LETTER TO THE EDITOR

Organic selenium vs. its combination with sodium selenite in poultry nutrition: food for thoughts

Peter F. Surai[*,†,1]

[*]*Vitagene and Health Research Centre, Bristol, BS4 2RS, United Kingdom; and* [†]*Saint-Petersburg State Academy of Veterinary Medicine, 196084, St. Petersburg, Russia*

2021 Poultry Science 100:101311
https://doi.org/10.1016/j.psj.2021.101311

Recently, Wang et al. (2021) published "The mixed application of organic and inorganic selenium shows better effects on incubation and progeny parameters" in *Poultry Science*. Their title is the main conclusion. Based on the data presented in the paper, I believe that the paper title is misleading after concluding that a combination of the two Se forms gave no benefit compared with pure L-Selenomethionine (SeMet). My conclusion is based on the following:

Differences: Sodium selenite (SS) + SeMet vs SeMet groups:

Tables

Table 3 reports no difference in production performance or reproductive performance based on Se source. Egg quality was not affected by Se source in Table 4. In addition, Se source decreasing brightness and increasing redness of the egg shell lack scientific value. Table 5 shows no difference in egg yolk and albumen antioxidant capacity due to Se source. Multiple effects of Se source on antioxidant function are described in Table 6. *Serum did* not differ. Three detrimental changes due to Se source are reported: inhibition of OH* decreased in pectoral muscle, heart GSH-Px decreased, and liver total AOA decreased. Furthermore, liver MDA decreased and inhibition of OH* increased.

Figures

Figure 2 shows different Se sources increased Se content in egg yolk, but Se content of egg albumin, and total egg are not reported. Different Se sources did not affect Se content in embryonic tissues in Figure 3. Figure 4 depicts different Se sources: increased GPX-4 mRNA in the liver but not GPX-1 or DIO-1 mRNA.

Data on egg albumin and total Se in eggs are not reported and there is no statistical significance in Se deposition in tissues between treatment groups. Therefore, the conclusion "The present data indicate for the first time that the combination of L-SM and SS is more efficient than their individual treatments for Se deposition in egg and chicken embryo tissues" is misleading.

The findings of Wang et al. (2021) support a more accurate conclusion that SeMet is more effective than SS in the laying hen diets and a combination of SS + SeMet did not provide an advantage compared with SeMet.

A combination of organic Se with sodium selenite seems an attractive option as a cheaper source of Se in poultry diets. However, because selenium from SS is poorly transferred to the egg (Surai and Fisinin, 2014) replacing a portion of organic Se with SS would decrease Se level in the egg. Furthermore, the change would decrease antioxidant protection in stress conditions (Surai and Kochish, 2019), because organic Se is considered "an insurance policy" (Surai et al., 2018) and selenoproteins are synthetized in response to the oxidative stress confronted (Surai, 2018).

REFERENCES

Surai, P. F. 2018. Selenium in Poultry Nutrition and Health. Wageningen Academic Publishers, Wageningen, The Netherlands.
Surai, P., and V. I. Fisinin. 2014. Selenium in poultry breeder nutrition: an update. Anim. Feed Sci. Technol. 191:1–15.
Surai, P. F., and I. I. Kochish. 2019. Nutritional modulation of the antioxidant capacities in poultry: the case of selenium. Poult. Sci. 98:4231–4239.
Surai, P. F., I. I. Kochish, V. I. Fisinin, and O. A. Velichko. 2018. Selenium in poultry nutrition: from sodium selenite to organic selenium sources. J. Poult. Sci. 55:79–93.
Wang, Z., L. Kong, L. Zhu, X. Hu, P. Su, and Z. Song. 2021. The mixed application of organic and inorganic selenium shows better effects on incubation and progeny parameters. Poult Sci. 100:1132–1141.

Received February 28, 2021.
Accepted June 1, 2021.

[1]Corresponding author: psurai@feedfood.co.uk