Chondroitin Adulteration Still Rampant

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Posted on: 02/05/2014

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ChromaDex operates a third-party laboratory that tests for chondroitin to ensure it is consistent with a supplier's claims. Frank Jaksch, CEO of ChromaDex in Irvine, CA, said more than half the samples tested fail.

Even though ChromaDex has been testing chondroitin for a decade, and FDA's years-old cGMPs (current good manufacturing practices) require manufacturers of dietary supplements to test their ingredients, Jaksch said the failure rates have remained the same.

Experts maintain such failures are symptomatic of a widespread problem: ingredient suppliers are substituting chondroitin with cheaper substances that are often ending up on store shelves across America. For instance, *Consumer Reports* revealed in its October 2013 issue that seven of 16 glucosamine/chondroitin supplements it tested did not contain their claimed level of chondroitin.

Chondroitin comes into the United States from as far away as India and China. While U.S. manufacturers of dietary supplements have an obligation under FDA's cGMPs to test their ingredients, experts note certain testing methods are unreliable.

For instance, Jaksch contends a U.S. Pharmacopeia (USP) testing method known as cetyl pyridinium chloride (CPC) titration is incapable of distinguishing between chondroitin and a similar polysaccharide such as inulin. Others pointed out similar flaws in the CPC titration method.

Weiguo Zhang, president and COO of Synutra International Inc., recommended using CPC testing in combination with another method (cellulose acetate membrane electrophoresis).

Zhang told **Natural Products INSIDER** that "the two methods complement each other to keep the CPC value true and the material pure."

Xiaoming (Sandy) Chien, Ph.D., vice president of Innovative Products at HORN Nutraceuticals, said there are a number of alternative methods to test chondroitin sulfate, including carbazole, reversed phase HPLC and most recently enzymatic HPLC.

"One of the [testing] challenges is the nature of the material itself," Chien said in a written statement to **INSIDER**. " Chondroitin sulfate has broad molecular weight variation due to its various sources, its poor UV absorbance, and strong ionic nature. The other challenge includes impurities and adulterants in chondroitin sulfate materials."

Experts also acknowledge some testing methods are more expensive than others, giving companies an incentive to opt for cheaper methods that may be less reliable.

USP's testing method "has opened up windows for sophisticated adulterants," Chien said.

Zhang cited a number of reasons for chondroitin's adulteration problem including the following: pricing pressure pushes industry to cut cost; lack of regulatory enforcement across nations and jurisdictions; lack of effective testing methodologies; substandard sourcing practices; and purposefully using less chondroitin than the label claim.

While Jaksch has not observed harmful adulterants used in chondroitin, he pointed out intentional adulteration still constitutes fraud because consumers are not buying what they were promised.

"A majority of what we see is intentional adulteration," he said.

Read more about the joint health industry's challenges and considerations in **INSIDER**'s Joint Health Digital Issue.