Can Selenium Be Administered In Drinking Water?

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Selenium inclusion in feed to food producing animals is regulated by FDA. Due to the potential toxic effects of over-feeding, FDA strictly regulates the quantity of selenium that can be added to feedstuffs. The maximum allowable amount that can be added to complete feeds is 0.3 ppm. The complete ruling can be found in the Code of Federal Regulations, Title 21, Chapter 1, Subchapter E, Part 573, Section 573.920. In no part of Section 573.920 is water administration discussed, only regulations for feed addition.

FDA was contacted shortly after Stuart Products launched EMCELLE TOCOPHEROL (vitamin E as d-*alpha*-tocopherol) about the administration of selenium in drinking water in combination with vitamin E. FDA informed us that according to the above CFR regulation, selenium **can not** be administered in drinking water.

However, several companies sell a liquid vitamin E/selenium supplement that was originally labeled for addition to drinking water. Since 2010, these companies have been required by FDA to change labeling to remove drinking water directions. Some companies now put "*Liquid Supplement For Further Manufacture of Feed*" on the label. Presently, most labels now have no drinking water directions on these liquid vitamin E/selenium products, but companies via the internet and technical support still recommend that these products be added to drinking water. The picture shows a sticker on a product with drinking water directions: "1 Gallon to 16 Gallons Stock Solution". Even though the label says for feed only, it continues to be recommended for use in drinking water.

There are three concerns with these vitamin E/selenium products: Safety, Efficacy, and Legality.

Safety. The main reason that selenium is regulated by FDA is the potential for toxicity when excessive selenium is consumed by animals through drinking water. The safety margin between selenium requirement and toxicity is very narrow. Recently in Florida, polo horses were injected with a compounded product containing excessive selenium. More than 20 horses died after being injected with the product due to selenium toxicity.

Another concern with most vitamin E/selenium products is the safety of the formula. They contain only oil-soluble ingredients and no water. Since selenium is only water soluble, selenium will settle out if not shaken well before each use. These products contain vitamin E oil, propylene glycol, vegetable oil and sodium selenite. Since sodium selenite is water soluble, what in the product will solubilize the sodium selenite? Nothing, hence settling. If these products are not well stirred before use then the selenium can settle to the bottom of the container. This potentially could create excess selenium supplementation when contents from the bottom of the container are used.

Efficacy. After an exhaustive search of the literature, only one published paper was found on the use of a vitamin E/selenium product in pig's drinking water and it showed no significant improvement in vitamin E or selenium status. Most of these products are sold on "concept" and not on efficacious data. Results showing that pigs consuming EMCELLE TOCOPHEROL had higher serum alpha-tocopherol status compared to a vitamin E/selenium product has been published (Stuart, et al. Proceedings 2011 AASV Annual Meeting).

Legality. According to FDA, the use of selenium in drinking water is **not permitted**. For companies to continue to recommend selenium-containing products in drinking water is unethical and inappropriate. The potential risk for toxicity is too great. Since selenium is not a drug, extra-label use is not allowed.

There are no regulations on the use of vitamin E products in drinking water. Before purchasing such products ask the supplier for efficacy data to support the use of vitamin E-containing products in drinking water.

If you require further clarification, please contact your state feed control official or FDA Center for Veterinary Medicine.