Benefits of extra liquid OH-Methionine for sows and piglets

Liquid OH-Methionine added to diets for lactating sows both leads to more fat and lactose concentration in the milk as well as a better gut absorption of nutrients in the suckling piglets' guts. Jointly, these factors explain a higher piglet body weight before and after weaning.

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Nutritionists must find solutions to feed the modern and hyper-prolific sows and develop new strategies to meet increasing nutrients requirements. Lactation is an essential phase, as sow milk quantity and quality play a central role in the growth of suckling piglets. Trials carried out by Adisseo prove that extra methionine added in the diets beyond requirements leads to an improvement of milk quality.

Improved sow milk quality

A trial was carried in China on cross-bred primiparous sows in order to compare lactating sow diets with an extra supply of methionine with a control diet containing 0.25% of total methionine, at a level in agreement with the recommendations of the United States National Research Council (NRC). Three methionine sources are available for the feed industry. In this trial, two forms of methionine were compared: a powder form, DL-Methionine (1.34 kg/tonne) and a liquid form: OH-Methionine (1.51 kg/tonne).

Compared to the control diet and the DL-Methionine diet, the diet containing liquid OH-Methionine leads to a significant improvement of fat and lactose content of the milk of the sows (**Figure 1**), the two sources of energy supply for suckling piglets. The authors also demonstrated that a better milk composition stimulates intestinal gene expression and increases absorption capacity of the suckling piglets' gut.

As a consequence of the higher nutritional milk content regarding macronutrients and amino acids, the body weight of suckling piglets at day 14 post-farrowing in the liquid OH-Methionine group was significantly higher (+510 g) than in the control group and tended to be higher (+310 g) than in the DL-methionine group.

Increase of piglet's body weight

These data confirm the better efficacy of liquid OH-Methionine as observed by a team around researcher Hao Li, affiliated to Sichuan Agricultural University, China. In that trial, where both sows and piglets received a diet with increased levels of sulfur amino acids through liquid OH-Methionine or DL-methionine, the scientists demonstrated that the body weight of 35 days old piglets was significantly higher when sows and piglets received methionine as liquid OH-Methionine compared with DL-methionine, also see **Figure 2**.

Post-weaning stress is attenuated

Furthermore, those piglets had a better gut morphology, with higher villus heights and villus height/crypt depth ratio (**Figure 3**) leading to a better absorption capacity. Moreover, during the post weaning period, the effect of dietary treatments on jejunal glutathione status showed that liquid OH-Methionine treatment allowed a better red-ox status than in the other treatments (as shown by higher reduced glutathione and lower oxidised glutathione to reduced glutathione ratio).

Higher feed intake

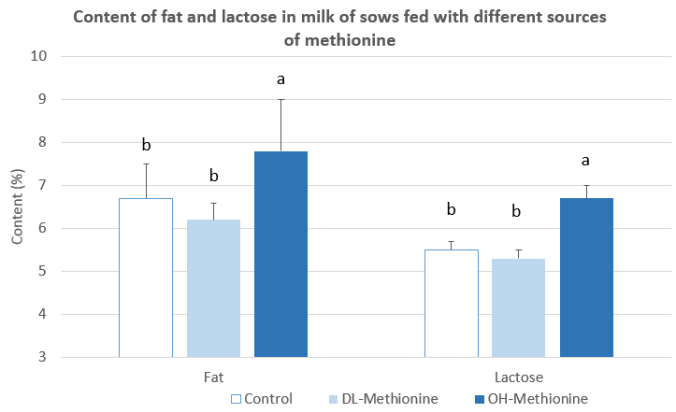
Another interesting finding was that weaned piglets receiving liquid OH-Methionine in their complete feed, show a higher feed intake across post-weaning days ($P<0.05$) compared to those in the control or DL-methionine groups, leading to a better average daily weight gain.

The researchers also concluded that increased consumption of methionine as liquid OH-Methionine might alleviate stresses associated with early weaning. Compared to the control group, higher number of goblet cells were observed in the liquid OH-Methionine treatment group providing evidence for its positive effect on weaning stress.

The team at Sichuan Agricultural University concluded that growth retardation, induced by early weaning, appears to be attenuated by increased consumption of methionine as liquid OH-Methionine. On one hand, this is related to changes in plasma amino acid profiles. On the other, elevation of growth performance and intestinal antioxidant capacity in piglets also plays a role.

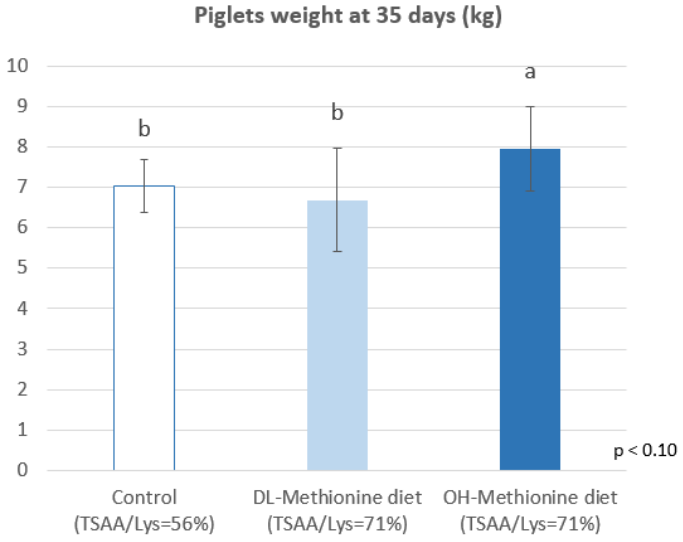
These observations offer novel insights into the mechanism of sulfur amino acids metabolism, with important nutrition and health implications.

Figure 1: Content of fat and lactose in milk of sows fed with different sources of methionine



a, b groups are significantly different.
Source: Zhang and others (2015)

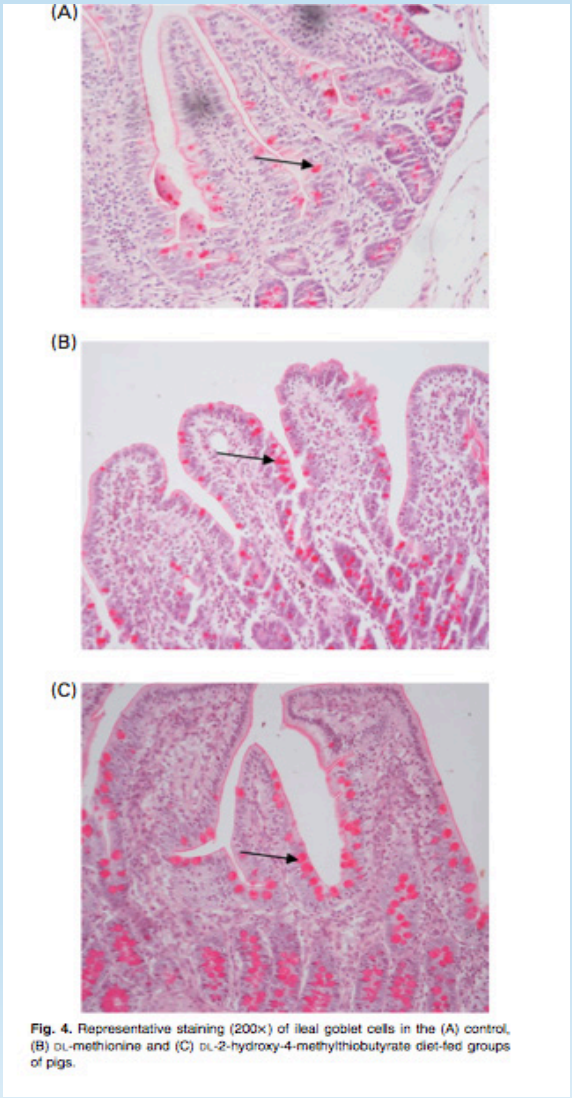
Figure 2: Piglets weight at 35 days (kg)



a, b groups are significantly different (p<0.10).
TSAA/Lys = Total Sulfur Amino Acids / Lysine
Source: Li and others (2014)

Figure 3: Ileal global intestinal cells of piglets

When sows and piglets receive increased levels of methionine, especially through liquid OH-Methionine, piglets have a significantly better gut morphology, with higher villus heights and height/crypt depth ratio, leading to a better nutrients' absorption capacity.



Legend:
A: Control diet.
B: DL-Methionine diet
C: Liquid OH-Methionine diet (representative staining X 200)
Source: Li and others (2014)