

## DIETARY MANAGEMENT OF SPANISH HORSES TO PREVENT FREQUENT NUTRITIONAL PATHOLOGIES.

### INTRODUCTION

As a species, the horse has been evolving over 60 million years, has been domesticated under 5000 years, and has been stabled under 500 years.

The increasing popularity in equine leisure and competition activities has led to drastic changes in the lifestyle and habitat of the horse, yet its gastrointestinal and digestive system has not changed from its days as a free roaming herbivore. Hence, many common pathologies that we see today are 'man made' conditions caused by our failure to address the evolved nutritional requirements of the horse.

The horse had evolved to consume constant amounts of fibrous plant material, and has a limited capacity to digest large cereal 'meals' within the small intestine. The large intestine is the prime site of fibre digestion in the horse and where many digestive disorders are focused.

### BRIEF DESCRIPTION OF DIGESTIVE PROCESS

Understanding the basic digestive physiology of the horse will not only help to increase feeding awareness but also reduce the incidence feed related disorders (FreDs) such as colic, laminitis and azoturia.

#### INGESTION:

In its natural habitat the horse would graze vast areas, continually eating small amounts of plant material. During a day of natural grazing, the horse would exhibit up to 60,000 jaw movements. Apart from the physical benefits of fibre ingestion, chewing has huge psychological benefits for the horse, particularly when stabled for long periods of time. Recent studies have shown that the association between chewing rates and different feed materials vary greatly.

E.g. Chewing rates based on an average 500kg horse (Harris, 1999)	
1kg Hay (dried grass)	= 3,400 chews (chewing duration approx. 40 mins)
1 kg Oats	= 850 chews (chewing duration approx. 10 mins)

Chewing and grinding also has a physical effect on teeth due to the long sweeping jaw movements needed to masticate fibrous plant material. Chewing cereal grains requires a more limited jaw action, hence, horses that are deprived of long fibre may begin to develop lateral and medial hooks reducing their ability to grind food well before it is swallowed.

## STOMACH & SMALL INTESTINE

The presence of food in the mouth stimulates the release of saliva which lubricates the feed before it enters the oesophagus and stomach. The horse can produce large amounts of saliva (>15 litres day), (Frape, 1998), which is directly related to chewing rates and moisture content of the food bolus.

When the ingesta enters the stomach, bacterial fermentation and mixing of gastric acids begins the digestive process. Because the horse has evolved to digest a high fibre diet, the stomach is relatively small (10 -15 litres), and has a limited volume capacity. When fed large meals, the ingesta is pushed quickly through the stomach and the small intestine, which allows undigested food to travel through to the large intestine where it creates disturbance and digestive upset. Feeding grain also produces less saliva than long fibre, so the food bolus enters the stomach in a dryer, less digestible state and travels faster thorough to the large intestine. Often, more than 40% of a large grain meal leaves the small intestine undigested (Jackson and Pagan, 1992).

The levels of digestive enzymes in the small intestine such as amylase are lower than in other monogastric animals, which also limits the capacity for starch digestion.

Digestive Process in the Small Intestine via Enzymatic Activity	
NS Carbohydrates	= Simple sugars, & Starch via glucosidases and amylase
Protein	= Amino acids, via amino-peptidases and carboxy-peptidases
Fats	= Free fatty acids via Lipase

## LARGE INTESTINE

A characteristic of all grazing animals is the ability to ferment fibrous ingesta via large populations of micro-organisms. The large intestine in the horse is the prime site for digestion and should be in a state of continuous fermentation. The population of digestive microbes amount to more than ten times all the tissue cells in the body, and comprise more than half of the dry weight of faeces (Frape, 1998). These microbes not only degrade fibre, but also synthesise amino acids, B Vitamins and vitamin K.

A Constant intake of fibre is critical to maintaining the healthy microbial population, so when horses are fed fibre deficient meals the population become redundant and die off. Any undigested starch that reaches this area will induce acidic conditions which further debilitate the population of microbes. The acidosis created by starch degradation in the large intestine can damage the intestinal mucosa allowing the release of endotoxins, which may lead to colic and laminitis

## Feeding Recommendations For Spanish Horses

Feeding a high fibre, low starch diet should be the aim of all horse owners. Feeding other low nutrient value forage throughout the day will help to keep the intestine healthy and the horse occupied. In practical terms, good quality straw would be acceptable as part of the equine diet in Spain if no other source was available, but it is imperative that water is freely available so that the horse is able to rehydrate at frequent intervals. This is even more important in hot weather when dehydration occurs naturally. Taking water to the horse 2/3 times daily is not acceptable in this situation, as dehydration and impaction can occur rapidly.

Stabled horses that are fed a cereal (starch) diet face a double challenge; Firstly, lack of dietary fibre results in the demise of beneficial microbes needed for hind gut stability. Secondly the unwelcome presence of starch in the large intestine induces acidosis which further disrupts the vital process of fibre digestion and nutrient absorption. Replace cereal diet such as oats with a high fibre, high oil feed.

Stabled horses should spend some part of the day in a corral or paddock and will gain physical and psychological benefits from this. Do not feed on the ground in sand corrals and make sure that there is water available at all times.

### SUMMARY

- **Check/Rasp Teeth regularly (every 6 months)**
- **Employ regular Parasite Programme**
- **Feed Smaller, more frequent meals (max 2 kg in one meal)**
- **High Fibre Diet**
- **High Oil (safe energy)**
- **Live Yeast (improve fibre digestion)**
- **Low Starch/Sugar  
(reduce colic/laminitis/PSSM)**
- **Short Chopped Fibre (increase chewing rates & saliva production. Slows rate of ingestion)**
- **Replace electrolytes lost through heat/sweat**