



Calphormin

For Optimum Skeletal Development and Conformation



“CALPHORMIN is used on all my horses for the simple reason my graduates are “sounder” with less OCDs or other bone problems.”

Eddie Woods
Leading US Consignor, including Big Brown.



BIG BROWN, raised on Calphormin, on his way to victory in the Preakness.



“CALPHORMIN is an integral part of my breeding programme that has produced **TEOFILO** - European Champion Two Year Old 2006 & **SOLDIER OF FORTUNE** - Irish Derby Winner 2007 from the same paddock.”

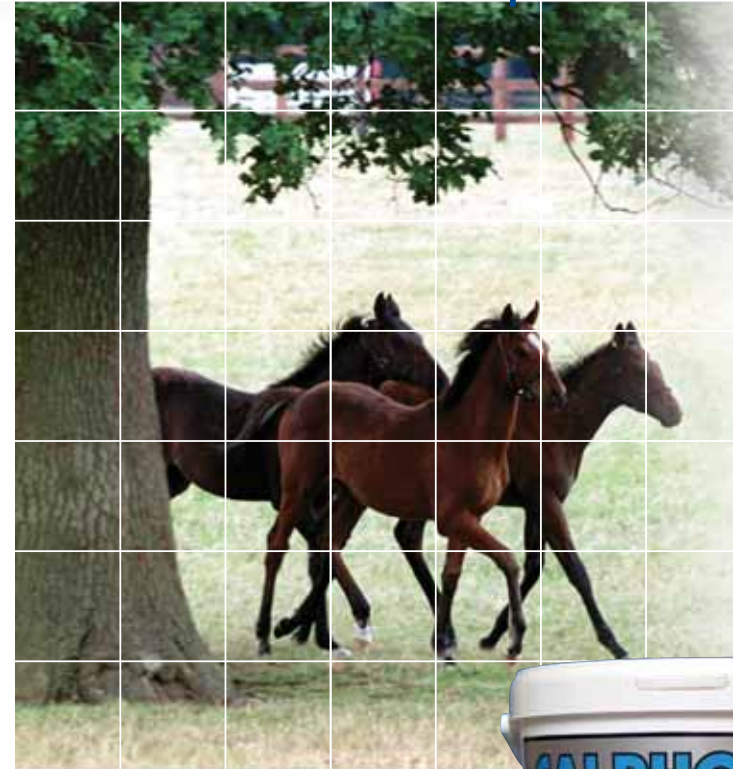
Jim Bolger
Racehorse Trainer.



TEOFILO winning the Dewhurst Stakes and raised on Calphormin.

Feeding Instructions	Ingredients	per 60g	per 120g	per 1kg
CALPHORMIN should be added to the normal feed ration.	Calcium	11,416mg	22,832mg	190,268mg
	Phosphorus	4,001mg	8,002mg	66,685mg
Mare in Foal (months 9, 10, 11): 120g per day.	Sodium Zeolite	5,004mg	10,008mg	83,400mg
	MSM	780mg	1,560mg	13,000mg
Lactating Mare: 120g per day.	Zinc	289mg	578mg	4,820mg
	Manganese	154mg	309mg	2,573mg
Weanling (6-12 months): 60g per day.	Copper	50mg	100mg	834mg
	Lysine HCL	6,240mg	12,480mg	104,000mg
Yearling: 60g per day.	Amino Acids	2,973mg	5,945mg	49,544mg

Calphormin



A natural feed supplement to promote optimum skeletal development



EXCELLENCE IN EQUINE NUTRITION

EXCELLENCE IN EQUINE NUTRITION





Calphormin

For Optimum Skeletal Development and Conformation

Supplementing in-foal mares or those with a foal at foot, as well as the young horse's diet with CALPHORMIN will help achieve optimum growth and skeletal development and maintain normal conformation.

CALPHORMIN is a unique feed supplement that contains a balanced combination of macro-minerals, trace minerals and amino acids, as well as a scientifically proven source of bioavailable silicon in the form of sodium zeolite. Every breeder is concerned whether their new born foal will develop into a top athlete, able to withstand the rigors of training, go on to race, or compete in other disciplines. In racing an immature two-year-old is expected to gallop at speeds approaching 35 miles an hour, despite their skeleton not yet being fully developed. In other disciplines, such as dressage and showjumping different, but equally challenging forces, are placed upon the skeleton from a young age.



The prevalence of developmental orthopaedic disease (DOD), including osteochondrosis desiccans and physitis, can be high in foals and a recent epidemiological study reported an overall prevalence of DOD of 60% amongst Thoroughbreds, Standardbreds and Warmbloods (Lepeule et al. 2008). Warmblood Breeds exhibited the highest prevalence of DOD (80%) compared to Standardbreds (63%) and Thoroughbreds (60%). Whilst the underlying risk factors for DOD are complex, nutrition, in terms of mineral availability and balance, is known to be critically important (McIlwraith 2005).

The foundations for a horses' skeletal health and future athletic success can be established before it is even born. Ensuring broodmares have an appropriate intake and balance of macro-minerals, trace minerals, and amino acids in the diet to pass on to the foal, both in utero and following birth via the milk, is critical. **CALPHORMIN** gives young horses the best start they can get, initially through supplementation of the mare, and latterly by feeding directly to foals and youngstock. Continuing to feed young, rapidly growing horses **CALPHORMIN** helps to maintain optimum growth and bone development.

THE MACRO-MINERALS

CALCIUM AND PHOSPHORUS

Whilst calcium and phosphorus are necessary for numerous body functions including nerve conduction and energy metabolism, blood coagulation, and temperature regulation, their principal function in the body is to mineralize bones and teeth, thus giving them strength.



Daily supplementation with **CALPHORMIN** will help ensure optimum conditions for strong healthy bone growth in the young athletic horse.

The underlying pathology in many cases of this syndrome is defective cartilage-to-bone conversion at the growth plates in the young horse. Whilst it is likely that other factors, such as genetics contribute, to the incidence of DOD, nutritional risk factors are highly significant. More importantly, nutrition is an area over which horsemen have direct control.

The current consensus regarding the role of diet and incidence of DOD is that whilst energy and protein tend to drive the rate of growth, it is the minerals including calcium, phosphorus, copper, zinc and manganese that are essential to support that rate of growth. Furthermore, where mineral intake is inadequate relative to the intake of energy and protein, the risk of DOD increases. This is particularly likely in genetically susceptible individuals. **CALPHORMIN** is a unique product that provides a convenient way to supplement the diet of broodmares, foals and youngstock with the significant minerals that have been shown to be effective in maintaining normal growth and development. **CALPHORMIN** is a palatable pelleted formula, which has been fortified with high concentrations of macro and trace minerals, together with sodium zeolite and essential amino acids.

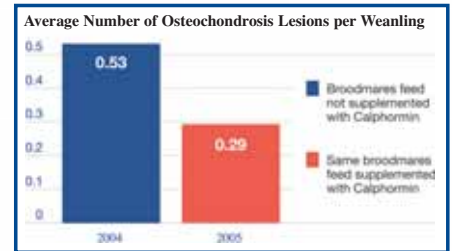
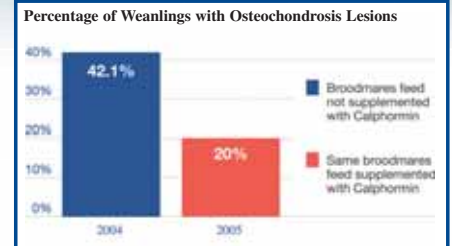


VANESSA BOKO, world record time for two year olds over 1660m, raised on Calphormin.

TRIAL RESULTS IN HORSES

CALPHORMIN has undergone significant trialing in broodmares to validate the efficiency of the formula. 38 foals from 5 different stud farms were x-rayed to establish the incidence of growth related problems in their hocks and patella (right and left) and fetlocks (right and left, front and back). The subsequent pregnancy of the mares of the same foals was monitored, but on this occasion **CALPHORMIN** was fed in addition to their normal diet (which remained unchanged). Consideration had also been given to the choice of stallions to ensure no genetic effect could compromise the results of the study.

At a similar time of year the siblings of the second group of foals, born to the same dam, were also X-rayed according to the same protocol. The results showed a statistically significant and marked reduction in the prevalence of joint lesions ($p < 0.05$), Fig 1 below.



SUMMARY

Nutritional imbalances have been recognised as one potential factor in the development of DOD in young, growing horses. **CALPHORMIN** helps to balance the diet with nutrients known to be critical to proper skeletal development. In developing horses, the major nutrients of concern are protein, energy, calcium, phosphorus, copper, zinc and lysine. Minimum requirements in horses for each of these nutrients have been published by the National Research Council (NRC, 1989); however, in some instances the optimum intake to sustain normal growth may be significantly higher.

CALPHORMIN provides a supplemental source of all of these nutrients in a carefully balanced and palatable formulation which provides for the likely elevated requirements of these essential nutrients for optimum skeletal development, and production of sound and robust athletic horses.

“ The Monticule Farm motto is ‘MAKING OUR MARK’ by always seeking to be the best that we can be. **CALPHORMIN** has helped us in fulfilling this aim. ”

Dr. G. Knapp, Owner, Monticule Farm, USA.

“ Since we began using **CALPHORMIN** at Boko Stables some years ago, we’ve noticed that our horses can stand hard training much better/longer, they’re simply more durable. ”

Mr. John Bootsman, Boko Stables, Sweden & Holland.



MAXIMISING HEALTH & VITALITY BY

TARGETING SPECIFIC NUTRITIONAL NEEDS





Irish Derby winner **SOLDIER OF FORTUNE**, raised on Calphormin.



U NEED LUCK, returning to the racetrack, after fracturing two cannon bones, was fed on Calphormin during recovery.



VIRGIL BOKO - winner of 2007 European Derby and raised on Calphormin.

Restriction of protein intake has been shown to limit growth rate in young horses. The requirement for protein in the total diet of horses varies according to lifestage and level of exercise. Weanlings needing a ration that comprises about 13% protein, yearlings about 10-11% and two year old horses about 9-10% protein (depending on whether they are in training or not).

Different sources of proteins contain varying combinations and relative amounts of amino acids. Both the amount of protein and its quality, or amino acid content, are important for growth. Amino acids serve as the "building blocks" for body protein, which is needed for tissue growth and repair. To synthesise the protein required for growth, development, and maintenance of tissues, horses must have an adequate supply and balance of amino acids in the diet. Although there are 22 basic amino acids, only 8 of them are considered to be essential. By "essential", we mean that the body cannot synthesize them they must be provided in the diet. The body is able to synthesize 14 non-essential amino acids, assuming it has an adequate supply of the essential eight. The production of new protein can be compromised if the dietary intake of essential amino acid is insufficient. **CALPHORMIN** provides a source of quality protein and a full complement of essential amino acids.

LYSINE

The protein source of many horse diets often means that they are low in lysine. The National Research Council refers to lysine as "the first limiting amino acid" in the diet of growing foals. Inadequate protein or lysine intake can result in decreased growth and development of young animals.

Lysine is needed for collagen and elastin formation, which are components of bone matrix, tendons, skin, and articular cartilage. Cereal grains and forages such as hay, haylage and grass are generally quite low in lysine.

CALPHORMIN provides a useful supplemental source of lysine for all horses, especially those in active growth or exercise training.

COMBAT DOD WITH CALPHORMIN

DOD is a significant problem facing today's horse breeders and a serious case of DOD can render a young horse essentially worthless due to crippling lameness. DOD is a term used to encompass a number of skeletal disorders in growing horses such as epiphysitis, contracted tendons, osteochondrosis dessicans and wobbler syndrome.



Calcium and phosphorus account for 70% of the mineral content of the body, with 99% of the calcium and about 80% of phosphorus being found within bones and teeth. The calcium and phosphorus content of mare's milk, which is approximately 0.1% and 0.06% respectively, represents about 30-50% of the total mineral content of milk. Milk is therefore a primary source of these two important minerals for growing foals.

Most horse rations intended for breeding horses and youngstock will comfortably provide the minimum amounts of both calcium and phosphorus required for growth as laid down by The NRC (National Research Council, 1989). However, more recent studies have shown that the requirements for calcium and phosphorus needed to ensure optimum bone density, and strength during training, may be very much higher than the NRC prescribes (Nielsen et al. 1998. ; Stephens 2004). Certainly, the incidence of DOD has been reported to be higher where the dietary intake of calcium or phosphorus was low or deficient, or where extreme ratios between these two minerals were apparent in the diet (Knight et al. 1985). It is also important to note that over 90% of the body's calcium and phosphorus content is deposited between the 8th and 11th months of gestation, and hence mineral intake in the mare is paramount at this time (Coenen 2000).

EFFECTS OF CALCIUM & PHOSPHORUS DEFICIENCY

The body has a complex homeostatic or balancing mechanism to maintain the level of physiologically active calcium in the blood within tight limits. Under the control of the parathyroid hormone and calcitonin, calcium balance in the body is maintained through direct effects on absorption within the gut, excretion via the kidneys and deposition into or resorption from bone.

As a result of these hormonal effects, a calcium deficient diet can lead to bone demineralization in an attempt to restore calcium balance. Mobilised mineral is then replaced by fibrous connective tissue, leading to osteodystrophia fibrosa and enlargement of bone (Luthersson et al. 2005). Although all of the skeleton can be affected, it is often most noticeable in young horses in the region of the growth plates of the legs and cervical vertebrae.

Other clinical signs such as insidious shifting of the legs, lameness, and generalised bone and joint tenderness may also occur (Ramirez and Seahorn 1997). These clinical signs are associated with subepiphyseal microfractures, loss of bone integrity, disruption of articular cartilage, and tearing or detachment of tendons and ligaments. In advanced cases, spontaneous fractures may occur (NRC 2007).

Daily supplementation with **CALPHORMIN** ensures that even horses fed on a high cereal containing diet, where the phosphorus content is significantly greater than that of calcium, will have sufficient levels of bio-available calcium to re-establish the calcium to phosphorus ratio to within an acceptable range.

When supplementing calcium and phosphorus, it is vital to ensure that not only is the absolute intake sufficient, but also that these two minerals are present in the diet in an appropriate ratio relative to each other. An excess of phosphorus, relative to calcium, results in reduced calcium absorption in the small intestine due to calcium phosphate complexes being formed within the digestive tract. This can be critical where calcium intake is sub-optimum. In contrast, excess dietary calcium has less effect on phosphorus absorption, as phosphorus is primarily absorbed in the large intestine.



The amount of calcium and phosphorus provided in the horse's daily diet can vary dramatically depending on the content of the feed, the proportion of roughage to concentrates fed, and indeed the type and quality of roughage provided. Ideally a calcium to phosphorus ratio of between 1.5 - 2.1:1 should be maintained in order to ensure that the absolute requirement for calcium and phosphorus is also met (Harris 2008). In general, most proprietary feed will offer a calcium to phosphorus ratio of near to 2:1, however the addition of other feed stuffs to this ration will inevitably alter the overall calcium to phosphorus ratio.

“ A big thanks to **CALPHORMIN** for helping to get 'You Need Luck' back to the track. ”

Mr&Mrs.L.Brady/Mr.G.Shevlin, Owners of You Need Luck.



MAXIMISING HEALTH & VITALITY BY

TARGETING SPECIFIC NUTRITIONAL NEEDS





KODIAK KOWBOY, raised on Calphormin, winner of the Amsterdam Stakes, Saratoga, USA, trained by Ian Brennan Vinery Stud.

CALPHORMIN with a calcium: phosphorus ratio of 2.85:1 is therefore ideally placed to optimize the balance between these two minerals in the total diet, in order to support the normal growth and development of strong, healthy bone in the young athletic horse.

THE MICRO-MINERALS

COPPER

Copper is involved in the strengthening or stabilisation of bone collagen, and is also needed for elastin synthesis, which gives many tissues such as the arteries, lungs, ligaments and cartilage their elastic properties. The involvement of a copper dependent enzyme in both of these processes makes dietary copper intake and bioavailability important. Copper is also needed for the mobilisation of body iron stores. Impairment in cartilage and or elastin formation may result in DOD in young horses. Marginal copper intake or true deficiency in horses can often be explained by low copper levels in the soil upon which cereal grains and or forages have been grown. Alternatively, copper uptake by plants may be inhibited by competing minerals, or due to adverse acidity or pH.

There are a large number of copper dependent enzymes within the body, including lysyl oxidase and superoxide dismutase and a reduced activity of these enzymes induced by low dietary copper intake can have far reaching effects within the body. Low copper intake has been repeatedly implicated in the development of some forms of DOD, (McIlwraith 2005).

Inadequate copper intake does not appear to slow growth rate; but inadequate copper for normal bone and cartilage development, can result in decreased bone density.

A number of studies also seem to indicate that ensuring an adequate copper intake, in mares, foals and weanlings may decrease the risk and occurrence of some forms of DOD (Hurtig et al. 1993), and also promotes the repair of existing lesions during growth (NRC 2007).

Low Dietary Copper is associated with a number of health issue, these include:

- Increased incidence of epiphysitis in young stock.
- Dullness in the coat and poor hoof condition.
- Anaemia; copper is involved in haemoglobin synthesis.
- Uterine artery rupture following foaling.



INDIAN INK, raised on Calphormin, winning the Coronation Stakes at Royal Ascot.

ZINC

Zinc has a major role in the body in protein and carbohydrate metabolism, and is a component of many zinc dependant enzymes. Zinc is also integrally involved in growth, including cartilage turnover. Inadequate zinc intake is associated with a reduced growth rate, and supplementation with zinc, as part of a complete trace mineral package, has been shown to increase bone mineral density compared to a basal un-supplemented diet (Ott and Asquith 1995). It is vitally important to ensure that supplemental zinc is present in the diet 'in balance' with other trace minerals such as copper, as an excessively high zinc to copper ratio in the diet can inadvertently reduce copper absorption as they compete for absorption sites.



Dr. G. KNAPP, owner of Monticule Farm with Mien, dam of Big Brown, fed on Calphormin.

MANGANESE

Manganese is also essential for carbohydrate and lipid metabolism and for the synthesis of chondroitin sulphate necessary for cartilage formation. Like copper and zinc there are a number of manganese dependent enzymes that have an important role in the body. Manganese deficiency in other species results in abnormal cartilage formation due to inadequate chondroitin sulphate synthesis. A significant deficiency of manganese has been associated with birth of weak young that may be un-coordinated, or have leg deformities such as enlarged joints, knuckled-over pasterns, twisted forelimbs, and bones that are weak, thickened, well calcified, brittle and shortened, resulting in lameness, stiffness, joint pain, bowed legs, and a reluctance to move.

Whilst there is no direct evidence of a major role for manganese in developmental problems in horses, nutritionists advise that the manganese content of the diet is adequate without being excessive, as it can reduce the absorption of phosphorus. Excessive liming of land can lead to reduced uptake of manganese by grass and other crops due to pH changes in the soil.

SODIUM ZEOLITE

Sodium zeolite is a bioavailable silicon-containing compound. Silicon enhances bone calcification and is present in large quantities in connective tissue. Silicon is a normal part of the horses' diet and is found in grains and soil, but not in a form that horses can readily absorb.

CALPHORMIN contains silicon in the form of sodium zeolite, which is broken down by stomach acid into monosilicic acid. This form of silicon can be absorbed directly from the gastro-intestinal tract into the blood stream. Silicon is associated with collagen formation, the fibrous protein matrix which provides support for body structures such as cartilage and bones. Consequently optimum bone health depends upon silicon as well as calcium.

- Sodium Zeolite and Bones and Joints

Silicon is essential for collagen formation and calcification of bone, which help give bone its strength and durability. Silicon is also required for the maintenance of articular cartilage, as well as for ensuring the integrity of joints and ligaments.

Sodium zeolite has been shown to be an available source of silicon in horses (Lang et al. 2001) and furthermore is able to increase the silicon concentration in mares milk thus delivering supplemental silicon to the foal (Lang et al. 2001). However, most significantly, daily supplementation with sodium zeolite has led to dramatic and significant reductions in the rate of bone related injuries in young quarter horses in race training (Nielsen et al. 1993). An earlier study had also suggested an increase in bone density through silicon supplementation in the form of sodium zeolite (Frey et al. 1992). A very recent study that compared two sources of bioavailable silicon has confirmed the efficacy of sodium zeolite increasing plasma silicon concentration, and improving calcium digestibility and retention (O'Connor et al. 2008).



BIG BROWN, raised on Calphormin, winner of the Kentucky Derby.

CALPHORMIN provides sodium zeolite in combination with other important nutrients and micro nutrients needed to support good bone development, mineralisation and strength.

PROTEIN & AMINO ACIDS

The amount of protein needed in the diet depends on:

- The individual animal's requirement for protein
- The amount of diet consumed
- The digestibility of the protein in the diet
- The quality of protein present in terms of its amino acid profile

“ Feeding CALPHORMIN in our stables has helped us to keep producing sound horses and stakes winners. ”

Mr. Ian Brennan, Trainer, Vinery Stud, USA.



MAXIMISING HEALTH & VITALITY BY

TARGETING SPECIFIC NUTRITIONAL NEEDS

