

Insights into the Moisture Protecting Properties of Nutracore™ Label Friendly Filler

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Introduction and Objectives

Nutritional products, including protein powders, vitamins, and dietary supplements, are often sensitive to moisture, where even slight humidity increase can lead to undesirable outcomes. For instance, protein powders can agglomerate rendering them unpalatable and challenging to mix. Vitamins, may degrade rapidly, resulting in a loss of potency and dietary supplements can become a breeding ground for microbial activity. To safeguard the quality and effectiveness of these products, it is imperative to store them in moisture-resistant packaging and adhere to the recommended storage conditions. This diligence is crucial for both manufacturers and consumers to ensure that the nutritional products maintain their integrity and support optimal health and wellness for the consumer.

Nutraceutical Label Friendly Filler (Nutracore), has been found to provide superior protection against moisture for sensitive nutritional supplements due to its ability to tightly bind and hold onto water in tablet and capsule formulations.

Methods

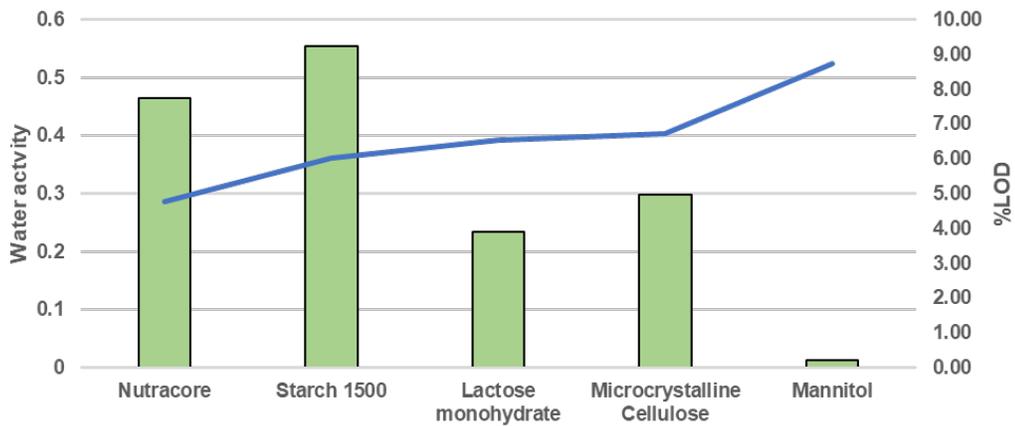
The water activity (a_w) and dynamic vapor sorption (DVS) behaviour were measured using a Rotronic HygroLab 3, Loss on Drying was measured using Mettler Toledo HX204 Excellence Plus Moisture Analyser and DVS Intrinsic (Surface Measurement Systems) equipment, respectively.

Results

Moisture content and Water Activity

Figure 1 gives the Loss on Drying (LOD) and water activity of various excipients measured at 21 °C. LOD shows the amount of water that is held inherently by an ingredient. Compared to other commonly used fillers, Nutracore has a slightly higher LOD; however, it also has the lowest water activity (a_w) which means it has the highest capacity for binding to moisture, and thus preventing it from interacting with other moisture sensitive ingredients such as the active ingredients in nutritional supplements. **Nutraceutical shows the lowest water activity compared to other excipients.**

Figure 1. Loss on Drying and Water activity of Nutracore of common excipients



- Water activity (aw) is a measure of thermodynamic energy of freely available water
- Low level of free water means reduced likelihood of nutritional ingredient degradation
- Water activity values range from aw=0 (completely dry) to aw=1.0 (pure water)
- Low aw means water is strongly bound and free water less available for chemical reactions

Dynamic Vapor Sorption (DVS)

- DVS is a gravimetric sorption/desorption technique that measures how quickly and how much water is sorbed or desorbed by a sample at controlled relative humidity (RH) conditions.
- Rapidly measures uptake and loss of moisture by flowing a carrier gas at a specified relative humidity over the sample.
- Two cycles of sorption and desorption form a loop called hysteresis, which is a fingerprint for a powder, as not all the sorbed water can dissociate during desorption or drying.

Similar to Starch 1500 (Figure 2), DVS analysis shows that Nutracore (Figure 3) has a greater capacity to bind with water and hold onto it.

Figure 2. DVS profile of Starch 1500

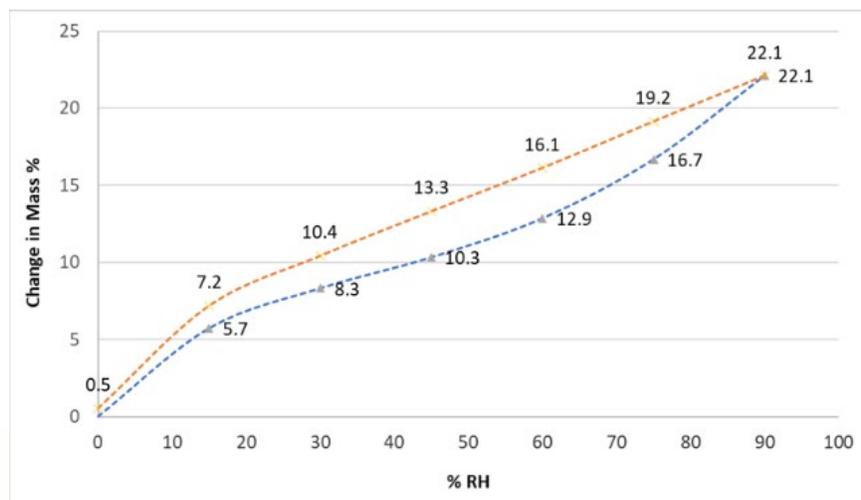
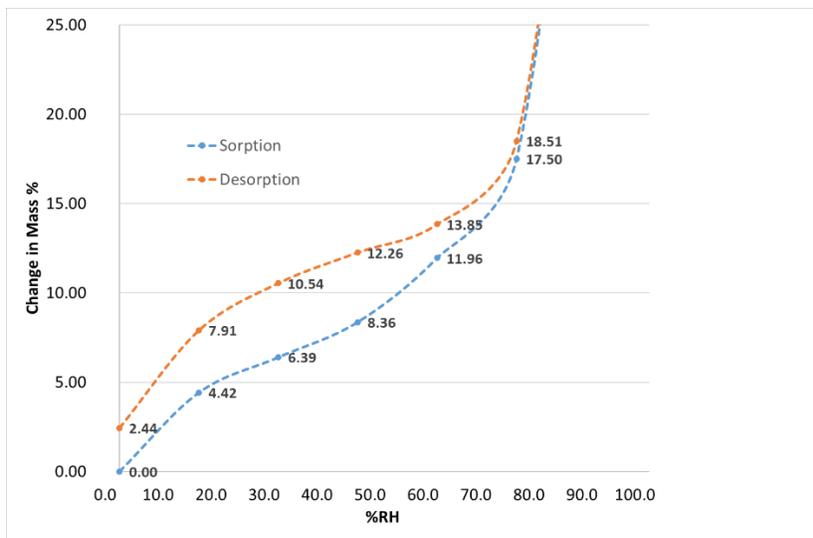


Figure 3. DVS profile of Nutracore Filler (NCF180049)



Conclusions and Discussion

Nutraceutical™ Label Friendly Filler, demonstrates excellent moisture scavenging properties compared to other commonly used pharmaceutical excipients, making it an excellent choice as part of a strategy for managing moisture, particularly when used in combination with Nutrafinish® Moisture Protection Coatings.

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