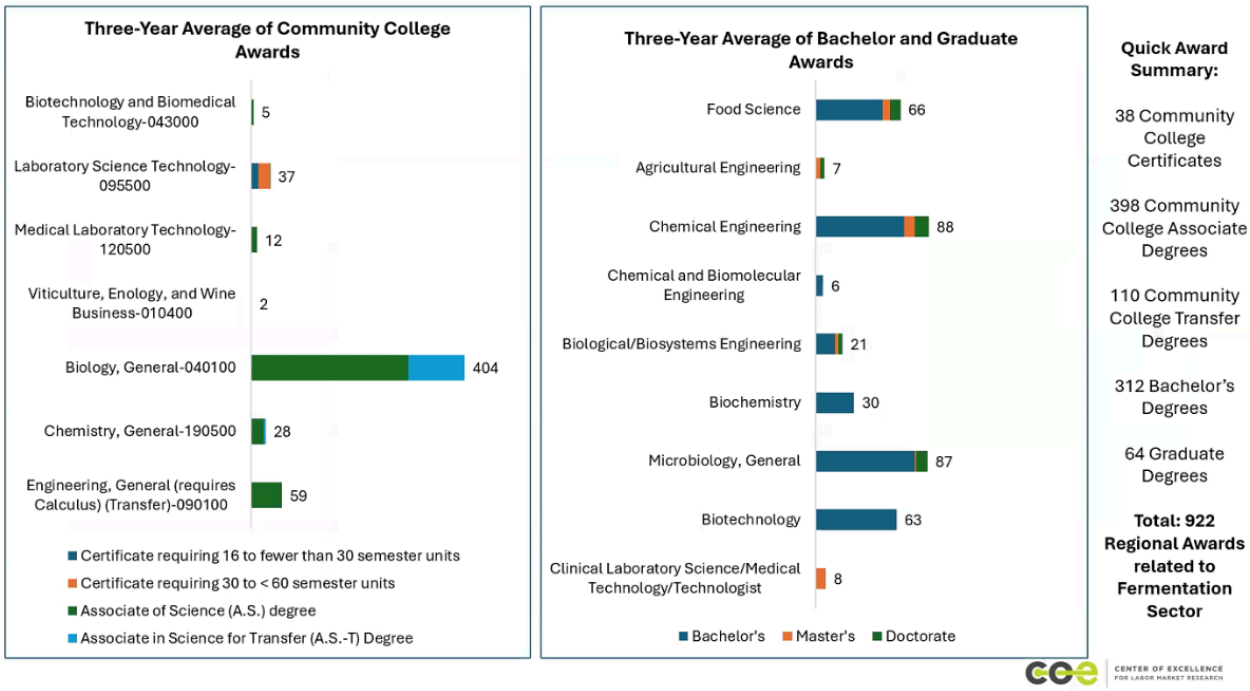

Figure 1.7 Regional Education System Awards

Despite the promising outlook, Benzing also addressed important limitations in the data. In industries such as craft brewing and small-batch fermentation, hiring often occurs through informal networks rather than traditional job postings, making demand harder to quantify. Additionally, job titles in the fermentation economy are not always clearly labeled or standardized, posing challenges for accurate labor market analysis.

To address these gaps, Benzing recommended conducting a comprehensive, region-specific labor market profile focused on biotechnology and fermentation-related industries. This would involve deeper qualitative research, including employer surveys and focus groups, to better understand the specific skills, certifications, and experience levels required across sectors. She also emphasized the importance of ongoing collaboration between educators, industry leaders, and workforce boards to ensure that training pathways remain agile, inclusive, and aligned with current labor market demands.

Panel Discussion

During the panel discussion, employers representing key segments of the Capital Region's fermentation economy,including wine, craft beer, and alternative protein production, shared insights into their businesses, workforce needs, and the challenges they face in sustaining growth. Speakers highlighted the evolving technical and educational demands of these industries, emphasizing the need for a workforce that is both scientifically grounded and practically trained. Their collective perspectives painted a clear picture: success in fermentation

careers requires a blend of traditional agricultural knowledge, cutting-edge technological skills, and adaptability to wear many hats in a small business environment.

The panel included:

- David Ogilvie, Owner, Ogilvie Merwin Vintners
- Raef Porter, Co-Owner, Bike Dog Brewing Company
- Justin Boeger, Owner and Winemaker, Boeger Winery
- Jacqueline Samson, Process Development Scientist, Better Meat Co.

Liz Kilkenny, 21st Century Workforce Project Manager at Valley Vision, moderated the panel.

Workforce Challenges and Hiring Priorities

One of the most prominent challenges highlighted by the panel centered on recruiting skilled workers for vital, yet frequently overlooked, roles within the fermentation sector. These positions—such as equipment maintenance, cleaning, packaging, and production support—are foundational to smooth operations but often struggle to attract candidates due to their perceived lack of glamour or visibility. Panelists emphasized the difficulty of filling these essential roles despite their critical importance, noting that finding employees who are willing to start in more physical, behind-the-scenes positions can be difficult.

The employer panel agreed that flexibility and adaptability are crucial traits for employees in small and mid-sized fermentation businesses, where the workforce must often juggle multiple responsibilities. David Ogilvie described how employees may shift from cleaning tasks one day to operating bottling lines the next, illustrating the dynamic and varied nature of the work environment. This need for versatility extends beyond technical ability; it encompasses a mindset open to continuous learning and collaboration. Formal education, while valued, is often secondary to qualities such as motivation, problem-solving skills, and effective communication. The consensus was clear: those who thrive are individuals eager to wear many hats and contribute to a team-oriented culture.

Additionally, the panel discussed regulatory hurdles that further complicate recruitment efforts, especially regarding age restrictions in alcohol-related industries. Federal and state laws prohibit individuals under 21 from participating in certain roles at breweries and wineries, effectively narrowing the pool of entry-level talent and limiting opportunities for younger workers to gain experience. This regulatory landscape creates a bottleneck in workforce development, making it more difficult for recent high school graduates and younger students to enter the fermentation industry pipeline. Addressing these challenges will require creative strategies that strike a balance between compliance and the need to build a robust and diverse talent pipeline for the future.

Valued Skills and Training Needs

A central focus of the panel discussion was the critical importance of developing and mastering specialized skills within the fermentation industry. Panelists emphasized that technical competencies, such as sensory analysis and off-flavor identification, are essential for ensuring product quality and consistency. Employers highlighted the need for employees who can not only detect subtle flavor nuances but also interpret statistical data from sensory evaluations to inform production decisions. This blend of scientific knowledge and practical application requires a nuanced understanding of fermentation science that extends beyond basic operational tasks.

Furthermore, the panel emphasized that equipment maintenance and aseptic processing techniques are essential skills often overlooked in traditional training programs. These technical capabilities directly impact operational efficiency and product safety, especially in environments where contamination risks are high. They stressed that employees must be adept at troubleshooting mechanical systems and maintaining complex machinery, noting that their success depends on employees who can quickly identify and resolve equipment issues before they escalate. This need for technical proficiency points to a broader industry trend where workers must wear multiple hats and adapt fluidly across roles.

Soft skills and cross-training were also highlighted as critical components for workforce resilience in the fermentation sector. The panelists agreed that employees with strong motivation, problem-solving abilities, and adaptability often become the most valuable assets, especially in small to mid-sized companies where staff must navigate diverse responsibilities. Jacqueline Samson noted that many competencies are developed on the job, making continuous learning and flexibility paramount. This underscores the importance of educational programs that integrate hands-on experience with theoretical knowledge, preparing workers to meet the evolving demands of fermentation industries effectively.

Education and Workforce Development Recommendations

A key area of consensus among panelists was the pressing need for more responsive and practical education pathways tailored to the fermentation industry's evolving workforce demands. Panelists underscored the importance of developing flexible certificate programs that integrate both foundational theory and applied skills. These programs should be designed to accommodate diverse learner schedules by offering evening classes and modular coursework, making them accessible to working adults and career changers eager to upskill or transition into fermentation careers.

Equally important is the emphasis on hands-on, experiential learning components within these educational offerings. The panel agreed that practical labs, internships, and apprenticeships are indispensable for bridging the gap between classroom knowledge and real-world industry challenges. By providing students with direct exposure to fermentation processes, equipment

maintenance, sensory evaluation, and aseptic techniques, these opportunities foster technical proficiency and confidence. Several panelists highlighted the value of workplace partnerships to create structured internship programs that not only enhance learning but also serve as pipelines for recruiting qualified talent. This approach aligns with a sector-partnership model that encourages collaboration between educators and employers to ensure curricula remain current with technological advancements and operational realities.

Another critical dimension discussed was the need for bilingual education options and continuing education pathways to support workforce diversity and retention. Panelists stressed that offering Spanish-language courses and culturally responsive training materials can significantly expand access for underrepresented groups, strengthening the talent pool while addressing equity considerations. Moreover, the panel encouraged the development of clear career ladders and stackable credentials that allow workers to progressively build skills and advance within the industry. This lifelong learning framework supports employee growth and adaptability in a sector where technical innovations and regulatory requirements are constantly shifting. Collectively, the panel's insights highlight that cultivating a skilled fermentation workforce requires education systems that are practical, inclusive, and closely integrated with industry needs.

Conclusion

At the conclusion of the advisory, faculty and employers were encouraged to continue fostering collaboration to strengthen the pipeline into careers within the region's Fermentation Sciences, Brewing, and Viticulture industries, and ensure that graduates are well-prepared to enter the workforce.

Please click here to view the detailed event materials and access a video recording. You can also access comprehensive labor market data on the Fermentation Sciences, Brewing, and Viticulture sectors compiled by the Center of Excellence for the Greater Sacramento region here. Additionally, if you're interested in staying updated on the latest news, insights, and opportunities in workforce development, you can sign up for Valley Vision's newsletter here. For more information about the report and labor market data provided, please contact:

- Liz Kilkenny, Workforce Project Coordinator, Valley Vision, liz.kilkenny@valleyvision.org
- Caitlin Blockus, Workforce Project Manager, Valley Vision, caitlin.blockus@valleyvision.org
- Ebony J. Benzing, Director, North (Greater Sacramento) Center of Excellence for Labor Market Research, Ebony.Benzing@losrios.edu