Garlic and fly mitigation

The Problem:

Horn flies and their ilk can cause significant losses to the US cattle industry annually, due to stress, decreased performance, and cost of mitigation.

The Potential:

Recent work by Durunna and Lardner (2021) has suggested that feeding of garlic powder can result in reduced fly cover and fewer defensive behaviors in cattle. They compared fly cover and behavior of grazing beef cows fed either a Conventional Trace Mineral Salt (C-TMS) or one infused with Garlic Powder (GP-TMS). The study was repeated over the course of 2 summers, with one group receiving C-TMS in the first year and GP-TMS in the second.

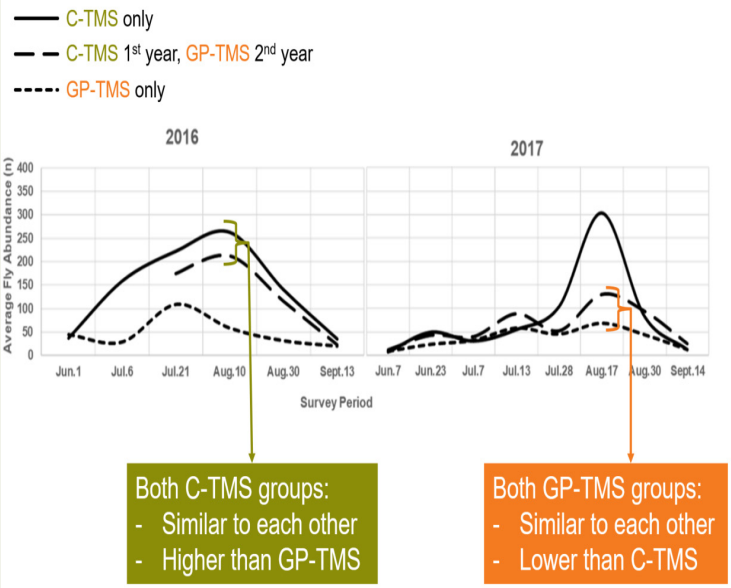

Figure 1. Average Fly Abundance on cows supplemented with conventional trace minerals (C-TMS) and garlic powder infused trace minerals (GP-TMS). Adapted from Darunna and Lardner (2021)

Results showed a marked difference in fly abundance (Figure 1), with GP-TMS supplemented cows being lower than C-TMS supplemented ones in both summers.

Furthermore, the group that switched from C-TMS to GP-TMS showed fly cover similar to the other C-TMS group in the first year, but cover similar to the other GP-TMS group in the second year.

Results also showed a marked reduction in defensive behaviors by cows consuming GP-TMS relative to C-TMS (Table 1), which is consistent with the lower fly cover.

Table 1. Animals exhibiting defensive behaviors[1] during observation.

	C-TMS[2]	GP-TMS[2]
Both Years	47.9%[c]	27.2%[a]
Single Year[3]	46.4%[b,c]	36.8%[b]

[1] Defensive behaviors = side-licks, tail-flicks, head-throws, leg-stomps, and belly-kicks.
[2] C-TMS = conventional trace mineral supplement; GP-TMS = garlic powder infused trace mineral supplement
[3] Animals received C-TMS in first year and GP-TMS in the second year.
[a-c] Different superscripts indicate difference at P < 0.05
Adapted from Darunna and Lardner (2021)

The Explanation:

Garlic is rich in a sulfur-containing compound called Alliin, which in the processing of garlic can be broken down into a range of volatile sulfur-containing compounds (Table 2). Broadly speaking, Alliin can be broken down enzymatically to create allyl thiosulfinates, which in turn can spontaneously decompose to their corresponding allyl sulfides. These compounds are responsible for the characteristic smell of freshly chopped garlic, garlic oil and garlic powders, and are also the putative reason for the effects observed in the study by Durunna and Lardner (2021).

Source: Durunna, O., & Lardner, H. (2020). Impact of Garlic-infused Salt Supplement on Fly Abundance, Salt Intake, and Defensive Behaviors in Grazing Beef Cows. *Sustainable Agriculture Research, 10*(1), 54. https://doi.org/10.5539/sar.v10n1p54

Garlic and fly mitigation

Table 2. Volatile sulfur-containing compounds derived from Alliin.	
Allyl Thiosulfinate	Ally Sulfides
Diallyl thiosulfinate (Allicin)	Diallyl sulfides
Allyl methyl thiosulfinates	Allyl methyl sulfides
Allyl trans-1-propenyl thiosulfinates	Allyl trans-1-propenyl sulfides

Source: QualiTech Research

In the study by Durunna and Lardner (2021) no attempt was made to profile the various sulfur-containing compounds in the garlic powders used. In an attempt to confirm this connection, we analyzed QualiTech dry garlic product – which is made from food-grade garlic oil – using our GC-MS (Gas chromatography-mass spectrometry) and found strong peaks indicative of large concentrations of several Alliin derived, sulfur-containing compounds (Figure 2)

The Next Steps:

QualiTech continues to explore the connection between the feeding of garlic products and the effects highlighted above. For more information about Feedbuds™ garlic products, please contact your QualiTech sales rep or email info@qualitechco.com

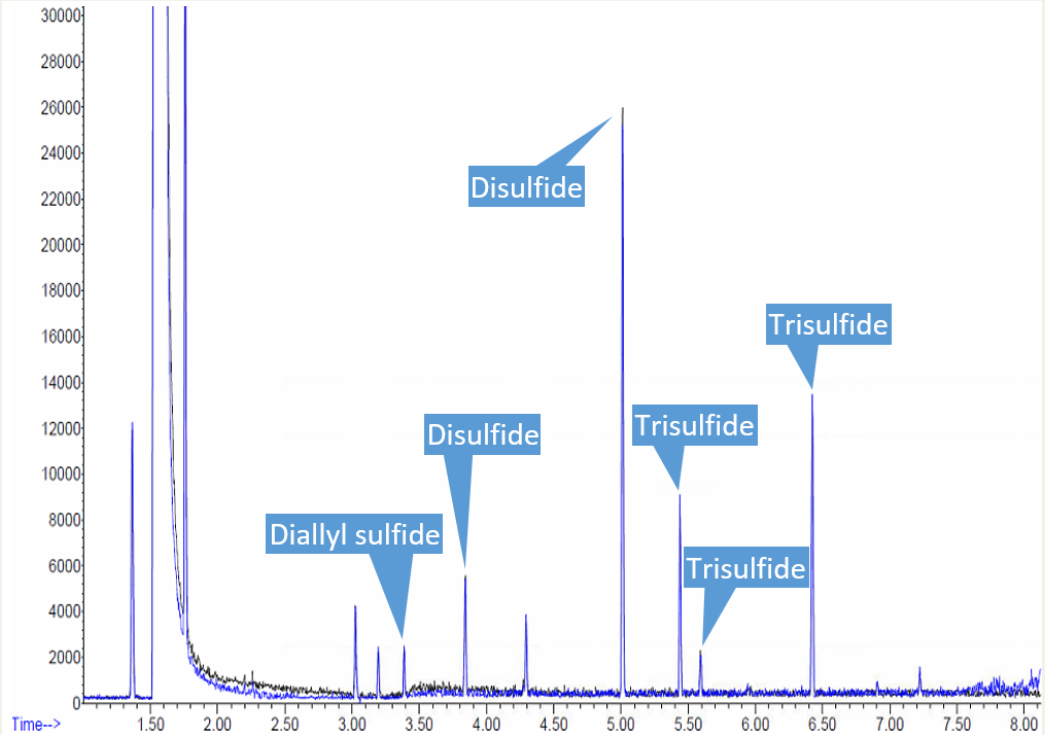

Figure 2. GC-MS chromatogram of QualiTech liquid garlic product (product code 2655). From left to right, the 6 labelled peaks represent diallyl sulfide, methyl 2-propenyl disulfide, diallyl disulfide, methyl 2-propenyl trisulfide, 4-methyl-1,2,3-trithiolane, and di-2-propenyl trisulfide.
Source: QualiTech Research

To learn more about the *Feedbuds® flavor systems*, contact QualiTech at 1.800.328.5870 or email info@qualitechco.com.