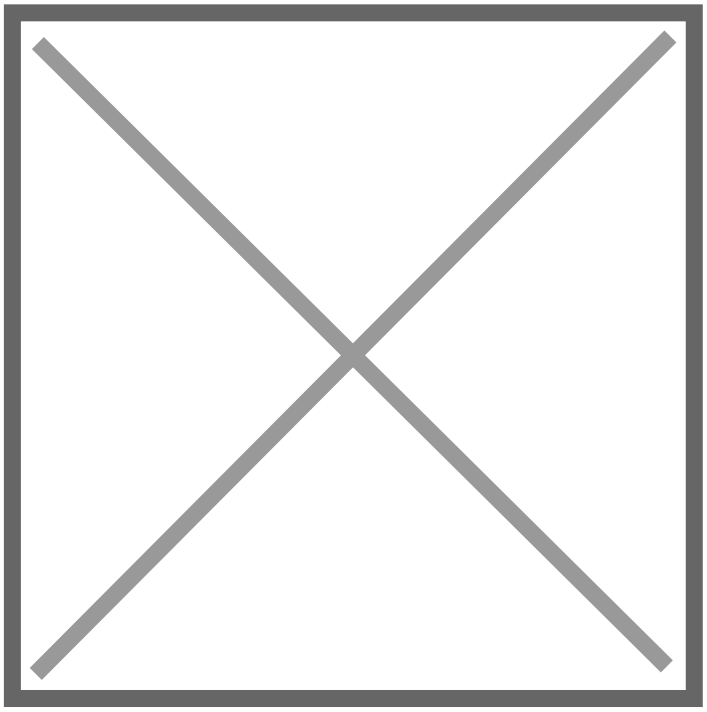
Role of Mancozeb in safeguarding grapes & global food security

06 November 2025 | News

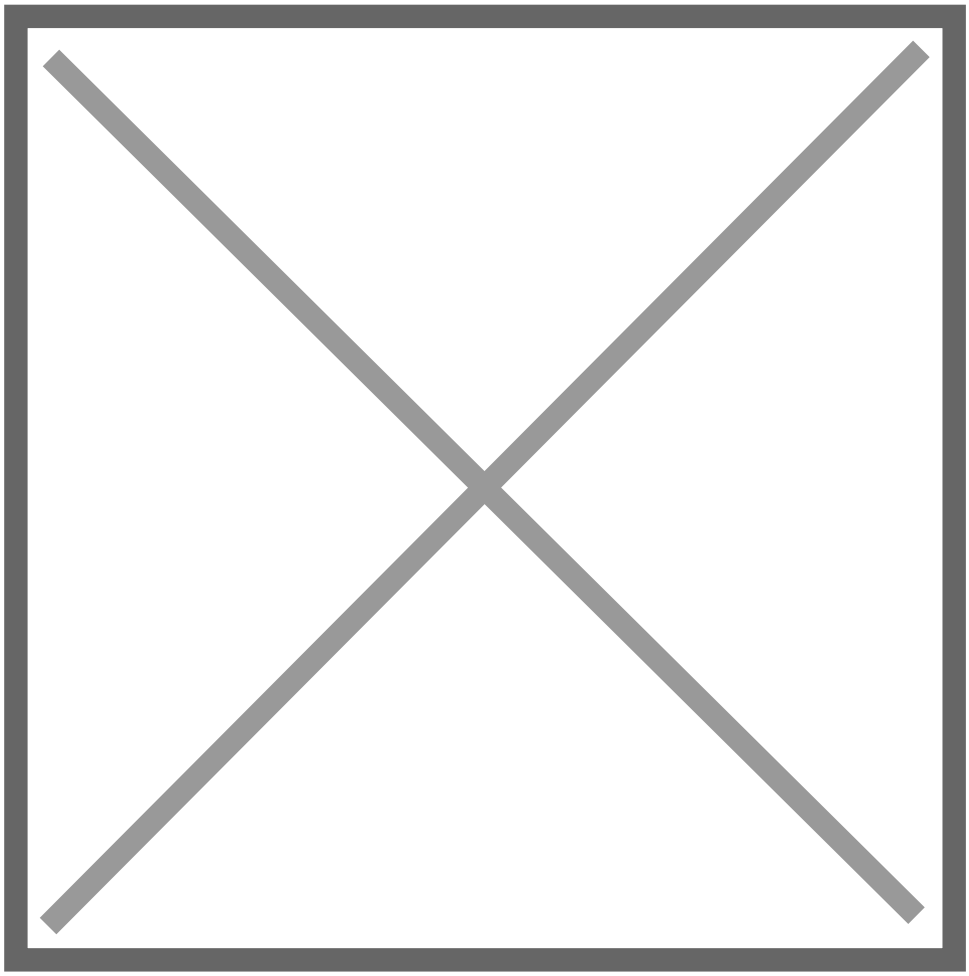
**The agriculture sector, known for its high-value fruits and significant export potential, is facing a convergence of agronomic, economic, and regulatory pressures. On October 13, a distinguished panel of scientists, industry leaders, and regulatory experts convened virtually to discuss the multifaceted role of Mancozeb in sustainable agriculture, in Agrospectrum webinar titled - The Future of Mancozeb: Science, Stewardship, and Global Food Security. The webinar examined the fungicideâ??s scientific attributes, its integration into disease management programs, regulatory trends, and its broader implications for farm profitability and food security. **



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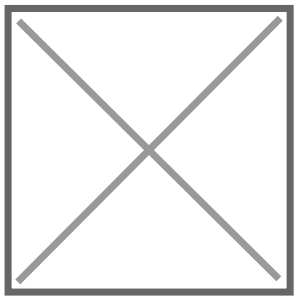
The virtually held discussions underscored that fungicide stewardship is no longer merely a technical matter; it is intricately linked to growersâ?? livelihoods, market access, and global food stability.

Â Economic Lessons from Disease Modeling



The session commenced with a presentation by Dr Kaushik Banerjee, FRSC, FNAAS, Director of ICAR-NRC for Grapes and Honorary Professor at Queen's University Belfast and the University of Laval, Canada. Dr Banerjee framed the discussion by highlighting the economic and systemic impacts of grape disease outbreaks.

Using advanced agronomic modeling, he demonstrated that fungal infections, particularly under high-pressure disease scenarios, can trigger cascading effects on farm profitability, regional supply chains, and even international markets. His analysis emphasised that targeted fungicide programs, including those employing Mancozeb, are not merely preventive measures at the field level but essential tools for stabilising grower income and maintaining global food security.

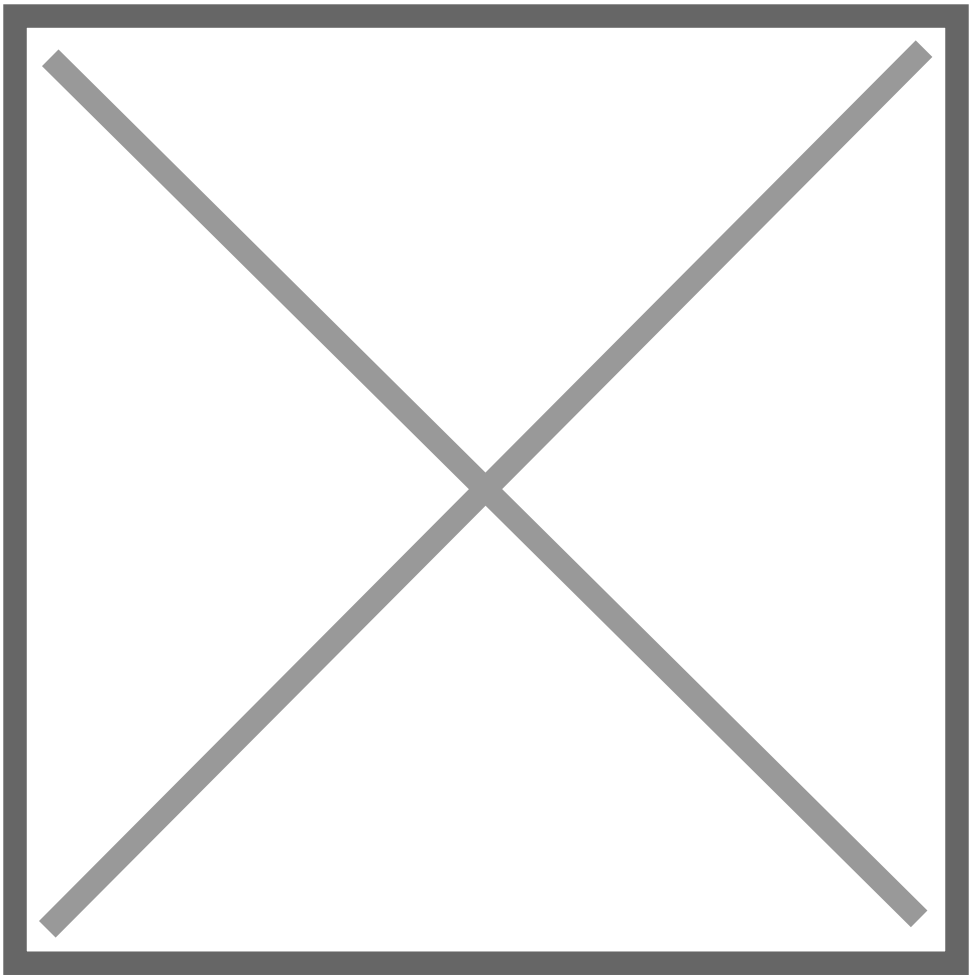


"Every outbreak of grape disease is not just a threat to individual farmsâ??it sends shockwaves through regional supply chains, export markets, and farmer livelihoods. Strategic fungicide programs, including judicious use of Mancozeb, are critical investments. Timely, science-driven interventions safeguard yields, stabilize income, and ensure that agriculture continues to feed both people and economies sustainably."

â?? Dr Kaushik Banerjee, FRSC, FNAAS, Director of ICAR-NRC for Grapes and Honorary Professor at Queen's University Belfast and the University of Laval, Canada

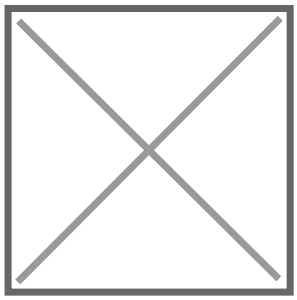
Dr Banerjee illustrated that under certain high-incidence conditions, the absence of an effective fungicide program could result in yield losses exceeding 30 to 40 percent, with downstream effects on pricing, processing capacity, and export viability. He stressed that investments in fungicide programs, though an upfront cost, are economically justified when considering the potential revenue losses avoided and the risk mitigation achieved.

Â Ensuring Safe Access to Mancozeb Worldwide



Following Dr Banerjeeâ??s presentation, the discussion shifted to regulatory science and risk assessment. Richard Mills, Global Director of Trade and Government Affairs at UPL, provided a comprehensive overview of the evolving global regulatory landscape for fungicides.

Mills articulated the distinction between risk-based and hazard-based regulatory frameworks, emphasising that risk-based assessments evaluate the probability and impact of exposure under realistic use conditions, whereas hazard-based approaches may restrict chemicals based solely on intrinsic properties without contextual application data. He further elaborated on the importance of personal protective equipment compliance, residue monitoring, and data-driven stewardship programs to maintain both domestic and international access to Mancozeb.



"Regulatory frameworks are only as effective as the practices behind them. Risk-based assessments let us evaluate real-world exposure, while hazard-based approaches can be overly restrictive. By combining compliance, PPE, residue monitoring, and proactive stewardship, we ensure safe, responsible use of Mancozeb, protecting both public health and growersâ?? market access across diverse international jurisdictions."

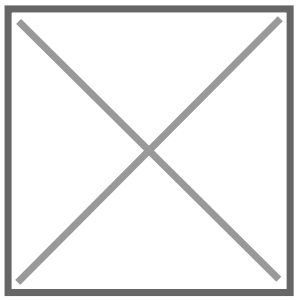
â??Richard Mills, Global Director of Trade and Government Affairs at UPL

Mills highlighted that harmonizing regulatory compliance across countries is essential for exporters, as maximum residue limits (MRLs) vary widely across jurisdictions. He stressed that proactive engagement with regulators, transparent record-keeping, and adherence to recommended application practices are vital to safeguarding market access while ensuring public safety.

Â *How Tech is Revolutionising Disease Control*

Building upon the regulatory perspective, Sandeep Jagtap, Senior Business Development Manager at Ross LifeScience, addressed the integration of Mancozeb into Integrated Pest Management (IPM) strategies and the role of digital agriculture.

Jagtap elaborated on how precision tools, including digital disease forecasting models, remote monitoring platforms, and app-based advisory services, allow growers to optimise fungicide use, ensuring applications are timely and necessary, thereby minimizing both economic and environmental costs. He underscored that combining chemical interventions with cultural practices such as canopy management, crop rotation, and resistant varieties enhances the sustainability and effectiveness of disease control programs.



"Integrating Mancozeb into IPM isnâ??t just about sprayingâ??itâ??s about precision, timing, and sustainability. Digital tools like disease forecasting and remote monitoring help growers apply fungicides only when necessary, reducing costs and environmental impact. When combined with cultural practices like canopy management and resistant varieties, these strategies optimize yield, protect the ecosystem, and make viticulture smarter for every scale of farming."

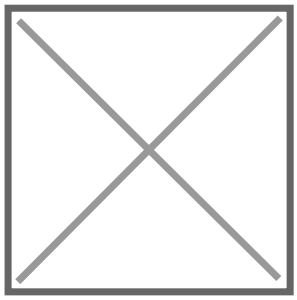
â?? Sandeep Jagtap, Senior Business Development Manager at Ross LifeScience

By demonstrating case studies where digital tools helped reduce fungicide usage without compromising yield, Jagtap highlighted that technology adoption in viticulture can be scaled to support both large commercial growers and smaller farmers, providing actionable insights that translate into improved farm profitability and environmental stewardship.

Â Â Collaborative Approaches to Fungicide Stewardship

Concluding the speaker presentations, Amiya Kumar Bartia, Strategic Marketing Head at Indofil, shared the industryâ??s perspective on stewardship and sustainable crop protection strategies.

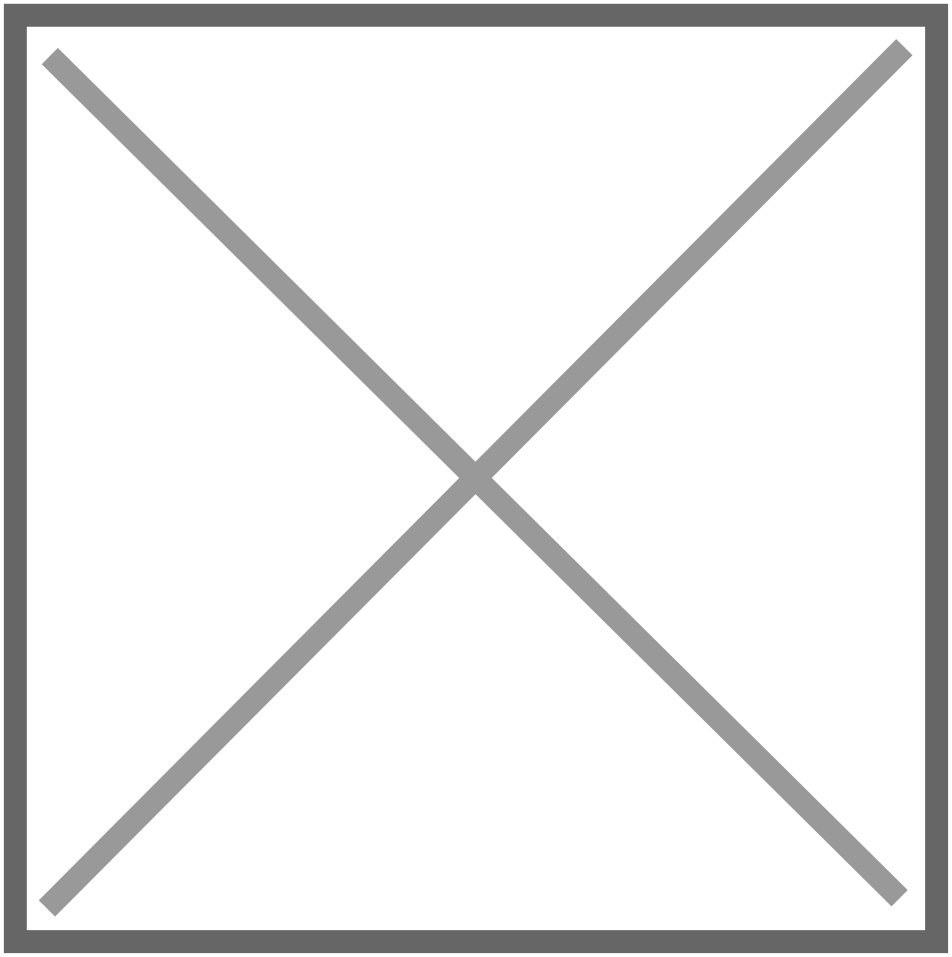
Bartia emphasized that ensuring responsible access to Mancozeb requires multi-level collaboration among growers, industry stakeholders, and regulators. He described initiatives such as educational outreach programs, grower training sessions, and digital monitoring tools that reinforce proper application practices and adherence to safety protocols.



"Responsible access to Mancozeb demands collaboration across growers, industry, and regulators. Stewardship isnâ??t just complianceâ??itâ??s a strategic imperative. Through training, outreach, and digital monitoring, we ensure safe, effective application while safeguarding market continuity. By building trust and engagement, we balance crop protection, environmental responsibility, and social accountability, promoting sustainable practices in high-value horticulture."

â??Amiya Kumar Bartia, Strategic Marketing Head at Indofil

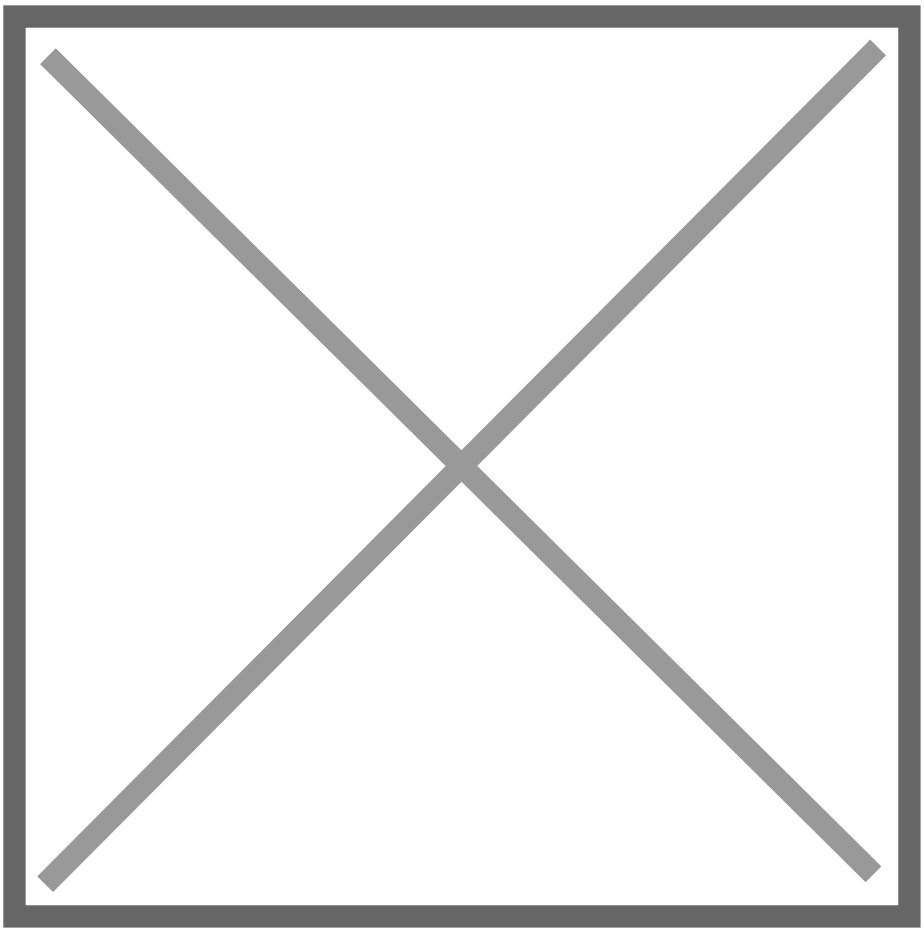
Bartia noted that stewardship programs are not merely regulatory obligations but strategic imperatives that secure long-term market continuity and support sustainable agricultural systems. By fostering trust and engagement between stakeholders, the industry aims to balance crop protection needs with environmental and social responsibility, illustrating a pragmatic approach to chemical management in high-value horticulture.



Following the formal presentations, the webinar hosted a dynamic Q&A session, providing participants an opportunity to engage directly with the expert panel.

Key questions centered on practical challenges, including managing resistance to single-site fungicides, navigating divergent international MRLs, adopting digital forecasting tools, and understanding the cost-benefit dynamics of fungicide programs. In addressing resistance concerns, Dr Banerjee recommended adherence to rotation strategies and integration of multi-site fungicides like Mancozeb into IPM programs.

Richard Mills responded to regulatory queries, emphasizing the necessity of maintaining meticulous residue records and proactively engaging with trade authorities to navigate changing international standards. When participants inquired about digital adoption among smallholder farmers, Sandeep Jagtap highlighted the scalability of mobile-based platforms and cloud-supported advisory services that enable data-driven decision-making even for resource-constrained growers.



Dr Banerjee quantified the economic benefits of preventive fungicide programs, showing that costs incurred are substantially offset by avoided yield losses, revenue stabilization, and mitigation of downstream market risks. Finally, Bartia discussed the components of effective stewardship, including transparent application practices, grower partnerships, and continuous monitoring, which collectively ensure responsible fungicide use while safeguarding the environment.

Several overarching themes emerged from the discussion.

First, Mancozeb remains an indispensable tool in grape disease management, particularly in regions facing high disease pressure. Its multi-site activity not only provides immediate disease control but also preserves the efficacy of other fungicides, underpinning the sustainability of crop protection programs.

Second, agronomic and economic modeling validates the cost-effectiveness of fungicide interventions, highlighting that upfront expenditure on well-planned programs mitigates larger financial risks from yield losses, quality deterioration, and compromised market access.

Third, regulatory vigilance and proactive stewardship are crucial to ensuring safe, compliant access to fungicides in a rapidly evolving global trade environment.

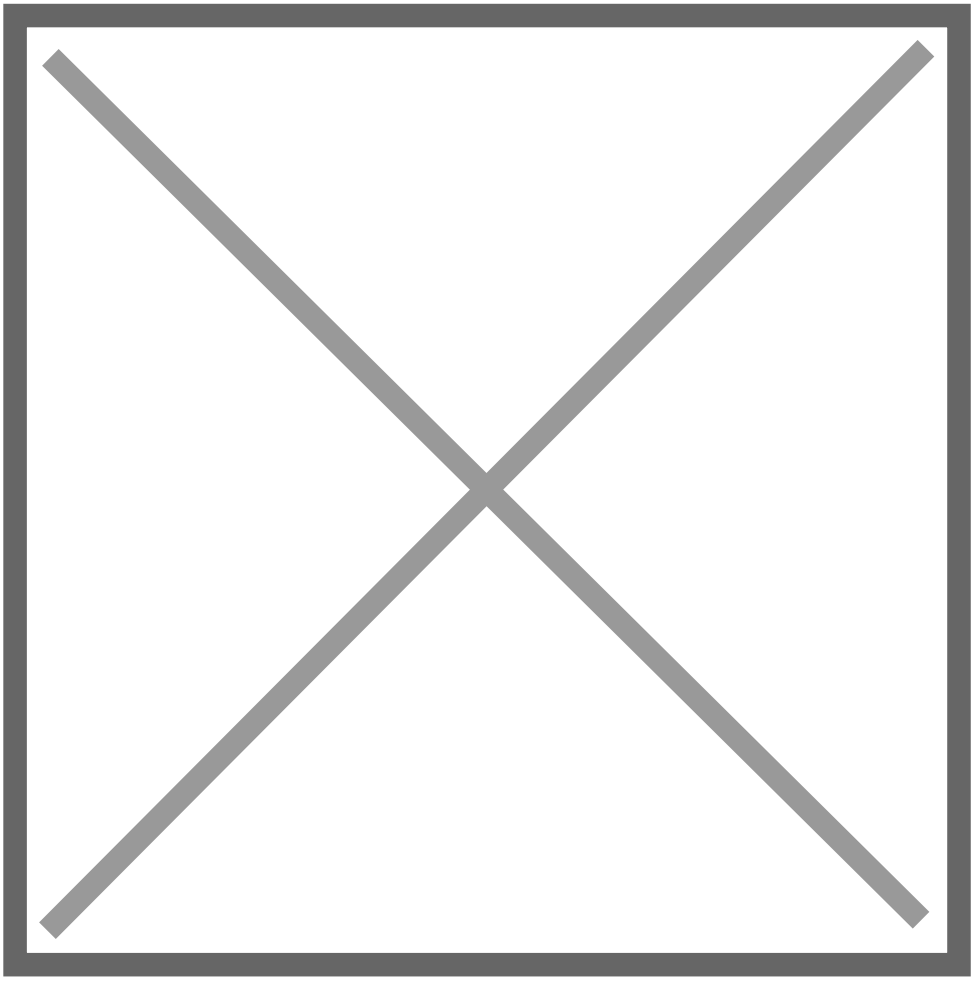
Fourth, the integration of digital agriculture and IPM enhances both efficacy and sustainability, enabling precision application, reducing environmental impact, and supporting data-driven farm management. Finally, collaborative industry frameworks, which align growers, regulatory bodies, and companies, are essential for maintaining market continuity, promoting responsible chemical use, and reinforcing sustainable agricultural practices.

The webinar also underscored the broader implications of fungicide management beyond the vineyard. By mitigating disease losses and supporting yield stability, effective fungicide programs contribute to food security, particularly in regions dependent on horticultural exports for economic and nutritional resilience.

In addition, the discussions highlighted that responsible fungicide stewardship intersects with environmental goals, including reduction of chemical overuse, protection of soil and water quality, and mitigation of pesticide resistance. As the agricultural

sector navigates the dual pressures of climate variability and intensifying disease outbreaks, the integrated strategies discussed in this webinar offer a blueprint for sustainable crop protection.

Participants and speakers alike noted that the convergence of scientific knowledge, regulatory compliance, economic modeling, and digital innovation is reshaping the landscape of viticulture. Mancozebâ??s role, while sometimes viewed through the lens of regulatory scrutiny, remains pivotal in maintaining both productivity and market viability.



The insights shared during the webinar demonstrate that strategic, data-driven approaches to fungicide use can yield multifaceted benefits, reinforcing economic resilience for growers, sustaining export markets, and protecting public health and the environment. The dialogue also highlighted the importance of ongoing education, capacity building, and collaboration among all stakeholders, as sustainable crop protection requires continuous adaptation to evolving challenges and opportunities.

In conclusion, the Mancozeb stewardship webinar successfully illuminated the complex, interconnected dimensions of modern grape cultivation. The expert panel provided a comprehensive analysis of agronomic strategies, regulatory frameworks, digital innovations, and stewardship initiatives, offering actionable insights for growers, industry participants, and policymakers.

The integration of scientific rigor, economic modeling, and regulatory understanding demonstrated that sustainable crop protection is achievable when multi-disciplinary approaches are applied thoughtfully and collaboratively. By emphasizing responsible fungicide use, digital integration, and stakeholder engagement, the webinar charted a pragmatic path forward for safeguarding grape yields, ensuring market access, and contributing to global food security.

The discussions reaffirmed that effective disease management is not merely a technical endeavor but a critical component of resilient agricultural systems capable of meeting both economic and nutritional demands in a rapidly changing world.

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