



SASSI Position Statement:

Synthetic Silicon Dioxide vs Organic Rice Hulls

Purpose: The Synthetic Amorphous Silica and Silicate Industry Association (SASSI) is offering substantiating evidence (which can be incorporated into the organic plans), justifying the continued use of silicon dioxide in lieu of organic rice hulls. Any customer of SASSI member companies that is required to complete organic plans for food processing can use this evidence.

SASSI is a national trade association whose mission includes furthering the understanding of synthetic amorphous silica and silicate health and safety data within the industry, monitoring the regulation of synthetic amorphous silica and silicate by government, educating the public and government on the views of the industry, and consulting and cooperating with officials and agencies on matters having an industry-wide significance.

Consistent with its mission, and on behalf of its members, SASSI submitted comment letters to NOSB and AMS/USDA in 2011, 2012 and 2013, on the proposal to amend the annotation for silicon dioxide in CFR 205.605(b): “Silicon dioxide—Permitted as a defoamer. Allowed for other uses when organic rice hulls are not commercially available.” (These comments letters are available on request from SASSI.)

In our comment letters and in presentations by member companies at an NOSB meeting in November 2010, SASSI provided evidence demonstrating that organic rice hulls (aka: Ribus Ground Up Rice Hulls; Ribus Nu-FLOW) are not a viable replacement for synthetic silicon dioxide in most anti-caking and free-flow applications.

Despite SASSI and its members' comments, the amendment was promulgated as a final rule on November 3, 2013. While silicon dioxide previously was generally allowed as a synthetic substance in organic products, now silicon dioxide is only generally permitted as a defoamer and is allowed for other uses (such as anti-caking or free flow agent) when organic rice hulls are not commercially available.

Organic customers may now be required to provide evidence that organic rice hulls are not commercially available when applying for organic certification. Commercial availability is described in 7 CFR 205.105 as “the ability to obtain a production input in an appropriate form, quality, or quantity to fulfill an essential function in a system of organic production or handling, as determined by the certifying agency in the course of reviewing the organic plan.”

(Additional text from *Federal Register* Number 2013-12504 (May 28, 2013): Silicon dioxide: “AMS believes the rule, as proposed and as adopted as final rule through this action, provides the flexibility that is needed by organic handlers. As indicated in the proposed rule, the annotation for silicon dioxide allows for the continued use of silicon dioxide in handling applications if organic rice hulls do not adequately substitute for the functionality provided by silicon dioxide. The term “commercially available” is defined under section 205.2 of the USDA organic regulations as “the

ability to obtain a production input in an appropriate form, quality, or quantity to fulfill an essential function in a system of organic production or handling, as determined by the certifying agent in the course of reviewing the organic plan.” Linking the use of silicon dioxide by annotation to the commercial availability of organic rice hulls reflects the NOSB's intent to permit the use of synthetic silicon dioxide when organic rice hulls do not fulfill an essential function in a system of organic handling, as determined by the certifying agent in the course of reviewing the organic plan. Inclusion of the commercial availability clause for organic rice hulls in the annotation provides the flexibility that was intended by the NOSB and does not exclude handlers from using silicon dioxide or other organic products in those applications where organic rice hulls do not provide the functionality needed. The annotation requires handlers to use organic rice hulls in place of silicon dioxide when it is available to substitute for synthetic silicon dioxide. In addition, the rule provides flexibility for handlers by allowing the continued use of silicon dioxide in those applications where organic rice hulls do not provide the functionality needed (e.g., as a defoamer). This rule implements the intent of the NOSB to limit the allowance of silicon dioxide to those functions where it is essential for the handling of organically produced agricultural products, as required by section 205.600(b)(6).”)

SASSI's Position:

Based on several SASSI members' evaluations of organic rice hulls as a replacement for synthetic amorphous silicon dioxide in a range of typical application, including as an anti-caking/free flow aid in three representative powders (non-dairy creamer, chili and garlic seasoning, and cheese powder) and as an anti-caking/free flow aid in a dried white topping and in a dried tomato soup mix. SASSI is providing evidence that clearly shows that with few exceptions (none found but allowing for the potential) organic rice hulls are not a viable replacement as demonstrated by lack of functionality. Because of their chemical composition and physical properties, as reflected in the W. R. Grace analysis, organic rice hulls should not be expected to be a viable replacement.

Executive Summary of Results:

1. Evonik Corporation: *Project 875: Comparison of Evonik SiO₂ to Ribus Nu-FLOW in Food Applications:*

Organic rice hulls were evaluated for use as an anti-caking/free flow aid in three representative powders: non-dairy creamer, chili and garlic seasoning, and cheese powder.

Conclusions: “For the three materials tested, no improvements were observed when a material was treated with Ribus Nu-FLOW relative to the untreated control. In all cases, the addition of the Nu-FLOW did not improve flow or reduce caking tendency when compared to the control. While at the same treatment level, the silicon dioxide samples improved the properties of each host powder. The claim that the Nu-FLOW is a one-to-one replacement for silicon dioxide in spray-dried powders and seasonings was found to be inaccurate. Not only was the performance poor when compared to silica, in most cases there was no improvement from the untreated control, seen especially in Figure 1. From this analysis of the Nu-FLOW material with these three base powders, it can be concluded that it is not a sufficient anti-caking or free flow aid.”

2. J.M. Huber: *Technical Service Report: Evaluation of Nu-FLOW Ribus Inc.*

Organic rice hulls were evaluated for use as an anti-caking/free flow aid in dried white topping and in a dried tomato soup mix.

Conclusions: Huber tested the Nu-FLOW material and compared it to several commercially available, Huber-manufactured synthetic amorphous silica grades in the following series of tests: Caking, Flowdex Flowability, Aeroflow Powder Flowability, and Hosokawa Powder Tester Angle of Repose. “In conclusion, the data shows that even though Nu-FLOW is advertised as a 1:1 replacement for silicon dioxide, it does not show any noticeable benefit as an anti-caking/free-flow aid in the food substrates tested.”

3. W. R. Grace: *Substance Characterization Report: R-70 Rice Shell Silica; and Investigation of Material Properties: Rice Shell Silica (TEMLAUS2):*

Conclusions: “The RFA and the element screening determined the amount of silica bound as SiO₂ with 17.77 wt%. The material does not consist of SiO₂ as major constituent. Furthermore, the material does not fulfill the requirements for silicon dioxide listed under (EC) No 1333/2008 E551.” “In addition, the REACH sameness criteria to be covered by silicon dioxide, synthetic amorphous are not fulfilled.” “TEM micrographs: It can be concluded that the appearance of the sample is very diverse: The sample contains structures without a distinct morphology and a second fraction of part aggregates that show morphology that is comparable to the one known for pyrogenic silica nanoparticle samples obtained by the pyrolysis of other starting materials.”

In addition to the comment letters, in the event that these reports may be useful to customers in the course of an organic plan review, SASSI member companies W. R. Grace, J.M Huber and Evonik Corporation have authorized the dissemination of the complete reports conducted on organic rice hulls. Please contact SASSI at jcarpenter@sassiasociation.org request copies of the reports and/or the comment letters.

AMS References:

Please refer to docket AMS-NOP-12-0016

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