



Managing palatability with acidifying ingredients

Presenting patent-pending pH-adjustor technology for dog and cat food formulations.

Palatability, a key metric used by pet owners when assessing pet food quality, depends on many factors—including the product formulation, process and design, as well as changes in features, such as stability. The addition of acidifiers to pet food formulations can also have a negative impact on palatability; however, with new patent-pending pH-adjustor technology from Kemin, acidifiers can now be used while still maintaining palatability.

“Neither dogs nor cats prefer the taste of strong acidifiers, but cats are especially sensitive to acidifiers that reduce kibble pH,” says Lynn Deffenbaugh, global palatant product manager at Kemin.

In a recent trial, dry cat food was coated with a palatant containing a strong acidifier. The palatability of that test diet (shown in Figure 1) had an Intake Ratio (IR) of 0.35 which

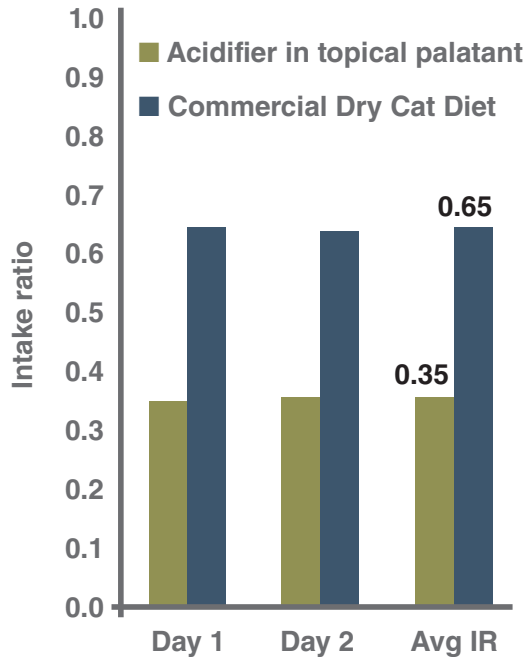


Figure 1. Effect of a Topical Acidifier on Cat Palatability (Kemin 2014)

was significantly lower than the intake ratio for the commercial benchmark cat food (Kemin 2014). Further, other data confirmed that nothing could mask the palatability loss caused by this acidifier.

Striking a balance: Selecting viable acidifiers

A screening process was used to identify viable

acidifiers for this new technology. “Screening was based on regulatory status, pH impact on model systems and palatability screening with pets,” Deffenbaugh says.

The organic acids, fumaric acid, succinic acid and sorbic acid, were unique in providing the correct balance of performance requirements. “While these three acidifiers may still have a negative impact on palatability, the Kemin R&D team was able to overcome any palatability loss. Balancing palatability with performance was not possible with many other acidifiers that were screened.”

Key performance factors

Kibble “dunk” test. The kibble “dunk pH” test indicates surface pH on the kibble and provides an easy means to evaluate the acidification potential of a pH-adjustor palatant.

In the example shown below (Figure 2), pH-adjustor palatants were formulated to deliver 0.2 percent, 0.3 percent or 0.4 percent fumaric acid to a cat food diet. These pH-adjustor palatants were all designed for an application rate of 1.5 percent palatant applied to the kibble.

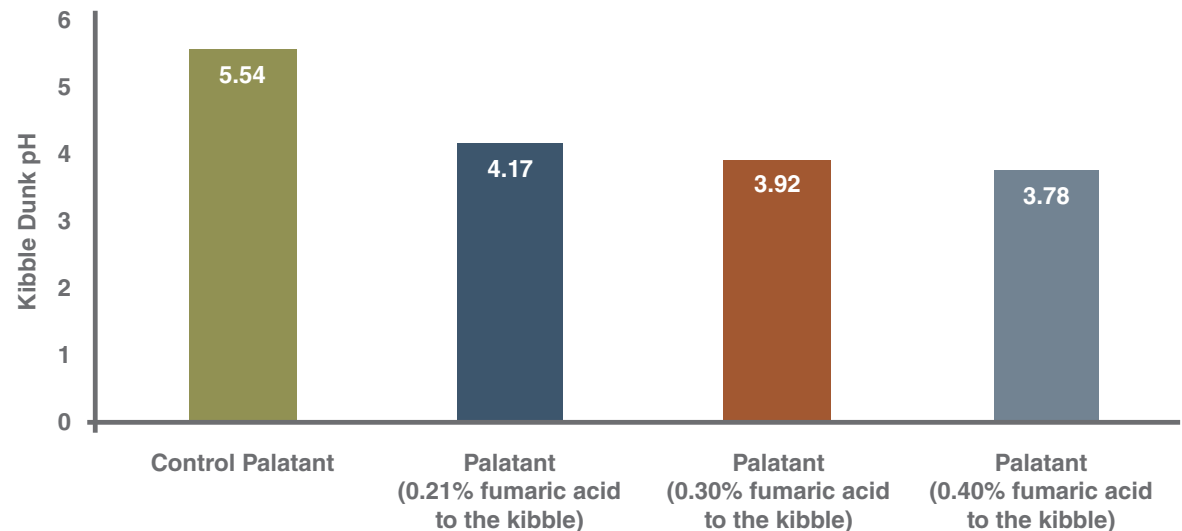


Figure 2. Effect of a Topical Palatant Containing Fumaric Acid on Kibble Dunk pH (Kemin 2014)

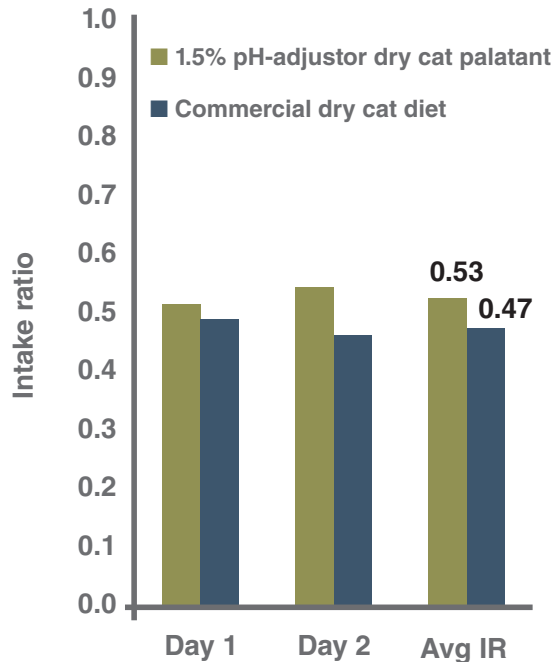


Figure 3. Effect of a 1.5% pH-adjustor Palatant on Cat Palatability (Kemin 2014)

Kibble dunk pH of a control diet was 5.54, and was reduced to < pH 4.2 when fumaric acid was delivered via a pH-adjustor palatant (Kemin 2014). Not surprisingly, the kibble dunk pH was reduced further when the fumaric acid content increased. Next, let's look at some examples of palatability data for pH-adjustor palatants.

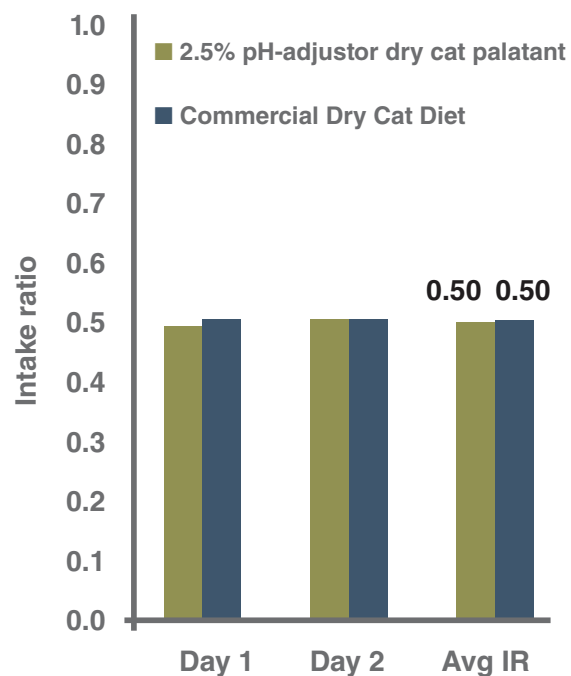


Figure 4. Effect of a 2.5% pH-adjustor Palatant on Cat Palatability (Kemin 2014)

Cat food trials

Extensive palatability testing with cats has shown that pH-adjustor palatants can deliver acidifiers to the diet and provide parity palatability versus a target. A critical learning was that palatability for cats fell off very quickly when kibble dunk pH fell below pH 3.8. This was the case with the strong

acidifier included in a palatant as shown in Figure 1; the pH was reduced so low that palatability was significantly reduced. However, the pH-adjustor technology allows the palatability to be maintained when the selected acidifiers are included.

In the following example, a pH-adjustor palatant was designed to deliver 0.4 percent fumaric acid to a cat diet. To test the palatability, the control palatant was replaced by a pH-adjustor palatant that was applied at 1.5 percent. The kibble dunk pH was 5.5 for the control kibble and was reduced to pH 3.8 for the diet with the pH-adjustor palatant. As shown in Figure 3, cat palatability was parity (IR = 0.53) to a commercial benchmark diet, which was the target for the pH-adjustor palatant diet (Kemin 2014).

“As shown, a pH-adjustor palatant with fumaric acid designed for 1.5 percent application was found to maintain target palatability for cats,” says Deffenbaugh.

“Similar results have been found for pH-adjustor palatants using combinations of fumaric, succinic and sorbic acids that are applied to cat food. This is illustrated in Figure 4 which shows that a pH-adjustor palatant with fumaric and succinic acids designed for 2.5 percent application also maintained target palatability in cats.” (Kemin 2014)

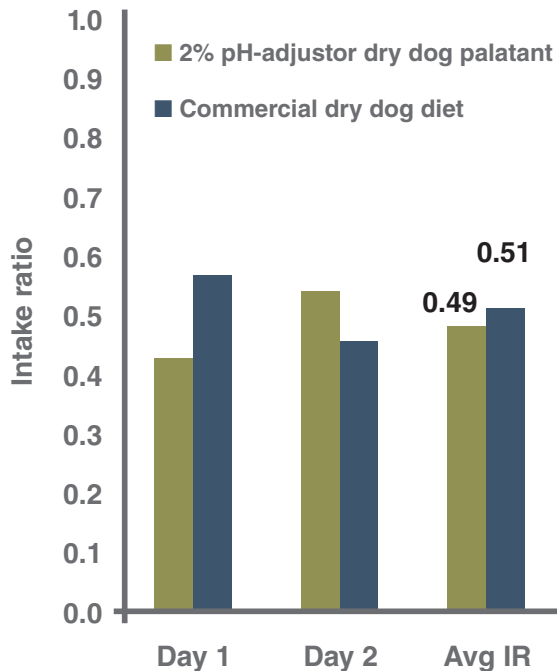


Figure 5. *Effect of a 2% pH-adjustor Palatant on Dog Palatability (Kemin 2014)*

Dog food trials

pH-adjustor palatants have also been developed for dog foods. In a dog food trial shown in Figure 5, a pH-adjustor palatant designed to deliver 0.4 percent fumaric acid to a dog's diet was tested. The control palatant was replaced by 2 percent of pH-adjustor

palatant and palatability was parity (IR = 0.49). (Kemin 2014)

“For dogs, as well as cats, pH-adjustor palatants, can be designed to maintain target palatability,” says Deffenbaugh.

“pH-adjustor palatants can also be designed for different application levels,” she continues. “In order to deliver a certain amount of organic acid, the pH-adjustor palatant has to be designed for a particular application rate.”

In general, a higher application rate is needed for higher palatability targets for both dogs and cats. “pH-adjustor palatants containing organic acids that have met both acidification and palatability targets have been designed for application rates ranging from 1 to 2.5 percent,” says Deffenbaugh. “For example, a cat pH-adjustor palatant applied at 1.5 percent could work for a standard or a premium cat food,” she said. “If it's a product that's marketed for high palatability, it might require 2.5 percent of a pH-adjustor palatant.”

The [patent application](#) (Burke and Nelles 2014) further describes how these particular organic acids are attractive candidates for use in dry palatant applications and can add functionality to the palatant by acting as acidifiers.

pH-Adjustor palatants' role in natural pet food diets

Some sources of the acidifiers used in pH-adjustor palatants have not met the Association of American Feed Control Officials (AAFCO) definition for “Natural”. Fortunately, a supplier of succinic acid, which is one of the organic acids used in pH-adjustor palatants, has information available to show that this acid will meet the AAFCO definition.

Contact your Kemin representative to discuss how you can evaluate pH-adjustor palatants for your pet food diets, even those that require natural ingredients.