United States Department of Agriculture
Agricultural Marketing Service | National Organic Program

Document Cover Sheet

Document Type:

☒ **National List Petition or Petition Update**

A petition is a request to amend the USDA National Organic Program's National List of Allowed and Prohibited Substances (National List).

www.ams.usda.gov/rules-regulations/organic/national-list

Any person may submit a petition to have a substance evaluated by the National Organic Standards Board (NOSB) [7 CFR 205.607(a)].

www.ams.usda.gov/rules-regulations/organic/nosb

National List Petition Guidelines for submitting a petition are available on the AMS website at How to File a Petition.

www.ams.usda.gov/rules-regulations/organic/national-list/filing-petition

AMS posts completed petitions online for public access on the NOP Petitioned Substances Index

www.ams.usda.gov/rules-regulations/organic/petitioned-substances

☐ **Technical Report**

A technical report is developed in response to a petition to amend the National List. Reports are also developed to assist in the review of substances that are already on the National List. Technical reports are completed by third-party contractors and AMS posts completed technical reports online for public access on the NOP Petitioned Substances Index. Contractor names and dates completed are available in the report.

www.ams.usda.gov/rules-regulations/organic/petitioned-substances

Read more about the technical report process in section
H. SUBSTANCE/MATERIALS REVIEW PROCESS in the NOSB Policy & Procedures Manual posted on the AMS website.

www.ams.usda.gov/sites/default/files/media/NOSB-PolicyManual.pdf

www.ams.usda.gov/rules-regulations/organic/nosb

National List Manager
USDA/AMS/NOP, Standards Division
1400 Independence Ave. SW
Room 2648-So., Ag Stop 0268
Washington, DC 20250-0268
Sent via e-mail/link

May 5, 2026

Re: Petition to Add Potassium Metabisulfite to the National List, § 205.605(b) - Synthetic for use in organic handling (only in wine labeled "made with organic grapes.")

Dear National List Manager,

On behalf of the Organic Winegrowers Network—a grassroots network of organic vineyard managers, viticulturists, researchers, and wineries rooted in Oregon's organic wine community—we are pleased to submit the enclosed petition requesting the addition of potassium metabisulfite (KMBS) to the National List at 7 CFR §205.605(b)(35).

Oregon represents one of the leading organic wine-producing regions in the United States, with approximately 3,000 acres of certified organic wine grapes—roughly one-third of the state's total vineyard acreage—and more than 40 wineries and growers with certified organic vines. Despite this significant organic production base and increasing interest from both growers and consumers in organically grown grapes, only a small fraction of wineries currently feature an organic claim on their labels. In practice, operational challenges associated with organic winery certification—including limitations on essential winemaking materials and uncertainty surrounding allowable inputs and labeling—have contributed to a disconnect between organically grown grapes and consumer-facing organic wine products.

To address this challenge, our group believes a practical and narrowly tailored regulatory change can help support greater participation in organic winery certification and increase the availability of wines labeled "made with organic grapes" in the marketplace. Accordingly, this petition seeks to allow potassium metabisulfite as a source of sulfur dioxide in wine labeled "made with organic grapes," under the same annotation and sulfite limit of 100 ppm currently applied to sulfur dioxide.

The petition directly adresses a practical issue affecting our members: while sulfur dioxide is allowed, access to sulfur dioxide delivery systems—particularly sulfur dioxide gas and sulfurous acid solutions—is not consistently reliable, practical, or feasible across all regions and operations. For many small and mid-scale wineries—particularly those already committed to certified organic vineyard production—this has become a barrier to certifying their winery operations, not due to lack of commitment, but due to operational impracticality. This constraint, in turn, results in wines produced from certified organic grapes going unlabeled as “made with organic grapes,” limiting both market transparency and the ability of producers to fully realize the value of their organic practices.

As detailed in the petition, potassium metabisulfite—a stable, powdered form used to generate sulfur dioxide in winemaking—provides a well-understood and functionally equivalent means of delivering sulfur dioxide, directly addressing these operational and access constraints without altering the existing limitations or conditions associated with the current sulfur dioxide allowance.

The enclosed petition provides a comprehensive technical and regulatory record to support consideration of this request, building on the established evaluation of sulfur dioxide and the broader scientific understanding of sulfites.

Thank you for your consideration and for your continued work in maintaining both the integrity and practicality of the organic standards. We would welcome the opportunity to provide additional information as needed.

Sincerely,

Organic Winegrowers Network

https://www.organicwinegrowers.com/about

Petition to Add Potassium Metabisulfite to the National List (§ 205.605(b)(35))
For use only in wine labeled "made with organic grapes"

ITEM A

A.1 – National List Section: This petition requests inclusion of **potassium metabisulfite** on the National List (NL) as an allowed synthetic substance at §205.605(b)(35) for use as a source of sulfur dioxide in wine labeled "made with organic grapes," subject to the same annotation and sulfite limit currently applied to sulfur dioxide.

Proposed amendment to the National List:

> (35) Sulfur dioxide—for use only in wine labeled "made with organic grapes," Provided, That, total sulfite concentration does not exceed 100 ppm. May be introduced as gas, aqueous solution, or from potassium metabisulfite.

This approach maintains the existing listing for sulfur dioxide while allowing an additional source that generates sulfur dioxide within the same wine system evaluated in prior technical reviews.

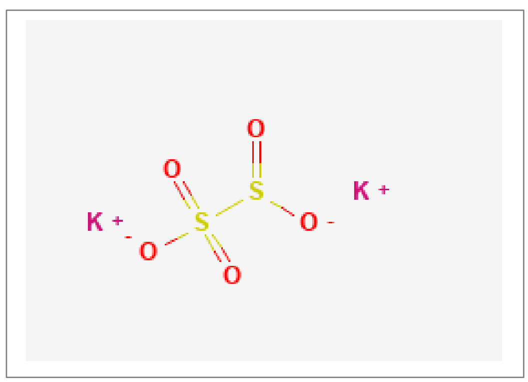
A.2 - OFPA Category (Crops and Livestock): N/A

A.3. – Inert Ingredients: N/A

ITEM B: SUBSTANCE INFORMATION

B1. Substance Name

Common Name: Potassium Metabisulfite



Other /Generic Names:

- Potassium Pyrosulfite
- Anhydrous Potassium Bisulfite
- Potassium Acid Sulphite

CAS Number: 16731-55-8
Empirical Formula: $K_2S_2O_5$
European Food Additive Number: E224

Potassium metabisulfite (KMBS) is a synthetic inorganic compound with the chemical formula $K_2S_2O_5$ and CAS Number 16731-55-8. It consists of potassium ions and the metabisulfite anion ($S_2O_5^{2-}$) and is widely used in food and beverage processing as a source of sulfur dioxide.

KMBS is a solid, crystalline substance that is stable under dry storage conditions and highly soluble in water. It is commercially available as a food-grade material, typically with a purity of ≥95–98%.

B.2. <u>Petitioner and Manufacturer Information:</u>

Petitioner:
[Organic Winegrowers Network]() - *A network of organic farmers and researchers sharing knowledge and solutions to grow the best wine and improve the health of the environment*

Petitioner Primary Contact:
Gwendolyn Wyard
1525 NW Lake St, Newport, Oregon 97365
gwenwyard@organicsos.com
503-798-3294

Note: This petition is organized, prepared, and submitted by a group of organic farmers, handlers, researchers, and other organic industry stakeholders. It is not a petition from the manufacturer of this substance. No marketers or manufacturers have actively contributed to the preparation of this petition nor the content it contains. The petitioners have not had access to any Confidential Business or Manufacturing information from any manufacturers of this substance.

Identified Manufacturers:
Potassium metabisulfite is produced by multiple commercial manufacturers globally. No single manufacturer is identified for the purposes of this petition. These examples demonstrate the availability of food-grade potassium metabisulfite from commercial manufacturers serving food and beverage applications, including wine production.

- **Aditya Birla Chemicals**
  - *Headquarters:*
    Aditya Birla Chemicals (India) Limited
    Aditya Birla Centre, S.K. Ahire Marg
    Worli, Mumbai 400030, India
  - *Website:* https://www.adityabirlachemicals.com

- **BASF Corporation**
  - *Headquarters (North America):*
    BASF Corporation
    100 Park Avenue
    Florham Park, NJ 07932, USA
  - *Website:* https://www.basf.com

- **Enartis (Esseco Group)**
  - *Headquarters:*
    Enartis S.r.l.
    Via San Cassiano 99
    28069 San Martino, Trecate (NO), Italy
  - *Website:* https://www.enartis.com

- **IOC (Institut Oenologique de Champagne)**
  - *Headquarters:*
    Institut Œnologique de Champagne (IOC)
    ZAC de la Source
    1 Rue de la République
    51530 Oiry, France
  - *Website*: https://www.ioc.eu.com

- **Laffort**
  - *Headquarters:*
    126 Quai de Bacalan
    CS 11584
    33000 Bordeaux, France
  - *Website:* https://laffort.com

B.3. Intended or Current Use

The intended use of potassium metabisulfite under this petition is as a processing aid in wine production, where it serves as a source of sulfur dioxide. In accordance with the Organic Foods Production Act (OFPA) and USDA organic regulations, the use of sulfites is permitted solely in wine production.

Within the USDA organic regulatory framework, the use of sulfur dioxide and related sulfite sources is specific to wine labeled "made with organic grapes," and no other applications are authorized. Accordingly, the scope of this petition is limited to this established use.

Potassium metabisulfite provides a controlled and measurable source of sulfur dioxide. Upon dissolution, it generates sulfur dioxide responsible for antimicrobial and antioxidant activity in wine (Monro et al., 2012; Cojocaru and Antoce, 2012; USDA NOP, 2011). Its solid form allows for ease of storage, transport, and precise dosing, making it a practical and widely used means of delivering sulfur dioxide in standard winery operations (Henderson, 2008).

B.4. Intended Activities and Application Rate

Potassium metabisulfite is intended for use as a processing aid in wine production as a source of sulfur dioxide. Typical points of application include:

- At crush
- During fermentation
- During aging
- At bottling

Sulfur dioxide is routinely applied at multiple stages of winemaking to control microbial activity and oxidation throughout production.

Typical additions range from approximately 20–60 mg/L depending on stage of production and wine conditions (e.g., pH, microbial load), with total sulfite levels maintained below the regulatory limit of 100 ppm (Zoecklein, 2014).

For this petition, application rates would be managed to comply with the existing regulatory limit for wine labeled “made with organic grapes,” such that total sulfite concentration would not exceed 100 ppm.

Mode of Action

Sulfur dioxide acts as an antioxidant by reacting with oxygen and oxidation intermediates, preventing the oxidation of phenolic compounds, degradation of aroma compounds, and preserving sensory quality (Cojocaru & Antoce, 2012; Silva et al., 2021).

Its antimicrobial activity is primarily associated with molecular SO_2, which can penetrate microbial cell membranes and disrupt metabolic processes, thereby inhibiting the growth of spoilage organisms (Monro et al., 2012).

Sulfur dioxide also plays a critical role in binding aldehydes and other carbonyl compounds, including acetaldehyde, which can otherwise contribute to off-aromas and mask desirable sensory characteristics. This binding contributes to the formation of bound sulfur dioxide and is central to maintaining wine quality and stability (Cojocaru & Antoce, 2012; Nardini & Garaguso, 2018).

Potassium metabisulfite, upon dissolution in wine, forms bisulfite species that equilibrate to generate sulfur dioxide, enabling the same mechanisms of antimicrobial and antioxidant activity. The functional outcome is therefore identical once the aqueous equilibrium system is established (Monro et al., 2012; Zoecklein, 2014; Iowa State University Extension, 2022).

In solution, potassium metabisulfite also dissociates to contribute potassium ions. At maximum permitted sulfite levels (100 mg/L total SO_2), this corresponds to approximately 60 mg/L of potassium, which is minor relative to naturally occurring potassium concentrations in wine (typically 900–2,500 mg/L depending on grape variety and growing conditions).

B.5. Manufacturing Process

Potassium metabisulfite ($K_2S_2O_5$) is produced from elemental sulfur and potassium-based alkaline compounds through a controlled, multi-step industrial process involving the generation of sulfur dioxide, its absorption into an alkaline potassium solution, and subsequent dehydration to form the final crystalline product.

The process begins with the production of sulfur dioxide (SO_2), typically generated by the combustion of elemental sulfur in the presence of oxygen:

$$S + O_2 \rightarrow SO_2$$

Elemental sulfur used in this process is commonly recovered as a byproduct of petroleum refining and natural gas processing through established sulfur recovery systems, including the Claus process (U.S. Environmental Protection Agency [EPA], 2020). This recovery process captures sulfur that would otherwise be emitted as sulfur-containing gases, contributing to emission reduction and resource efficiency.

The sulfur dioxide gas is then absorbed into an aqueous alkaline solution containing potassium hydroxide (KOH) or potassium carbonate (K_2CO_3), resulting in the formation of potassium bisulfite ($KHSO_3$) in solution:

$$SO_2 + KOH \rightarrow KHSO_3$$
or
$$SO_2 + K_2CO_3 + H_2O \rightarrow 2\ KHSO_3$$

This absorption step is carried out under controlled conditions in aqueous systems where temperature, pH, and gas flow are regulated to optimize conversion efficiency and product consistency (Spormann et al., 1968).

The resulting potassium bisulfite solution is then subjected to controlled dehydration and condensation reactions to form potassium metabisulfite:

$$2\ KHSO_3 \rightarrow K_2S_2O_5 + H_2O$$

This step may involve evaporation and thermal processing under controlled conditions to remove water and drive the equilibrium toward formation of the metabisulfite salt (Spormann et al., 1968).

Following formation, potassium metabisulfite is crystallized from solution, separated, and dried to produce a stable, free-flowing solid material. The final product is typically manufactured as a white crystalline powder or granular solid, with defined purity specifications suitable for food-grade applications (Joint FAO/WHO Expert Committee on Food Additives [JECFA], 2008; Esseco USA, n.d.).

Throughout the manufacturing process, conditions are carefully controlled to ensure product purity, stability, and consistency. The resulting material is inorganic salt that is stable under dry storage conditions and readily soluble in water. When dissolved, potassium metabisulfite dissociates to form bisulfite ions and generates sulfur dioxide within an aqueous equilibrium system, consistent with its intended function in wine production (EFSA, 2016a).

Based on review of the manufacturing process, potassium metabisulfite production does not appear to involve persistent or bioaccumulative intermediates. The primary inputs—sulfur dioxide and potassium-based reagents—are standard industrial chemical materials commonly used in food-grade applications.

B.6. <u>Ancillary Substances</u>

As described in Section B.5, the manufacture of potassium metabisulfite involves standard reaction materials, including water and alkaline potassium compounds such as potassium hydroxide or potassium carbonate. No additional synthetic processing aids, solvents, or stabilizers are required in the manufacture of bulk potassium metabisulfite. The final conversion from potassium bisulfite to potassium metabisulfite occurs through controlled dehydration, and the product is isolated through crystallization and drying (Spormann et al., 1968).

Potassium metabisulfite is commercially available in forms used in wine production, including crystalline powder, granular material, and tablet formulations. Bulk KMBS products supplied for winery use are typically high-purity materials consisting primarily of potassium metabisulfite, as indicated in representative product safety data sheets (Esseco USA, n.d.; IOC, n.d.)

In some tablet formulations (e.g., Campden tablets), additional substances are present to support handling and dosing. Representative product labels and safety data sheets (L.D. Carlson, n.d.) identify these ancillary substances as including microcrystalline cellulose (binder), calcium sulfate or lactose (filler), magnesium stearate (lubricant), and silicon dioxide (anti-caking agent).

Consistent with NOSB definitions (February 16, 2016, Ancillary Substance Procedure Proposal), these substances function within the formulated potassium metabisulfite product itself and do not contribute to the technical function of potassium metabisulfite as a source of sulfur dioxide in wine. They may be present in the final organic product only in insignificant amounts and do not have a technical or functional effect in the finished wine.

This petition is limited to potassium metabisulfite as the active substance. Ancillary substances present in formulated products are identified here to reflect commercial practice and to support review during the petition process. Their acceptability for use in organic handling is determined through product-level evaluation.

B.7. <u>Previous Reviews</u>

Sulfur dioxide has been reviewed and considered by the National Organic Standards Board (NOSB) as part of the development and ongoing maintenance of the National List of Allowed and Prohibited Substances. It is currently listed at §205.605(b) for use in wine labeled "made with organic grapes," subject to a maximum sulfite concentration of 100 ppm.

Early NOSB evaluations of sulfur dioxide, including the 1995 Technical Advisory Panel (TAP) review, established its essential functional role in wine production, particularly with respect to microbial control, oxidation management, and product stability. These evaluations informed its inclusion on the National List as a necessary synthetic substance for specific use in organic handling (USDA NOSB, 1995).

The National Organic Program conducted a Technical Evaluation Report (TR) on sulfur dioxide in 2011 (USDA NOP, 2011), which provides a comprehensive review of its chemistry, mode of action, human health effects, environmental impact, and compatibility with organic systems. This review describes sulfur dioxide as functioning within an aqueous equilibrium system and identifies molecular sulfur dioxide as the active antimicrobial species.

The 2011 Technical Review also recognizes that solid sulfite salts, including potassium metabisulfite, are distinct synthetic substances that generate sulfur dioxide through chemical transformation in aqueous systems. Consistent with this distinction, potassium metabisulfite has not been included under the existing National List entry for sulfur dioxide. This interpretation is reflected in guidance and materials review practices, which distinguish between sulfur dioxide (including aqueous forms) and sulfite salts as separate substances.

Importantly, the scientific foundation established in the 2011 Technical Review demonstrates that, once introduced into aqueous systems, sulfur dioxide—regardless of source—exists within the same equilibrium system and produces the same active molecular species responsible for antimicrobial and antioxidant effects.

No separate NOSB Technical Review has been conducted specifically for potassium metabisulfite.

This petition builds on the existing body of scientific and regulatory work and addresses a consideration not fully evaluated in earlier reviews: the relationship between substance form, method of delivery, and practical access to sulfur dioxide in wine production.

B.8. **Regulatory Authority**

Potassium metabisulfite is widely regulated and accepted for use in food processing, including wine production, by regulatory authorities in the United States and internationally.

United States Regulatory Framework

In the United States, potassium metabisulfite is affirmed as Generally Recognized as Safe (GRAS) by the **U.S. Food and Drug Administration** under 21 CFR §182.3637 for use as a food additive, including in beverages such as wine. Its use is permitted as a source of sulfur dioxide, consistent with established limits and labeling requirements. FDA requires that sulfites present at levels above 10 ppm be declared on product labels due to allergen considerations (U.S. Food and Drug Administration (FDA), 2023).

The Alcohol and Tobacco Tax and Trade Bureau (TTB) regulates wine production under 27 CFR Part 24 and recognizes sulfur dioxide and sulfite compounds, including potassium metabisulfite, as standard winemaking materials used for antimicrobial and antioxidant purposes, subject to applicable limitations and labeling requirements. (Alcohol and Tobacco Tax and Trade Bureau (TTB), n.d.)

The Organic Foods Production Act (OFPA) establishes a general prohibition on the use of synthetic substances in organic handling. Under 7 U.S.C. §6510(a)(3), handlers may not add sulfites to organically produced agricultural products, *except in the production of wine* (Organic Foods Production Act (OFPA), 7 U.S.C. §6510).

The USDA National Organic Program implements this exception through the National List of Allowed and Prohibited Substances (7 CFR §205.605(b)), which includes sulfur dioxide with the annotation: "Sulfur dioxide—for use only in wine labeled 'made with organic grapes,' provided that total sulfite concentration does not exceed 100 ppm." (USDA NOP, n.d.)

International Scientific and Regulatory Evaluations

Sulfites, including potassium metabisulfite, have been extensively evaluated by international scientific bodies. The Joint FAO/WHO Expert Committee on Food Additives (JECFA) established an acceptable daily intake (ADI) of 0–0.7 mg/kg body weight (expressed as SO_2 equivalents), reflecting a comprehensive toxicological assessment of sulfites as a group (FAO/WHO, 2008).

The European Food Safety Authority (EFSA) has similarly evaluated sulfur dioxide and sulfites collectively, recognizing their shared chemical behavior and toxicological profile in aqueous systems (EFSA, 2016b).

Codex Alimentarius includes potassium metabisulfite (INS 224) within the General Standard for Food Additives (GSFA), establishing internationally recognized use levels for sulfites in food and beverages, including wine (Codex Alimentarius Commission, n.d.).

International Organic Systems

In major international organic systems, sulfites are permitted in organic wine within defined concentration limits, and potassium metabisulfite is recognized as an allowable source of sulfur dioxide in wine production.

- **European Union:** Regulation (EU) 2018/848 on organic production and labeling of organic products permits sulfites in organic wine within defined concentration limits. Implementation of these standards is reflected in organic wine certification requirements, including those of the Soil Association, which recognize sulfur dioxide and sulfite sources, including potassium metabisulfite, for use within established limits (Soil Association, 2025, Section 6.9, pp. 113–120).

- **Canadian Organic Standards:** The Canadian Organic Standards permit the use of sulfites in alcoholic beverages within defined concentration limits that are generally consistent with those established under USDA organic regulations. Potassium metabisulfite is explicitly permitted as a source of sulfur dioxide within the sulfur dioxide listing (Canadian General Standards Board (CGSB), 2026, Table 6.3, p.41).

- **Biodynamic Standards:** Demeter International standards also permit potassium metabisulfite as a source of sulfur dioxide in biodynamic wine production within defined limits (Demeter International, 2018/2025, p. 156).

Regulatory Scope and Use Context

Potassium metabisulfite is used as a processing aid in wine production and is not applied to crops, soil, or livestock. As such, it does not fall within the scope of pesticide regulation under the U.S. Environmental Protection Agency.

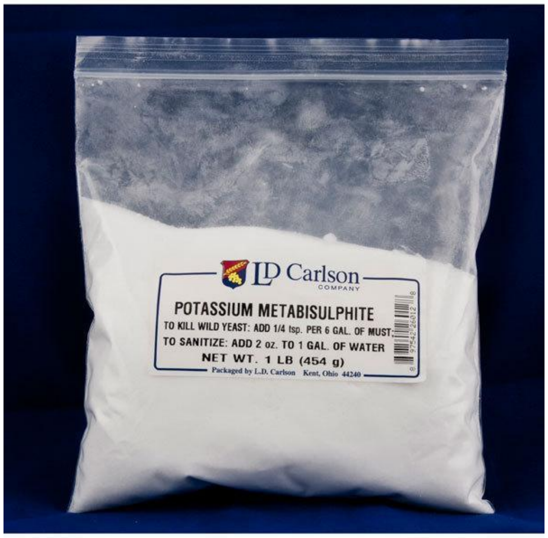
At the state level, regulatory requirements associated with sulfur dioxide are primarily triggered when handled as a compressed gas or hazardous material. These requirements do not apply in the same manner to potassium metabisulfite, which is a stable solid and does not require pressurized storage or hazardous gas handling infrastructure.

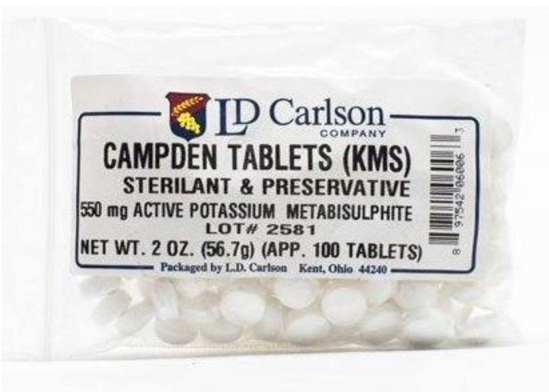
B.9. Chemical Abstract Service (CAS) Number and Product Labels:

CAS Number: 16731-55-8

Potassium metabisulfite is commercially available as a food-grade material, typically with a purity of approximately 95–98%, with minor amounts of sulfate and moisture depending on manufacturer specifications.

Photos of Typical Product Labels:





B.10. Physical and Chemical Properties:

a. Chemical interactions with other substances, especially substances used in organic production

Potassium metabisulfite functions as a source of sulfur dioxide in aqueous systems used in wine production. Upon dissolution, it establishes an equilibrium between molecular sulfur dioxide, bisulfite, and sulfite species. The distribution of these species is influenced by pH and governs the antimicrobial and antioxidant activity of the substance.

In organic handling systems, potassium metabisulfite and the sulfur dioxide it generates may interact with other substances present during processing, storage, and sanitation. These include water, organic acids, sugar, oxygen, and residual microbial populations associated with fermentation and storage environments.

Sulfur dioxide reacts readily with dissolved oxygen and oxidation intermediates, limiting oxidative reactions. It also forms reversible and irreversible binding interactions with carbonyl compounds, including aldehydes such as acetaldehyde, which may be present as natural byproducts of fermentation.

Interactions with cleaning and sanitation materials commonly used in organic handling systems are not expected to result in persistent or hazardous byproducts under normal conditions of use, as sulfur dioxide and its sulfite derivatives rapidly dissolve and participate in aqueous reactions that yield predictable, non-persistent species (Henderson, 2009; Cojocaru & Antoce, 2012; Iowa State University Extension, 2022).

Under conditions relevant to wine production, potassium metabisulfite does not form persistent residues outside the aqueous sulfur dioxide system and does not introduce reactive intermediates beyond those already associated with sulfur dioxide use.

The chemical interactions of potassium metabisulfite are therefore consistent with those of sulfur dioxide and are limited to well-characterized reactions in aqueous systems and standard processing environments.

b. Toxicity and environmental persistence

Sulfites, including sulfur dioxide and potassium metabisulfite, are among the most extensively studied food additives and have been evaluated by multiple regulatory and scientific bodies.

Potassium metabisulfite is affirmed as Generally Recognized as Safe (GRAS) by the U.S. Food and Drug Administration under 21 CFR §182.3637 for use in food processing, including beverages such as wine.

Internationally, the Joint FAO/WHO Expert Committee on Food Additives (JECFA) established an acceptable daily intake (ADI) of 0–0.7 mg/kg body weight (expressed as SO_2 equivalents) based on extensive toxicological data (FAO/WHO, 2008). The European Food Safety Authority (EFSA) has conducted comprehensive re-evaluations of sulfur dioxide and sulfites as a group, recognizing that sulfite salts—including potassium metabisulfite—share common chemical behavior and toxicological profiles in aqueous systems (EFSA, 2016b).

In environmental contexts, potassium metabisulfite does not persist. In aqueous systems, it dissociates and is oxidized to sulfite and sulfate species, which are components of the natural sulfur cycle and do not bioaccumulate (EFSA, 2016; FAO/WHO, 2008; Dordevic et al., 2023).

c. Environmental impacts from its use and/or manufacture

The environmental impact of potassium metabisulfite is considered in the context of its production, use, and environmental fate.

The sulfur used in its production is typically derived from recovered industrial streams, such as petroleum refining and natural gas processing. Sulfur recovery processes—most commonly the

Claus process—convert hydrogen sulfide into elemental sulfur, reducing emissions of sulfur-containing gases (U.S. Environmental Protection Agency [EPA], 2020).

The manufacturing processes and chemical behavior of sulfur dioxide and related sulfite materials are well established. In use, potassium metabisulfite generates sulfur dioxide and related sulfite species that are already present in systems where sulfur dioxide is applied (USDA NOP, 2011). The environmental fate and behavior of these species are well characterized, with sulfur dioxide being highly soluble, reactive, and not expected to result in adverse environmental effects at levels used in winemaking (USDA NOP, 2011).

Based on available information, the environmental profile of potassium metabisulfite is expected to be comparable to that of sulfur dioxide under similar conditions of use.

d. Effects on human health

The human health effects of sulfur dioxide and sulfites are well established and have been extensively evaluated within existing regulatory frameworks. Sulfur dioxide is currently permitted for use in wine labeled “made with organic grapes,” subject to a maximum total sulfite concentration of 100 ppm, reflecting an established regulatory determination of acceptable use and exposure within the USDA organic system.

The primary human health concern associated with sulfites is sensitivity in a small subset of individuals, particularly those with asthma. This risk is well characterized and is addressed through labeling requirements and regulatory limits on total sulfite concentration. The prevalence of sulfite sensitivity is limited, and variability in individual response mechanisms is recognized in the scientific literature (Vally & Misso, 2012).

Potassium metabisulfite does not introduce additional health risks beyond those already associated with sulfur dioxide. As a precursor that generates sulfur dioxide in solution, exposure occurs through the same sulfite species that are already permitted and regulated. EFSA identified sulfur dioxide as the active substance generated in situ from potassium metabisulfite and concluded that potassium metabisulfite does not present a safety concern when used as a source of sulfur dioxide, provided that applicable limits are not exceeded (EFSA, 2016a).

Consistent with this framework, sulfur dioxide and sulfites are evaluated collectively, with read-across between different sulfite sources based on their shared capacity to form sulfite ions and sulfur dioxide (SO_2) equivalents (EFSA, 2016b, pp. 3–5). This is further supported by EFSA’s assessment of potassium metabisulfite as a precursor that generates sulfur dioxide in situ, consistent with other authorized sulfite sources (EFSA, 2016a).

Dietary exposure to sulfites is assessed on a total intake basis across the diet, as sulfites are widely present in a range of foods and beverages. Reviews of sulfur compounds in food systems confirm that exposure is cumulative across the diet and reflects overall dietary patterns rather than any single source, such as wine (Dordevic et al., 2023). Within this broader context, product-specific limits—such as the 100-ppm restriction for organic wine—serve to constrain contribution at the individual product level.

Ongoing research continues to examine potential interactions between sulfites and biological systems, including effects on gut microbiota and metabolic processes. These findings highlight the importance of dose, dietary context, and individual variability, but do not alter the established safety framework based on controlled exposure levels (de la Guía et al., 2025).

e. Effects on soil organisms, crops, or livestock

Potassium metabisulfite is used as a processing aid in wine production and does not result in direct application to soil or agricultural systems. As such, its use does not result in exposure to soil organisms, crops, or livestock and does not impact these systems.

B.11. Safety Information:

Sulfur dioxide may be applied in wine production through several delivery forms, including compressed gas, prepared aqueous solutions (typically sulfurous acid solutions), and solid sulfite salts such as potassium metabisulfite. In practice, (non-certified) wineries most commonly introduce sulfur dioxide through potassium metabisulfite powder or prepared aqueous solutions, both of which allow controlled addition within the processing system (WorkSafeBC, 2023; Matheson, 2023).

Sulfur dioxide supplied as a compressed gas is also used in certain applications and is subject to established occupational safety standards, including exposure limits, ventilation requirements, and the use of appropriate personal protective equipment to manage inhalation risks. When handled in accordance with these regulatory frameworks, sulfur dioxide gas can be used safely within controlled environments (WorkSafeBC, 2023).

By contrast, potassium metabisulfite is a stable solid material that does not require pressurized storage systems or the same level of regulatory oversight associated with compressed gas handling. It can be transported, stored, and applied using standard winery practices, without the need for specialized gas-handling infrastructure or continuous monitoring systems.

While potassium metabisulfite is handled as a solid material, it presents known hazards that require appropriate management. In particular, exposure to sulfur dioxide may occur during preparation of solutions or when the material comes into contact with moisture, and risks may increase under acidic conditions. These hazards are managed through established practices, including ventilation, controlled preparation of solutions, and the use of appropriate personal protective equipment (WorkSafeBC, 2023; SDS).

As a result, potassium metabisulfite provides a more accessible and operationally straightforward means of generating sulfur dioxide within the aqueous systems used in wine production, while maintaining the same functional outcome. These considerations reflect differences among sulfur dioxide delivery systems that extend beyond chemical form to include practical handling and operational context, while remaining within established safety and regulatory frameworks.

A substance-specific report from the National Institute of Environmental Health Sciences (NIEHS) for potassium metabisulfite was not identified. However, potassium metabisulfite is evaluated within the broader class of sulfites, which have been extensively assessed by international regulatory bodies, including the Joint FAO/WHO Expert Committee on Food Additives (JECFA) and the European Food Safety Authority (EFSA), as described in Section B.10. These evaluations establish the safety profile of sulfites based on their shared chemistry and exposure as sulfur dioxide and sulfite species under regulated conditions of use.

B.12. Research Information:

Extensive research has been conducted on sulfur dioxide and sulfites, including potassium metabisulfite, across multiple scientific and regulatory domains. This body of literature includes peer-reviewed enology and food science research, international regulatory evaluations, and technical reviews conducted for the National Organic Program.

The chemistry, functionality, and safety of sulfur dioxide in wine production are well established. Sulfur dioxide has been extensively studied for its antimicrobial and antioxidant properties, as well as its role in binding aldehydes and other carbonyl compounds, which are critical to maintaining microbial stability, controlling oxidation, and preserving sensory quality in wine (Cojocaru & Antoce, 2012; Monro et al., 2012).

The 2011 Technical Review conducted for the National Organic Program provides a comprehensive evaluation of sulfur dioxide, including its mode of action, human health considerations, and environmental fate (USDA NOP, 2011).

Research also includes emerging and contrasting perspectives on sulfites in wine and human health. Wang et al. (2023) discuss potential biological interactions involving sulfites, nitrite, and nitric oxide pathways, while also noting that sulfites are commonly perceived as harmful and that additional studies are needed to evaluate whether any potential beneficial effects outweigh known adverse effects or sensitivities. This research does not alter the established regulatory safety framework for sulfites under controlled exposure levels, but it is relevant as part of the broader scientific literature evaluating sulfites in wine.

There has also been ongoing research and industry interest in reducing or replacing sulfur dioxide in wine production due to consumer perception, labeling considerations, and sulfite sensitivity in certain individuals. A wide range of chemical, biological, and physical alternatives have been evaluated, including antimicrobial agents, physical processing technologies, and plant-derived antioxidant systems (Silva et al., 2021; Yıldırım et al., 2020).

More recent research has evaluated specific alternative vinification approaches using natural additives derived from vineyard materials. While these methods may show potential under controlled conditions, they have not yet demonstrated equivalence to traditional sulfite-based systems. As noted by Mercanti et al. (2024), the absence of equally effective alternatives and the continued indispensable role of sulfur dioxide remain key conclusions in the literature.

Previous technical evaluations, including the 2011 Technical Review, have distinguished between sulfur dioxide gas and solid sulfite salts such as potassium metabisulfite based on differences in chemical form prior to use. However, the available scientific evidence demonstrates that these differences do not result in different functional outcomes in wine production. Potassium metabisulfite serves as a precursor to sulfur dioxide and is widely recognized as an established and effective means of delivering sulfur dioxide in winemaking practice.

The current petition builds on this established scientific foundation and does not introduce new or uncharacterized chemistry, toxicology, or environmental considerations. Instead, it addresses a practical and operational question not fully captured in earlier evaluations: the accessibility of sulfur dioxide in forms that are usable across diverse production contexts.

Taken together, the available research supports the conclusion that potassium metabisulfite functions as a well-understood source of sulfur dioxide in wine production, with the primary distinction relating to its form and method of delivery, rather than its behavior or impact once used in wine systems.

B.13. Petition Justification Statement:

A. Inclusion of a Synthetic on the National List at § 205.605(b)

Potassium metabisulfite is proposed for inclusion on the National List as a synthetic, nonagricultural substance for use as a source of sulfur dioxide in wine labeled “made with organic grapes,” under the existing annotation and sulfite limit of 100 ppm.

The evaluation of substances for inclusion on the National List is governed by the Organic Foods Production Act (OFPA), which establishes that synthetic substances may be permitted only if they are not harmful to human health or the environment, are necessary due to the lack of natural alternatives, and are compatible with organic production systems (7 U.S.C. §6517).

This petition addresses a specific and practical issue within organic wine production: ensuring that an already permitted and essential substance—sulfur dioxide—remains accessible and usable across diverse production contexts.

Necessity of the Substance for Handling

Sulfur dioxide is already recognized by the National Organic Standards Board (NOSB) and codified in the National List (§205.605(b)) as essential for wine production due to its unique and irreplaceable antimicrobial and antioxidant functions. This determination reflects longstanding scientific consensus and regulatory review that no alternative substance or method fully replicates its combined functionality across all stages of winemaking.

This petition does not seek to reestablish the necessity of sulfur dioxide. Rather, it addresses a practical limitation in the accessibility and use of an already permitted substance within diverse winery operations.

Sulfur dioxide may be introduced through multiple delivery forms, including compressed gas, prepared aqueous solutions, and solid sulfite salts such as potassium metabisulfite. While sulfur dioxide is currently permitted under the National List, access to practical delivery forms is not consistent across all regions and operations. Existing delivery systems may present constraints related to infrastructure, handling requirements, supplier availability, and cost.

Potassium metabisulfite provides an established and widely used means of delivering sulfur dioxide in wine production. Its inclusion would help ensure that producers can reliably access and utilize a substance already determined to be essential under organic standards, while maintaining the existing annotation and sulfite limitations.

Availability of Alternatives

Research and industry experience demonstrate that while a range of alternative approaches to sulfur dioxide in wine production have been explored—including sterile filtration, ultraviolet treatment, oxygen management using inert gases (e.g., nitrogen, argon), and emerging antimicrobial agents such as chitosan—these approaches typically address only specific aspects of microbial control or oxidation. Collectively, they do not replicate the full combination of antimicrobial, antioxidant, and carbonyl-binding functions provided by sulfur dioxide across all stages of wine production. In practice, these approaches are often used in combination with sulfites rather than as direct substitutes (USDA NOP, 2011; Silva & van Wyk, 2021; Yıldırım & Darıcı, 2020).

Sulfur dioxide may be introduced through multiple pathways, including sulfur dioxide gas, prepared aqueous solutions, or the dissolution of solid sulfite salts such as potassium metabisulfite. The relevant comparison for this petition is therefore not between potassium metabisulfite and alternative substances, but between different forms of sulfur dioxide delivery that establish the same functional system in wine.

While sulfur dioxide is currently permitted under the National List, its practical use depends on access to delivery forms that are usable within wine production systems. Access to these forms is not consistent across all regions or operations. Compressed sulfur dioxide gas systems are subject to regulatory, safety, and operational requirements that may include specialized equipment, trained personnel, monitoring systems, and, in some jurisdictions, additional compliance obligations (WorkSafeBC, 2023; OSHA, 2023; NIOSH, 2019; California Department of Pesticide Regulation, 2023; Napa County Agricultural Commissioner, 2022).

These requirements are appropriate and necessary to ensure safe use; however, they introduce practical constraints related to infrastructure, training, and ongoing compliance. In addition, access to sulfur dioxide gas or prepared aqueous solutions may vary depending on region, supplier availability, and operation scale, affecting consistent and reliable use across diverse production contexts. Industry experience indicates variability in supplier availability, distribution infrastructure, and cost associated with sourcing sulfur dioxide in usable forms. These factors directly influence production decisions and may disproportionately affect small and mid-scale producers, who may lack the infrastructure or supplier access needed to reliably obtain sulfur dioxide in usable forms.

While potassium metabisulfite is widely available through standard distribution channels and commonly used by the wineries growing certified organic grapes, it is not currently permitted under the National Organic Program as a source of sulfur dioxide. This creates a situation in which a permitted substance—sulfur dioxide—is not consistently accessible in a form that is practical for use across all operations.

In practice, this limitation influences production decisions and contributes to challenges in pursuing or maintaining organic certification at the winery level. For producers and handlers who are otherwise aligned with organic principles and already farming certified organic grapes, the inability to reliably access sulfur dioxide in usable forms creates a barrier to certification and limits the ability for wines labeled “made with organic grapes” to reach the marketplace and the shoppers seeking them.

Beneficial Effects Relative to Other Available Materials or Practices

The inclusion of potassium metabisulfite provides several beneficial effects relative to existing practices by enabling certification of wines produced from certified organic grapes that are already made using standard industry practices within existing regulatory limits.

First, it ensures consistent and practical access to an already permitted substance. By providing a stable, widely available, and easily handled form of sulfur dioxide, potassium metabisulfite addresses gaps in access to usable sulfur dioxide.

Second, the use of potassium metabisulfite reduces reliance on delivery systems that require specialized handling, infrastructure, or constrained supply chains. As a solid material, it can be transported, stored, and applied using standard winery practices, providing a more accessible and flexible means of generating sulfur dioxide in solution.

Third, and critically, allowing potassium metabisulfite will support producers and handlers in completing the certification pathway from vineyard to finished product, particularly where operational constraints have previously limited participation. By improving access to practical sulfur dioxide delivery tools, this change helps close the gap between organically grown grapes and wines labeled as “made with organic grapes,” enhancing market transparency and enabling producers to more fully realize the value of their organic practices.

Compatibility with Organic Systems

Potassium metabisulfite is compatible with organic wine production because it does not introduce a new functional substance or alter the fundamental nature of organic production systems. Rather, it provides a practical means of delivery.

The use of sulfur dioxide in wine is not discretionary in the sense of being easily replaced or avoided. It is a foundational tool that supports microbial stability, product quality, and shelf life. Without it, the risk of spoilage, oxidation, and product variability increases significantly. Potassium metabisulfite does not change this role; it enables producers to apply an already permitted substance in a manner that is safe, controlled, and operationally attainable.

Beyond functional equivalence, the inclusion of potassium metabisulfite supports the integrity and growth of organic wine production systems by addressing a key barrier between organic practices in the vineyard, organic certification of the winery, and organic representation (organic label claim on the front panel) in the marketplace.

Organic winegrowers are making significant investments in soil health, biodiversity, and ecological management at the vineyard level. These systems are designed to enhance long-term soil function, improve water retention, support beneficial organisms, and reduce reliance on external inputs. As climate variability increases—including drought stress, pest pressure, and extreme weather—these practices are demonstrating measurable resilience and adaptive capacity in vineyard systems.

However, under the current regulatory framework, limitations on practical sulfur dioxide delivery tools prevent many producers from translating organically grown grapes into wines labeled “made with organic grapes” through winery (handling) certification. This creates a disconnect between on-farm organic practices and consumer-facing organic products, limiting market visibility and return on investment for organic producers.

The inclusion of potassium metabisulfite directly addresses this barrier. By ensuring access to a practical and widely available form of sulfur dioxide, this petition enables more producers to complete the organic certification pathway from vineyard to finished product.

This has important downstream effects. Increased availability of wines labeled “made with organic grapes” strengthens the connection between organic production and consumer choice, allowing market demand to more accurately reflect the scale of organic practices already occurring in vineyards. In turn, this supports economic incentives for continued and expanded adoption of organic viticulture.

Organic winegrowing represents a distinct and values-driven approach to agriculture—one that prioritizes soil health, ecosystem function, and long-term resource stewardship. Supporting the viability of this system contributes to environmental benefits including improved soil structure, enhanced biodiversity, and greater resilience to climate stressors.

Because potassium metabisulfite functions solely as a delivery mechanism for sulfur dioxide within an already evaluated and accepted system, its use does not introduce new environmental or human health impacts beyond those previously considered. Instead, its inclusion supports the broader environmental, economic, and agricultural benefits associated with organic wine production by ensuring that essential tools remain accessible.

B.14. References

Biodynamic Federation Demeter International. (2018, revised 2025). *International Demeter Biodynamic Standard – Section 7.12: Wine and sparkling wine* (pp. 154–158). https://demeter.net/certification/standard/

California Department of Pesticide Regulation (DPR). (2023). *Qualified applicator certification requirements.* California Environmental Protection Agency. https://www.cdpr.ca.gov

Canadian General Standards Board (CGSB). (2026). *CAN/CGSB-32.311-2026: Organic production systems — Permitted substances lists* (Table 6.3, p. 41). Government of Canada. https://inspection.canada.ca/en/food-labels/organic-products/standards

Codex Alimentarius Commission. (n.d.). *INS 224 – Potassium metabisulfite.* Retrieved May 2, 2026, from https://www.fao.org/gsfaonline/groups/details.html?id=161

Cojocaru, G. A., & Antoce, A. O. (2012). *Chemical and biochemical mechanisms of preservatives used in wine: A review.* Scientific Papers, Series B, Horticulture. https://horticulturejournal.usamv.ro/pdf/vol12issue4/Art79.pdf

de la Guía, E. R., et al. (2025). *May sulfites in wine affect gut microbiota?* Journal of Agricultural and Food Chemistry, 73, 19397–19409. https://pmc.ncbi.nlm.nih.gov/articles/PMC12510145/

Dordevic, D., Capikova, J., Dordevic, S., Tremlová, B., Gajdács, M., & Kushkevych, I. (2023). *Sulfur content in foods and beverages and its role in human and animal metabolism: A scoping review of recent studies.* Heliyon, 9, e15452. https://pubmed.ncbi.nlm.nih.gov/37123936/

Esseco USA. (n.d.). *Potassium metabisulfite safety data sheet (SDS).* https://www.essecousa.com/wp-content/uploads/2017/10/Esseco-USA-Potassium-Metabisulfite-SDS-2022.pdf

European Commission. (2008). *Regulation (EC) No 1333/2008 on food additives.* https://food.ec.europa.eu/food-safety/food-improvement-agents/additives/eu-rules_en

European Food Safety Authority (EFSA). (2016a). *Safety assessment of the active substance potassium metabisulfite (E224) for use in active food contact materials.* EFSA Journal, 14(5), 4465. https://efsa.onlinelibrary.wiley.com/doi/10.2903/j.efsa.2016.4465

European Food Safety Authority (EFSA). (2016b). *Scientific opinion on the re-evaluation of sulfur dioxide (E220) and sulfites (E221–228) as food additives.* EFSA Journal, 14(4), 4438. https://doi.org/10.2903/j.efsa.2016.4438

European Union. (2018). *Regulation (EU) 2018/848 on organic production and labeling of organic products.* https://eur-lex.europa.eu/eli/reg/2018/848/oj

Food and Agriculture Organization of the United Nations & World Health Organization (FAO/WHO). (2008). *Evaluation of certain food additives: Sixty-ninth report of the Joint FAO/WHO Expert Committee on Food Additives (JECFA).* https://www.who.int/publications/i/item/9789240083059

Henderson, P. (2008). *Sulfur dioxide: Science behind this anti-microbial, anti-oxidant wine additive.* https://www.gencowinemakers.com/docs/Sulfur%20Dioxide-Science%20Behind%20this%20Anti-microbial%2C%20Anti-oxidant%20Wine%20Additive.pdf

IOC (Institut Oenologique de Champagne). (n.d.). *Potassium metabisulfite safety data sheet (SDS).* https://tinyurl.com/3z4a8vxw

Iowa State University Extension and Outreach. (2022). *Sulfur dioxide use in winemaking (FS53).* https://shop.iastate.edu/extension/family-food-health/food-and-nutrition/food-safety/fs53.html

L.D. Carlson Company. (n.d.). *Safety Data Sheet: Campden Tablets (potassium metabisulfite formulation)*. https://ldcarlson.com/wp-content/uploads/2017/07/Campden-Tablets-SDS.pdf

Matheson Gas. (n.d.). *Wine production gases and equipment brochure.* https://www.mathesongas.com/pdfs/wine-production-brochure.pdf

Mercanti, N., et al. (2024). *Towards sulphite-free winemaking: A new horizon of vinification and maturation.* Foods, 13, 1108. https://doi.org/10.3390/foods13071108

Monro, T. M., et al. (2012). *Sensing free sulfur dioxide in wine.* Sensors, 12, 10759–10773. https://doi.org/10.3390/s120810759

Napa County Agricultural Commissioner. (2022). *Pesticide use reporting and operator identification requirements.* https://www.countyofnapa.org/273/Agricultural-Commissioner

National Institute for Occupational Safety and Health (NIOSH). (2019). *Sulfur dioxide: Immediately dangerous to life or health (IDLH) values.* https://www.cdc.gov/niosh/idlh/7446095.html

Nardini, M., & Garaguso, I. (2018). *Effect of sulfites on antioxidant activity, total polyphenols, and flavonoid measurements in white wine.* Foods, 7(3), 35. https://doi.org/10.3390/foods7030035

Occupational Safety and Health Administration (OSHA). (2023). *Sulfur dioxide: Occupational safety and health standards.* https://www.osha.gov/chemicaldata/chemResult.html?recNo=476

Organic Foods Production Act (OFPA), 7 U.S.C. §6510. https://uscode.house.gov/view.xhtml?path=/prelim@title7/chapter94&edition=prelim

Silva, A., Cosme, F., & Filipe-Ribeiro, L. (2021). *Emerging non-thermal technologies as alternatives to sulfur dioxide in wine production.* Foods, 10(9), 2116. https://doi.org/10.3390/foods10092175

Soil Association. (2025). *Organic wine standards* (pp. 113–120). https://www.soilassociation.org/media/25996/sa-ni-food-drink.pdf

Spormann, W., Heinke, J., & Luedemann, H. (1968). *Production of solid potassium metabisulfite.* U.S. Patent 3,369,866. https://patents.google.com/patent/US3369866A

TTB (Alcohol and Tobacco Tax and Trade Bureau). (n.d.). *27 CFR Part 24 – Wine production regulations.* https://www.ecfr.gov/current/title-27/chapter-I/subchapter-A/part-24

U.S. Environmental Protection Agency (EPA). (2020). *Sulfur recovery units (Claus process).* https://www.epa.gov/sites/default/files/2020-09/documents/8.13_sulfur_recovery.pdf?utm_source=chatgpt.com

U.S. Food and Drug Administration (FDA). (2023). *Potassium metabisulfite; affirmed as generally recognized as safe (21 CFR §182.3637).* https://www.ecfr.gov/current/title-21/chapter-I/subchapter-B/part-182/subpart-D/section-182.3637

USDA, National Organic Standards Board (NOSB). (1995). *TAP review: Sulfur dioxide.* https://www.ams.usda.gov/sites/default/files/media/Sulfur%20dioxide%20report%20processing%201995.pdf

USDA, Agricultural Marketing Service, National Organic Program (USDA NOP). (2011). *Technical evaluation report: Sulfur dioxide.* https://www.ams.usda.gov/sites/default/files/media/Sulfur%20dioxide%20smoke%20bombs%20report%202011.pdf

USDA, Agricultural Marketing Service, National Organic Program (USDA NOP). (n.d.). *7 CFR §205.605(b) – National List of allowed and prohibited substances (handling).* Electronic Code of Federal Regulations (eCFR). Retrieved May 2026, from https://www.ecfr.gov/current/title-7/part-205/section-205.605

Vally, H., & Misso, N. L. A. (2012). *Adverse reactions to the sulphite additives.* Gastroenterology and Hepatology From Bed to Bench, 5(1), 16–23. https://pubmed.ncbi.nlm.nih.gov/24834193/

Wang, S., et al. (2023). *Sulfites in wine effect on cardiovascular diseases.* International Journal of Food Science and Nutrition, 8(2), 73–76. https://www.foodsciencejournal.com/assets/archives/2023/vol8issue2/8035-1687005448503.pdf

WorkSafeBC. (2023). *Working safely with sulfur dioxide and KMS in wineries (WS 2023-01).* https://www.worksafebc.com/en/resources/health-safety/bulletins/working-safely-sulfur-dioxide-kms-wineries?lang=en

Yıldırım, H. K., et al. (2020). *Alternative methods to sulfur dioxide in wine production.* Journal of Food Processing and Preservation, 44(6), e14485. https://www.researchgate.net/publication/342444928_ALTERNATIVE_METHODS_OF_SULFUR_DIOXIDE_USED_IN_WINE_PRODUCTION

Zoecklein, B. W. (2014). *Sulfur dioxide (SO_2) in wine production.* Virginia Tech. https://enology.fst.vt.edu/downloads/wm_issues/Sulfur%20Dioxide.pdf

SAFETY DATA SHEET

POTASSIUM METABISULFITE

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Potassium Metabisulfite

OTHER/GENERIC NAMES: Anhydrous Potassium Bisulfite
Potassium Pyrosulfite
Potassium Acid Sulphite

PRODUCT USE AND RESTRICTIONS ON USE: Drug manufacture, food additive, water treatment, textile manufacture, photographic chemicals, and other chemical processes.

SUPPLIER: Esseco USA LLC
4 Gatehall Drive
Parsippany, NJ 07054

MANUFACTURER: Esseco Srl
Via San Cassiano 99
San Martino die Trecate Novara 28069
Italy

FOR MORE INFORMATION CALL: 973-267-3330
(Monday-Friday, 9:00am-4:30pm)
FOR EMERGENCY IN USA, CALL CHEMTREC: 800-424-9300
(24 Hours/Day, 7 Days/Week)

2. HAZARDS IDENTIFICATION

GHS Classification

Eye Damage Category 1
Skin Irritation Category 2

Label Elements:

DANGER!

Causes serious eye damage.
Causes skin irritation.

Wash hands thoroughly after handling.
Wear protective gloves and eye protection.

POTASSIUM METABISULFITE

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a POISON CENTER or doctor.
IF ON SKIN: Wash with plenty of water.
If skin irritation occurs: Get medical advice.
Take off contaminated clothing and wash it before reuse.

3. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NUMBER	WEIGHT %
Potassium metabisulfite	16731-55-8	≥97

Trace impurities and additional material names not listed above may appear in Section 15 of this SDS. These materials may be listed for local "Right-To-Know" compliance and for other reasons. The exact concentrations are a trade secret.

4. FIRST AID MEASURES

SKIN: Wash skin with plenty of soap and water. Remove contaminated clothing and launder before reuse. Get medical attention if irritation persists.

EYES: Flush eyes immediately with water for at least 15 minutes. Remove contact lenses if present after the first 5 minutes if you can do so easily and continue flushing. Get immediate medical attention.

INHALATION: Remove to fresh air. Get immediate medical attention if signs of suffocation, irritation, difficulty breathing, or other symptoms develop.

INGESTION: Rinse mouth with water and give 1 glass of water to drink. Do not induce vomiting unless directed to do so be medical personnel. Get medical attention if symptoms develop.

MOST IMPORTANT SYMPTOMS/EFFECTS, ACUTE AND DELAYED: May irritate the skin. May cause irritation and/or burns to the eyes. Harmful if swallowed or inhaled. May cause severe and possibly fatal allergic reactions if inhaled or swallowed by some asthmatics and other 'sulfite-sensitive' individuals. Reacts with acids to form toxic and irritating sulfur dioxide gas. Releases sulfur dioxide if heated above 300°C (572°F).

INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT, IF NEEDED: Immediate medical attention is required for eye contact or allergic respiratory reaction. Treat symptomatically. Note potential for anaphylactic shock with allergic individuals.

5. FIRE FIGHTING MEASURES

SUITABLE (AND UNSUITABLE) EXTINGUISHING MEDIA:
Material is not flammable. Use extinguishing media appropriate for material in surrounding fire.

SPECIFIC HAZARDS ARISING FROM THE CHEMICAL:
Releases toxic and irritating sulfur dioxide at fire temperatures.

SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIRE-FIGHTING:
Wear NIOSH-approved self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT, AND EMERGENCY PROCEDURES: Provide ventilation to clear sulfur dioxide fumes which may be generated by contact with water. Wear appropriate personal protective equipment.

ENVIRONMENTAL PRECAUTIONS: Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP: Promptly sweep up material with minimum dusting and shovel into an empty container with a cover. Rinse spill area with plenty of water.

7. HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING: (See section 8 for recommended personal protective equipment.)
Avoid contact with skin, eyes and clothing. Do not breathe dust. Do not eat or drink in the work area. Use normal personal hygiene and housekeeping. Keep away from water, ice, acids, heat and oxidizing agents.

CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES:
Store in a cool, dry, well-ventilated area away from water, ice, acids, and oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE GUIDELINES

INGREDIENT NAME	ACGIH TLV	OSHA PEL	OTHER LIMIT
Potassium metabisulfite	None	None	None

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS:
Sulfur dioxide: OSHA TWA = 5 ppm
ACGIH STEL = 0.25 ppm

APPROPRIATE ENGINEERING CONTROLS:
Local exhaust if dusty conditions exist or if there is a release of sulfur dioxide gas. Do not use in unventilated spaces, e.g., the holds of fishing boats, walk-in coolers or confined spaces.

INDIVIDUAL PROTECTION MEASURES, SUCH AS PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION: For handling dry material, wear rubber gloves and full work clothing, including long-sleeved shirt and trousers. When handling solutions and there is prolonged or repeated contact, wear impervious gloves, clothing and boots.

EYE PROTECTION: Wear chemical safety goggles.

POTASSIUM METABISULFITE

RESPIRATORY PROTECTION: Where required, use a NIOSH-approved respirator for dust, mist and/or sulfur dioxide gas, as conditions indicate. Some exposures may require a NIOSH-approved self-contained breathing apparatus or supplied-air respirator. Equipment selection depends on contaminant type and concentration. Select in accordance with 29 CFR 1910.134 and good industrial hygiene practice.

ADDITIONAL RECOMMENDATIONS: Eyewash and safety shower are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	White crystalline solid.
PHYSICAL STATE:	Solid.
ODOR:	Slight sulfur dioxide odor.
ODOR THRESOLD:	Not determined.
MOLECULAR WEIGHT:	222.32
CHEMICAL FORMULA:	$K_2S_2O_5$
RELATIVE DENSITY (water = 1.0):	1.20
SOLUBILITY IN WATER:	450 g/l H_2O at 20°C (68°F)
pH:	5% solution - 3.5-4.5
INITIAL BOILING POINT/RANGE:	Not applicable.
MELTING/FREEZING POINT:	Begins to rapidly decompose above 150°C (302°F)
VAPOR PRESSURE:	Not applicable.
RELATIVE VAPOR DENSITY (air = 1.0):	Not applicable.
EVAPORATION RATE:	Not applicable. **COMPARED TO:** Not applicable.
% VOLATILES:	Not applicable.
PARTITION COEFFICIENT (N-OCTANOL/WATER):	Not determined.
KINEMATIC VISCOSITY:	Not applicable.
FLASH POINT:	Not flammable.
FLASH POINT METHOD:	Not applicable.
AUTOIGNITION TEMPERATURE:	Not applicable.
UPPER FLAME LIMIT (volume % in air):	Not applicable.
LOWER FLAME LIMIT (volume % in air):	Not applicable.
DECOMPOSITION TEMPERATURE:	Not determined.
FLAMMABILITY:	Not flammable.
OSHA FLAMMABILITY CLASS:	Not applicable.
PARTICLE CHARACTERISTICS:	Not available.

10. STABILITY AND REACTIVITY

REACTIVITY:
Not normally reactive

CHEMICAL STABILITY:
Normally stable.

POSSIBILITY OF HAZARDOUS REACTIONS:
Reacts with acids to form toxic and irritating sulfur dioxide gas.

CONDITIONS TO AVOID:
Avoid elevated temperatures. Temperatures above 150°C (302°F) cause the rapid evolution of toxic and corrosive sulfur dioxide gas.

INCOMPATIBILITIES:
Oxidizers: may cause strong exothermic reactions.
Acids, water and ice: releases sulfur dioxide gas which is toxic, corrosive, and potentially deadly.

HAZARDOUS DECOMPOSITION PRODUCTS:
Reaction with acids and thermal decomposition will generate sulfur dioxide and potassium sulfate.

11. TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH HAZARDS

ACUTE EFFECTS OF EXPOSURE:

SKIN: Repeated or prolonged contact with dust may cause irritation. Contact with solutions will cause skin irritation and possibly burns.

EYES: Dust or mist may irritate or burn the eyes. Solutions will irritate or burn. Permanent eye injury is possible.

INHALATION: Inhalation of dust or mist can irritate the respiratory tract. May cause severe or deadly allergic reactions in some asthmatics and sulfite sensitive individuals. Possible signs and symptoms of allergic reactions include bronchoconstriction, sweating, flushing, hives, rapid heart rate, decreased blood pressure, and anaphylaxis. Contact with acids, water and/or ice, releases sulfur dioxide gas which may be harmful or deadly if inhaled.

INGESTION: May irritate the gastrointestinal tract. May cause severe or deadly allergic reactions in some asthmatics and sulfite sensitive individuals. Very large doses may cause violent colic, diarrhea, depression, and even death.

CHRONIC EFFECTS: None known.

Ingredients found on one of the three OSHA designated carcinogen lists are listed below.

INGREDIENT NAME	NTP STATUS	IARC STATUS	OSHA LIST
No ingredients listed in this section.	----	----	----

NUMERICAL MEASURES OF TOXICITY:

Immediate (Acute) Effects:
Potassium metabisulfite – LD_{50} (oral, rat) = 2300 mg/kg

Delayed (Subchronic and Chronic) Effects:
No data currently available.

Other Data:
None

12. ECOLOGICAL INFORMATION

ECOTOXICITY:

POTASSIUM METABISULFITE

If discharged into surface water, the product can cause considerable oxygen reduction, with negative consequences on living organisms.

Brachydemio rerio 96 hrs LC50	460-1000 mg/L
Pseudomonas putida 17 hr EC50	65 mg/L

PERSISTENCE AND DEGRADBILITY:
Chemical Oxygen Demand (COD) 140 mg/g (calculated)

BIOACCUMULATIVE POTENTIAL:

Distribution coefficient n-octanol/water	-4.0

MOBILITY IN SOIL:
No data available

OTHER ADVERSE EFFECTS:
No data available.

13. DISPOSAL CONSIDERATIONS

RCRA

Is the unused product a RCRA hazardous waste if discarded? No

If yes, the RCRA ID number is: Not applicable.

OTHER DISPOSAL CONSIDERATIONS:
Dispose of in accordance with applicable Federal, State and Local regulations.

The information offered in section 13 is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

US DOT HAZARD CLASS:	Not regulated.
US DOT ID NUMBER:	Not applicable.
PROPER SHIPPING NAME:	Not applicable.

For additional information on shipping regulations affecting this material, contact the information number found in Section 1.

15. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS:	All components are listed on TSCA Inventory of Chemical Substances.
OTHER TSCA ISSUES:	None.

SARA TITLE III/CERCLA
"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

INGREDIENT NAME	SARA/CERCLA RQ (lb)	SARA EHS TPQ (lb)

POTASSIUM METABISULFITE

No ingredients listed in this section.	----	----

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee. Many states have more stringent regulations. Report all spills in accordance with local, state and federal regulations.

SECTION 311 HAZARD CLASS: See OSHA Hazard Classification in Section 2.

SARA 313 TOXIC CHEMICALS:
The following ingredients are SARA 313 "Toxic Chemicals" and may be subject to annual reporting requirements. CAS numbers and weight percents are found in Section 2.

INGREDIENT NAME	COMMENT
No ingredients listed in this section.	----

STATE RIGHT-TO-KNOW
In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

INGREDIENT NAME	WEIGHT %	COMMENT
No ingredients listed in this section.	----	----

CALIFORNIA PROPOSITION 65
This product does not contain any ingredients known to the State of California to cause cancer and/or reproductive harm.

ADDITIONAL REGULATORY INFORMATION:
None

FOREIGN CHEMICAL CONTROL INVENTORY STATUS:
Listed on Canadian DSL, Australian AICS, Philippines PICCS, Chinese IECSC, Japanese MITI, Korean KECL, and EU EINECS.

16. OTHER INFORMATION

CURRENT ISSUE DATE: January, 2026
PREVIOUS ISSUE DATE: December, 2021

CHANGES TO SDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:
Updated for HCS 2024. Updated classification based on newly available information.

OTHER INFORMATION: Only NF grade is for use in drug formulation. Only Food Grade material is for use as a food additive.