

# Omega Facts

*Get the scoop on omega-3 fatty acids.*

**By Christine Hamilton**

FISH OIL IS ALL THE RAGE, LATELY. WHY? BECAUSE IT'S a prime source for omega-3 fatty acids and animals need those specific fats for good health. Omega-3 supplements, such as fish oil, have been marketed for human diets, as a pet-food ingredient, and recently as good for horses.

But there are a few things many people don't understand about omega-3 fatty acids. Studies have shown how important they are to the body, in humans and animals alike, but researchers suspect there is even more to learn, especially in horses.

"We're just starting to find out what omega-3 fatty acids can do," said Joann Kouba, Ph.D., horse teaching and research specialist at Kansas State University. "This is a relatively new area.

"Companies that have come on board (selling omega-3 supplements for horses) in the last three to four years are making claims, and research facilities haven't done very much to back up a lot of it," she continued. "Primarily, they're making claims off human medicine and work that's been done in other species, but not necessarily in the horse."

That doesn't mean supplementing your horse's diet with omega-3 is a bad idea. But you might want to look at the facts before you top-dress his grain with fish oil.

## What We Know

OMEGA-3 FATTY ACIDS ARE "ESSENTIAL" FATTY ACIDS – THE BODY must have them for good health, and animals (including humans) only get them through diet. Flax seed is the best plant source for omega-3s; but fish oil contains the highest concentrations of them.

"Omega-3s are helpful in a variety of areas in the body because fatty acids make up cell membranes," Kouba explained. "When you change the fatty acid profile in the diet, you can potentially modify or impact a lot of different systems in the body, just by changing one thing in the diet."

That's why the research being done on them is so varied. Some researchers have looked at the effects of omega-3 on the sperm cell membrane's ability to react to cooling and freezing. Others are looking at their effect on laminitis or arthritis because of its influence on how a cell mediates the inflammatory process.

The body needs omega-3 along with another type of essential fatty acid – omega-6 fatty acids – and they have different but important functions. For example, while omega-3s fight inflammation, omega-6s promote it.

To function properly, the two must be in proper balance; you can have too much or too little of either in your diet. Scientists call it the "n6 to n3 ratio." The ideal ratio is low omega-6 to high omega-3.

And there's the rub – researchers are finding that the diets of many species have gotten out of balance in modern times. Horses and humans have too much omega-6s and not enough omega-3s in their diets.

## UP AND COMING

These facilities are exploring the effects of omega-3 fatty acids:

*Colorado State University* – semen quality, joint inflammation, cardiovascular benefits

*Kansas State University* – cardiovascular benefits, broodmare milk composition and foal immunity, exercise-induced pulmonary hemorrhage, effects on joint inflammation, mare reproduction

*Southern Illinois University, Carbondale* – omega-3 plasma levels and mare reproduction

*Texas A&M University* – semen quality in output and improved morphology, laminitis and arthritis

*University of Florida* – cellular oxidative stress and damage, foal immunity and inflammatory response, establishing fatty acid profiles for forage hay.

## HANDS ON

Omega-3 supplements are found in a variety of forms – most commonly oils, pellets and powders. Most are fed as a top-dressing on grain, with set amounts to give each day.

The cost varies: a 30-ounce bottle of fish oil is about \$50 for a 30-day supply). Storage varies, too, depending on the product, but it's often recommended to keep supplements sealed in a cool place, out of direct sunlight.

One of the biggest problems is simply the fishy smell that often lingers on the hands that fed the supplement.

"With some of the earlier products we used, you would smell like fish all day, and that was miserable," Kouba said, speaking from experience.

She had an honors student do a palatability study with two fish oil products with flavors added to offset the fish smell; Wellpride's was orange crème, and Nordic's was apple.

"I don't know that (the smell) matters to the horses; we haven't noticed problems with palatability," she said. "They get used to it after a couple of days."

Researchers at Southern Illinois University, Carbondale, even fed the supplement via home-baked horse "cookies," and proved the horses were absorbing the fatty acids. Even though, "they still smelled fishy," according to Sheryl King, Ph.D., researcher and professor, the horses ate them.

Horses are a grazing animal. Their natural diet of forage hay is low in overall fat, but the fat it has includes a good percentage of omega-3.

"This means that when a horse is consuming a diet composed largely of forage, their omega-3 intake is much higher than their omega-6 intake," explained Lori Warren, Ph.D., assistant professor of equine nutrition at the University of Florida.

But horses have been increasingly kept stalled and fed cereal grains such as oats or corn, which are high in omega-6s. Human research has linked a high omega-6 to omega-3 ratio to a number of problems from depression to arthritis, and researchers are wondering about its effects on the horse. If you have too few omega-3s, the body will use omega-6s to replace them, and that can impact the way the body functions.

## Stallion Research


FOR EXAMPLE, STEPHEN WEBEL, PH.D., OF UNITED BIONUTRITION Inc. pointed to research done in the past few years on the stallion sperm cell. The company supported the research to develop Magnitude, an omega-3 supplement marketed for stallions through Bioniche.

"We know there are specific fatty acids that the body incorporates into the cell membrane of the sperm that benefit the cell's function during cooling or storage," Webel said. "If the ideal fatty acid for the membrane is not included in a horse's diet, the body will incorporate an alternative fatty acid. But it won't allow those membranes to function as efficiently."

That could result in sperm cells less able to function normally, especially after cooling or freezing.

"The more concentrated grain we feed to horses, the more fatty acids from the omega-6 family we bring in," Webel continued. "Omega-6s are not desirable to be incorporated into the sperm cell for optimum function and viability. That is what feeding a supplement such as Magnitude helps to





Changing the equine diet from primarily forage hay to increased grain concentrates has increased horses' intake of omega-6 fatty acids. Scientists are studying how feeding omega-3 supplements offsets that increase and what it does for equine health.

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balance and offset, by increasing the omega-3 in the diet.”

Recent data from Texas A&M University has indicated benefits in feeding Magnitude specifically to stallions with poor fertility, improving their semen's ability to withstand cooling. (See the December 2006 issue of *The Journal*.)

### What We Don't Know

EQUINE RESEARCHERS HAVE ONLY RECENTLY BEGUN LOOKING AT the effects of omega-3 on horses.

“With all the research that was coming out in humans, it was a natural jump to see if we could find some of that in horses,” Kouba said. “Most of us working with omega-3s are just beginning to find out some of the things that they could be doing. We're in the infancy of the research that needs to be done.”

She pointed out that important unknowns include what the proper dietary levels are for horses and the optimum ratio of omega-6 to omega-3.

Warren agreed. “We don't know the ideal ratio of omega-6s to omega-3s needed in the horse's diet, and it may very well be different depending on the horse, the problem(s) being addressed and the physiological state – the ideal ratio for a mare may be different during estrus versus pregnancy,” she said.

She also pointed out that there are potential risks in over-feeding omega-3. Data in humans indicates that high doses

of omega-3 can actually suppress immune function.

“We're going to find some interesting and beneficial effects supplementing with these types of fats,” Kouba said. “People always ask, ‘Would you tell a consumer to go out and buy this for their horse?’”

“Most researchers are not at the point where we would categorically say, ‘Yes.’ But we are closer to where we can say it can help certain *types* of horses.”

There is danger in looking at research data showing the benefits of omega-3 to humans and automatically transferring that to horses. Data from other species can suggest directions for researchers to take, but to go further than that is a mistake.

“We can utilize data, say, from the pig as a model to tell us where we should go in the horse,” Webel said, “But we can't extrapolate dose levels. We still need the species data.”

Researchers also need consistent results. According to Kouba, in the omega-3 studies that have been done, some equine studies have produced results that have not been repeated.

She gave as example research at KSU: Researchers found increased levels of omega-3 at birth in the plasma of foals whose dams had been fed omega-3 supplements, proving it can cross the placenta.

Researchers also found a higher level of antibodies in the milk of those supplemented mares, which has significant implications on improving foal immunity. But the next study

didn't show the same results in the milk antibodies nor did a related study done at the University of Florida.

"So we know that we can increase milk, mare and foal plasma omega-3 levels," Kouba said. "Now, what does it do for them?"

In other areas, the available research that is there is not enough to allow researchers to make specific recommendations.

According to Warren, research conducted in horses has indicated positive effects that omega-3s have had on the cellular mediators that play a role in inflammation. But the research was performed *in vitro*, on cells in the lab, not *in vivo*, in a living horse.

"Because the data came from *in vitro* stimulation of the body's cells, it is somewhat artificial and doesn't reflect the whole body response," Warren said. "Therefore, I can't extrapolate the response of inflammatory mediators to something like reducing joint inflammation or battling heaves or upper airway disease.

"Until more work is done in the joint directly or with specific inflammatory conditions, I can't recommend omega-3s for that purpose," Warren added.

"The research is just not there yet with what we need to know," Kouba said. "There are so many areas to explore and there's a lot of opportunity out there. It's a matter of deciding which areas to go toward."

## Be a Cautious Consumer

"I HAVE CONCERNS THAT OMEGA-3 FATTY acids might become 'fashionable' to feed, which could result in horse owners feeding them whether they may be of benefit or not," Warren said, "and possibly creating problems we have not yet discovered."

Kouba noted that the three brands she has worked with in her research, "were pretty consistent" when tested for the levels and purity of omega-3 fatty acids they contained. But the claims that most companies make regarding their products' benefits for horses simply don't have the research to back them.

"If someone has a supplement out

there, ask them to provide some data where they have fed that supplement to horses and show that the product is safe and effective," Webel advised.


"If a product makes a claim, then the sponsor of it has to have demonstrated that to the Federal Drug Administration," he continued. "They can sell a nutritional supplement that has a compound in it. But when they say that compound will do something, they have to have data."

In the meantime, the research will continue.

"I don't know if any of us are prepared to tell you to start giving it to *all* your horses," Kouba said. "The jury is still out on that." ■

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Studies have shown that the fishy odor common to many omega-3 supplements doesn't affect palatability to horses.

## Other Article Sources

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