MAAAX™ LONGfibe™ cubes Facts Sheet

Why feed MAAAX™ LONGfibe™ cubes?

- ✓ MAAAX™ LONGfibe™ cubes increase chewing activity and saliva production.
- ✓ MAAAX™ LONGfibe™ cubes are dust free and can help to prevent or decrease the effects of RAO/COPD.
- ✓ MAAAX™ LONGfibe™ cubes prolong chewing time and increase gastrointestinal health.
- ✓ MAAAX™ LONGfibe™ cubes increase hind-gut activity and enrich microbial flora.
- ✓ MAAAX™ LONGfibe™ cubes allow the horse or pony to show naturally slowed feeding behavior.
- ✓ MAAAX™ LONGfibe™ cubes can help to develop better rehydrating and longer working / performance abilities in horses.

Horses graze up to 16 hours a day to take up enough forage and meet their chewing requirement. The forage intake should have a daily total of 2% of body weight in dry matter including grass, hay, and straw, and of course MAAAX™ LONGfibe™ cubes to secure a complete and healthy ration. The chewing is important to produce enough saliva to buffer gastric acid and hold all digestive fluids in balance. Fiber particle length must be above 3.6 cm (1.4 inches) to prolong chewing and to increase saliva production to 3-5 liters per kg of material which is needed to prevent gastric ulceration, choking and to maintain physical and mental health. MAAAX™ LONGfibe™ cubes have a minimum length of 4.5 cm (1.6 inches) NOTE – Minimum implies a guarantee of fibre length and that is not likely to be the case.and increase the chewing rate. Insufficient amount of forage does increase the danger of developing stereotypic behaviors such as wood chewing. Long chewing periods meet the horse's requirement of natural grazing behavior. MAAAX™ LONGfibe™ cubes are virtually dust free and when combined with dust free surroundings can help to prevent or decrease the effects of *Recurrent Airway Obstruction* (*RAO*), also known as *Chronic Obstructive Pulmonary Disease* (COPD),. Furthermore, MAAAX™ LONGfibe™ cubes contain highly palatable and digestible proteins, carbohydrates, chlorophyll and loads of minerals.

Did you know?

It is important that horses chew as much as possible!

MAAAX™ LONGfibe™ cubes *increase chewing behavior and saliva flow to increase gastrointestinal health!*

The chewing intensity and chewing rates of horses are the crucial factor for gastrointestinal and mental health. Horses must chew in order to maintain an optimal balance of their digestive fluids. The production of digestive fluids such as saliva, gastric acid, mucus and bile within mouth, stomach, small and large intestine is initiated by presence of feedstuff within the mouth cavity (Alexander, 1966). It is not only the production of saliva that depends on chewing, but also the gastric acid production which starts the moment the horse begins to chew. This is the body's reaction to the incoming feed and to prepare the feed to be digested, and also to minimize the passage of too many microbes at a time into the horse's body.

The production of gastric acid is consistent in the amount depending on the amount of time of chewing and feeding while saliva is only secreted in the presence of food in the mouth cavity. By feeding forages, the production of gastric acid is maximized

The amount of saliva produced varies with the size of the animal between 20 ml and 90 ml per minute (Meyer, 1980). The longer and coarser the feedstuff is, the more saliva will be produced during the chewing process. Feeding pure forage such as alfalfa or hay, the horse will produce 3-5 liters of saliva per kg of forage; while there will be only 1-1.5 liters of saliva per kg concentrates (Meyer, 1980). In total, the horse will produce 10-25 liters of saliva per day (Meyer et al, 2002, Frape, 2004). This is very important to buffer gastric acid. The largest amount of the total saliva production takes place within the parotid gland. If the horse does not have the opportunity to chew, the gland may swell and can influence the horse's suppleness and willingness to work. This can be prevented by feeding MAAAX™ LONGfibe™ cubes *from a low sited trough.*

We recommend further reading:

Alexander F. A study of parotid salivation in the horse. J Physiol. 1966;184(3):646-56.

Alexander F, Hickson JC. The salivary and pancreatic secretions of the horse. In: Phillipson AT, (Hrsg.). Physiology of digestion and metabolism in the ruminant. New Castle: Oriel Press Ltd.; 1970: 375-389.

Meyer H, Ahlswede L, Pferdekamp M. Untersuchungen über Magenentleerung und Zusammensetzung des Mageninhaltes beim Pferd. Dtsch Tierarztl Wochenschr. 1980;87(2):43-7.

Meyer H. A report on the regulation of feed intake by horses. Dtsch Tierarztl Wochenschr. 1980;87(11):404-8.

Meyer H, Coenen M, Teleb H, Probst D. Untersuchungen über Futterzerkleinerung und Freisetzung von Futterinhaltsstoffen im Kopfdarm des Pferdes. Z Tierphysiol , Tierernähr u Futtermittelkde. 1986;56:266-75.

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Frape, D.,: Equine Nutrition and Feeding, 4. Edition. Oxford 2011

NRC National Nutrition Council: Nutrient requirements for horses, 5th Edition, 2007.

Geor, R.J., Harris, P.A., Coenen, M. : Equine Applied and Clinical Nutrition, Saunders, 2013

Did you know?

Size Matters!

MAAAX™ LONGfibe™ cubes *contain forage particles of 4.5 cm and longer to secure sufficient chewing!*

The longer the forage particles are, the higher the chewing rates. Short particles of less than 2.5 cm will decrease the chewing rates and the horses are more at risk for choking and gastric disturbances (Meyer et al, 2002). The picked-up forage will be chopped by the horse to a particle size of 2 mm in diameter and 1-4 mm of length, combined with larger parts (Meyer et al, 2002). The larger parts can influence the microbial flora in the hind gut by offering a different substrate to microbes. Depending on the type of feed, the horse will chew at different rates. Older research show chewing rates of 800-1200 chews per kg concentrates (Meyer, 1975) while forages are generally chewed way more often. The chewing rate of 1 kg of hay is around 3000-5000 chews per kg in horses and 7500 – 10000 chews per kg in ponies (Meyer, 1975). These numbers were confirmed by Cuddeford (1995), who reports the chewing rate with 5500 per kg hay in horses. When forage is chopped, it is very important to focus on the remaining particle size. Opposed to the reported particle size of Meyer et al (2002), Cuddeford and Ellis report a longer size that matters. If the particle length is less than 3.5 cm per particle average, there is no difference between the chewing rate of concentrates or chopped forage (Cuddeford, 1992, Ellis, 2003). Oats and concentrates are only chewed 10-20 minutes per kg in horses and 30-40 minutes per kg in ponies, while forage is chewed for at least 40-80 minutes. This means, that long forage particles are better than short ones. MAAAX™ LONGfibe™ cubes *contain forage particles of even 4.5 cm and longer to secure sufficient chewing!*

We recommend further reading:

Cuddeford, D., Woodhead, A.,/Muirhead, R.: A comparsion between the nutritive value of short cutting cycle, high temperature dried alfalfa and timothy hay for horses. Equine Veterinary Journal, Ausg. 24 1992, S.84-89

Ellis, A./Hill, J.: Nutritional physiology of the horse, Nottingham, 2005.

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Meyer H, Ahlswede L, Pferdekamp M. Untersuchungen über Magenentleerung und Zusammensetzung des Mageninhaltes beim Pferd. Dtsch Tierarztl Wochenschr. 1980;87(2):43-7.

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Did you know?

MAAAX™ LONGfibe™ cubes don't make your horse "hot"!

MAAAX™ LONGfibe™ cubes *are the perfect source for slow digestible energy!*

When a horse chews, the feed is chopped and squeezed. Nearly 30 % of protein and 30 % of NfEs are quickly available to the horse after chewing and gastric passage through the stomach, and through the pure mechanic degrading by the teeth (Meyer et al, 1975, Meyer et al. 1986, Staszyk et al. 2006). But the degrading of concentrates happens quicker than the degrading of forages. MAAAX™ LONGfibe™ cubes *are degraded slowly by microbes in the hind gut and offer "slow long term energy" to the horse. It won't make them hot, but keeps them in a perfect condition and ready for work.*

Depending on the feeding behavior and chewing rate, the particle size of forage in the hind gut varies around 1630 µm in horses as well as 1600 µm in ponies (Ueden et al, 1982). This means, that ponies have more or less the same particle size, but significantly higher energy efficiency because of a bigger digestive tract in comparison to horses. Ponies with a "big barrel" house a larger digestive tract within. Their digestive system has a significantly larger surface to help them to take up more nutrients.

We recommend further reading:

Meyer H, Ahlswede L, Reinhardt HJ. Studies on the duration of feeding, masticatory frequency and mincing of feed in horses. Dtsch Tierarztl Wochenschr. 1975;82(2):54-8.

Meyer H, Coenen M, Teleb H, Probst D. Untersuchungen über Futterzerkleinerung und Freisetzung von Futterinhaltsstoffen im Kopfdarm des Pferdes. Z Tierphysiol , Tierernährg u Futtermittelkde. 1986;56:266-75.

Staszyk C, Lehmann F, Bienert A, Ludwig K, Gasse H. Measurement of
masticatory forces in the horse. Pferdeheilkunde. 2006;22(1):12-6.

Ellis, A./Hill, J.: Nutritional physiology of the horse, Nottingham, 2005.

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NRC National Nutrition Council: Nutrient requirements for horses, 5th Edition, 2007.

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Did you know?

A short walk for a bite is essential!

MAAAX™ LONGfibe™ cubes *promote natural chewing behavior!*

Different to dogs, horses do not show the pavlovian response. Therefore the body reacts differently in preparation for digestion than in other species. Horses have a considerably small stomach, but a long small intestine and a huge caecum and large intestine, which is made for fermentation. Fermentation takes place by the microbial flora, which lives off the feedstuff the horses eat. The microbes in return produce important nutrients for the horse. Because of that, chewing and grazing is essential to horses, to secure a permanent and adequate level of forage in the hind gut to ensure a healthy microbial flora. In the wild, horses graze up to 16 hours per day, which includes chewing and slow motion walking (Duncan et al, 1980, Boyd et al, 1988). The slow-motion walking is needed to help the horse's gut to be moved slightly for a better transport of the feedstuff through the horse. Horses do have a strong peristaltic musculature around the guts – but it is easier and better if they can move all day on a field or paddock.

We recommend further reading:

BOYD, L./CARBONARO, D.A./Houpt, K.A.: The 24-hour time budget of Przewalski horses. Applied Animal Behaviour Science, Ausg. 21, 1988, S. 5-17.

DUNCAN, P.: Time budgets of Camamargue horses I, EEC Recommendations, Farm Animal Welfare. 1980, Ausg. 72, S. 26-47

DUNCAN, P.: Time budgets of Camargue horses II. Time budgets of adult horses and weaned sub-adults. Behaviour, Ausg. 72, 1980, S. 26-49.

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NRC National Nutrition Council: Nutrient requirements for horses, 5th Edition, 2007.

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Did you know?

It's more than just "*slobber*"!

MAAAX™ LONGfibe™ cubes *increase saliva flow and help to maintain a stable pH within the gastrointestinal tract!*

By chewing, saliva is secreted into the mouth cavity. The saliva is rich in electrolytes (Alexander, 1966). The amount of Na, Cl and Bicarbonate in saliva increases by the amount of produced saliva. The more saliva is secreted, the richer it is. The horse's saliva has an average pH of 6.8 (Eckersall, 1985), which helps to buffer gastric acid.

We recommend further reading:

Alexander F. A study of parotid salivation in the horse. J Physiol.1966;184(3):646-56.

Alexander F, Hickson JC. The salivary and pancreatic secretions of the horse. In: Phillipson AT, (Hrsg.). Physiology of digestion and metabolism in the ruminant. New Castle: Oriel Press Ltd.; 1970: 375-389.

Eckersall PD, Aitchison T, Colquhoun KM. Equine whole saliva: variability of
some major constituents. Equine Vet J. 1985;17(5):391-3.

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NRC National Nutrition Council: Nutrient requirements for horses, 5th Edition, 2007.

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Did you know?

Taking a mouth full!

MAAAX™ LONGfibe™ cubes *are taken up slowly to prevent choking!*

When horses take up feedstuff, they use their sensor system by smelling and touching the food. Afterwards they start to take it up. Every time a horse picks up food, it will take up 1.5-2.5 mg DM per kg BW. In a 500 kg horse, this will be 7.5-12.5 g DM per pick-up. In comparison to other animals like sheep, the horse takes up way less forage per pick-up (Arnold, 1984). As a consequence, one may say that a horse must have the chance to graze an adequate time of up to 16 hours a day (Keiper et al, 1980, Frape, 2004). The speed of the feed-uptake is regulated by the type and structure of the feedstuff but not by the amount of energy within. Horses do not sense if they are under- or overfed with nutrients. Only if they receive enough forage or not.

When a horse takes a bite of MAAAX™ LONGfibe™ cubes, *it will take up around 8.5 g of forage with each bite. The material will be thoroughly chewed and mixed with saliva, while it is transported and rolled through the mouth cavity. When the horse has gathered around 60-70 g in a bolus of 30 % DM and 70 % saliva, the bolus will be swallowed through the esophagus into the stomach.*

We recommend further reading:

ARNOLD, G.W.: Comparison of the time budgets and circadian patterns of maintenance activities in sheep, cattle and horses grouped together. Applied Animal Behaviour Science, Ausg. 13, 1984, S. 19-30.

Frape, D.,: Equine Nutrition and Feeding, 4. Edition. Oxford 2011

KEIPER, R.R./KEENAN, M.A.: Natural activity patterns of feral ponies. Journal of Mammals, Ausg. 61, 1980, 116-118.

Ellis, A./Hill, J.: Nutritional physiology of the horse, Nottingham, 2005.

Frape, D.,: Equine Nutrition and Feeding, 4. Edition. Oxford 2011

NRC National Nutrition Council: Nutrient requirements for horses, 5th Edition, 2007.

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Did you know?

Take a breath!

MAAAX™ LONGfibe™ cubes *are dust free and can help to prevent or decrease the effects of RAO/COPD!*

Beside the chewing activity in horses that enhances gastrointestinal health overall, MAAAX™ LONGfibe™ cubes *are virtually dust free. But what is dust? "Dust" describes very small particles with a diameter of half a millimeter and less. Sometimes you can see it, but very often the particles are so small, you can only guess. Especially in horse stables, dust is a problem. You can make it visible by waiting until it's dark and then light up the alley alongside the stables with an flashlight or a laser pointer. You will see loads of dust. Usually, dust in the airways is stopped by the mucus in the upper airway of the horse and secreted over the nostrils as goo.*

Depending on the dust size, it can be inhaled. But not only dust can find the way into the horse's lung. Also spores of fungi, virus and bacteria can be taken up into the lungs where it can cause serious damage and strong allergies (Chrichlow et al, 1986, 1087, Burell, 1996).

Very often the main dust source is the horses' bedding (80%) and the forage or hay (20%) that is presented to the horse. Additionally to that, 80 % of toxins such as mold, bacteria and virus in the normal stable environment are attached to dust particles (Clarke, 1986; Bartz, 1992). Therefore we need to handle both: bedding AND forage. That's why MAAAX™ LONGfibe™ cubes *can be the first 20 % on the road to equine respiratory health. As opposed to hay and other feedstuff, they need no soaking because they are already dust free and can be given to horses that suffer from RAO/COPD.*

We recommend further reading:

BARTZ, J. (1992): Staubmessungen im direkten inatmungsbereich eines Pferdes mit Hilfe eines „personal sampler" Tierärztliche Hochschule, Fachbereich Vet.Med., Diss., Hannover

BURELL, M.H.; WOOD, L.N. WHITEWELL, K.E.; CHANTER, N.; MACINTOSH, M.E.; MUMFORD, J.A. (1996): Respiratory disease in thoroughbred horses in training: the relationship between disease and viruses, bacteria and environement Vet. Rec., 139, 308-313

CLARKE, A.F. (1986): Air hygiene of stables and chronic pulmonary disease in the horse PhD Thesis, University of Bristol

CLARKE, A.F. (1987): A review of environmental and host factors in relation to equine respiratory disease Equine Vet. J. 19, 435-441 CRICHLOW, E.C.; YOSHIDA, K.; WALLACE, K. (1980): Dust levels in riding stables Equine Vet. J. 12, 185-188

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Frape, D.,: Equine Nutrition and Feeding, 4. Edition. Oxford 2011

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