

FEED TIMES

Issue 2 Spring/Summer 2015



PEGUS
HORSE FEED

FEED
THAT
PERFORMS

Digestion

Small intestine

The small intestine of an average sized horse (450 kg) is about 20 metres long. It is anatomically divided into 3 segments:

Duodenum - the first 1-1.5 meters. The bile duct and pancreatic duct empty their contents into the duodenum at the junction with the jejunum.

Jejunum - the middle part of the intestine (> 80% of the length). The wall of the jejunum has an abundance of digestive glands that secrete enzymes and buffers into the lumen. The jejunum has a large absorptive surface, and is the major site for the absorption of nutrients including vitamins and minerals.

Ileum - the final 1-2 meters of the small intestine. The ileum's structure and function is much like that of the jejunum.

The horse has no gall bladder. The bile, which is produced by the liver, is therefore secreted continuously into the small intestine. Bile solids (phospholipids and bile salts) help in the emulsification of fat, and are a pre-requisite for lipid digestion. The pancreas secretes a bicarbonate-rich fluid which neutralises the acidic contents of the stomach digesta. Gastric contents are neutralised within a few metres of their emergence into the small intestine. The pancreas also secretes enzymes that hydrolyse proteins (trypsin), fats (lipase) and starch (amylase). Enzymes secreted by the glands of the intestinal wall continue to digest end products from pancreatic enzyme reactions into small components that can be absorbed by the cells of the intestinal epithelium.

The transport velocity through the small intestine is approximately 20 cm per minute, thus giving the small intestine about 1.5 hours to digest the feed and extract nutrients. In the last part of the ileum the digesta accumulates before it is squirted under pressure into the large intestine at the junction between the colon and the caecum. Emptying of the ileum appears to take place 3-6 times per hour, and delivers 0.2 to 1.5 litres of intestinal contents to the hind-gut at a time.

The digestive secretions increase the water content of the digesta until it has the consistency of a thick soup that can be propelled through the long and curving intestine. At the terminal ileum the water content is about 96% (4% dry matter) on a roughage diet, and in the range 90% to 96% on diets with a greater proportion of grains and commercial concentrates.

Hind-gut

The horse is technically referred to as a hind-gut fermenter. Herbivores which are hind-gut fermenters are characterised by the development of one or more large fermentation chambers in the distal parts of their digestive tract. In the horse both the caecum and the colon are used as fermentation chambers.

The caecum is a blind sac starting at the point where the ileum empties into the hind-gut. It is about 1m long and contains, in an average-sized horse, 30 litres of digesta. The colon has a complex anatomy and passes in a double horseshoe-like fashion from the junction with the caecum towards the liver in the foremost part of the abdominal cavity. Next it continues to the pelvic flexure at the rear of the abdominal cavity, then forward again to empty finally into the rectum.

The fermentation chambers have dense population of microbes (bacteria and protozoa, Table 5) which digest fibrous carbohydrates such as cellulose, hemicellulose and pectines none of which are broken down in the small intestines. The horse, like all other plant-eating animals, depends on microbial enzymes to extract the energy from these fibrous carbohydrates. No digestion of cellulose could take place in a sterile hind-gut.

pH, AMMONIA CONCENTRATION, AND NUMBER OF MICROBES IN THE DIGESTA IN DIFFERENT PARTS OF THE DIGESTIVE TRACT OF A HORSE ON A HAY RATION:

Small Intestine	Caecum	Colon	pH
7.4	6.6	6.6	pH
52	29	54	Ammonia_N, mg/l
36	492	363	Bacteria/gram x 10E + 6
0.9	2.6	21.4	E. Coli/gram x 10E + 6
0	5600	0	Protozoa/gram

Here at Pegus Horse Feeds, we are happy to advise you on your equine nutritional needs. And it won't cost you a penny! Whether you have a query on feeding your grass-kept pony club pony or your yard of competition horses, talk to us today.

Free Nutritional Helpline:

From Republic of Ireland, call 1800 37 8463

From UK, call 0800 011 4182

Did You Know? The length of the horse's digestive system



Digestion

The concentration of microbes in the hind-gut of the horse is approximately the same as that found in ruminant stomachs. The activity and number of microbes are strongly dependent on the nutrients which reach the hind-gut with the ileal contents, the passage rate, and the buffering capacity of the glands of the intestinal wall. Efficient microbial growth depends on an adequate supply of nitrogen (as protein, amino acids or ammonium ions). A certain amount of readily fermentable carbohydrates (starch and monosaccharides) will speed up bacterial growth and protein synthesis.

Short-chain fatty acids (acetate, propionate, lactate and butyrate) which are produced by bacteria during fibre digestion are absorbed into the blood stream and utilised as energy sources by the horse. The bacteria also synthesise

large quantities of water soluble vitamins of the B-complex (Table 6), but the extent to which these are absorbed is not known. However, horses with a normal workload do not experience vitamin B or C deficiencies. Horses which are used for hard exercise or endurance competitions are often treated with extra vitamins, although no exact requirements

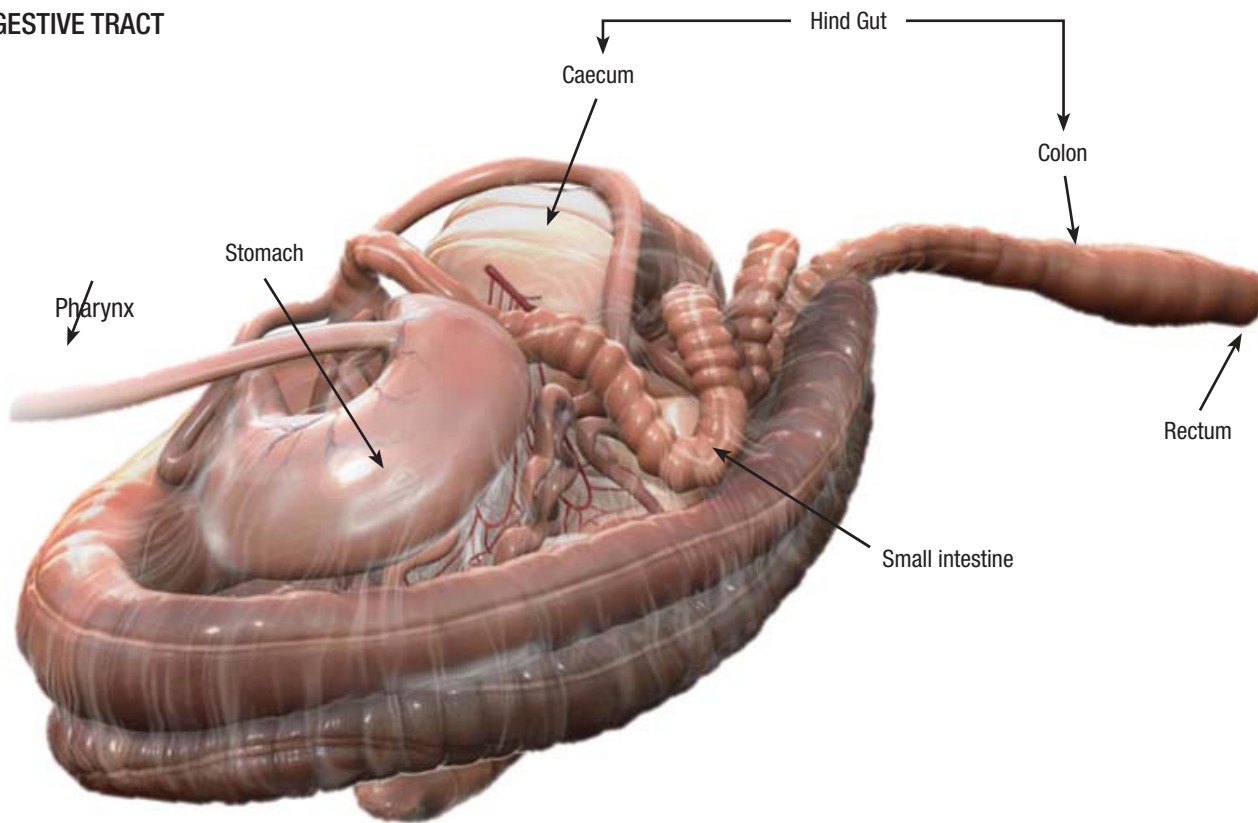
for these vitamins has been given in the international literature.

Concentrations of B-vitamins in feeds and intestinal contents in mg/kg of dry matter.

In the second half of the digestive tract the faeces gradually dries due to the absorption of water and ions.

Vitamin	Feed	Caecum	Colon Start	Colon End
B1	1.1	7.1	7.8	7.8
B2	0.4	7.0	9.2	12.2
B6	0.2	2.4	6.1	6.2
Nicotinic acid	3.0	121.0	96.0	119.0
Pantothenic acid	0.8	39.2	34.4	20.5
Biotin	0.01	0.2	3.8	2.3
Folic acid	0.1	3.0	4.7	2.7

THE DIGESTIVE TRACT



m is about 30 metres. That's the same as three buses, end to end!



Starch in Horse Feed Rations

There is a long tradition of using grains and cereal-based concentrates, especially those derived from oats and barley, in horse rations. Such ingredients are commonly an important part of rations for work horses and horses in training, since these have increased demands for energy which are difficult to meet from forage alone. Oats are commonly fed whole or crushed, while barley and other grains are main ingredients in concentrate mixtures, whether in the form of pellets or muesli.

The distinctive thing about grains is that they contain about 50% starch and it is this starch that is the energy-rich part of the grain. Generally, we expect grain and grain-based feed mixtures to contain about twice as much energy per kilogram as dry forages (i.e. hay). Compared with forage or silage, which contain substantive amounts of water, the food value of grain, which usually has a water content of 15%, is even greater. When comparing energy contents of feeds always remember to adjust to the same water content first. The most energy-rich ingredient we can add to the rations of horses is fat (e.g. vegetable oil). Fat gives almost 3 times more energy per kilo than corn, but cannot be used in large quantities due to limitations of digestion and absorption.

When the horse's ration is predominantly forage, much of the digestion occurs in the hind gut (caecum and colon) after the feed has passed through the stomach and small intestine. Here the finely chewed plant fibres are degraded (fermented) by microbes. This fermentation produces water-soluble fatty acids, mainly acetic and propionic acid. These are absorbed easily through the

intestinal wall and give the horse a steady supply of nutrients to be used as energy for work and for the production of milk or foetus.

When we give the horse a starch-rich diet (a high proportion of grain and concentrate mixtures), a large part of that starch is digested in the small intestine. The starch is broken down by enzymes in the intestines into sugars (glucose) that are transported from the intestinal contents into the blood. This leads to an increase in the horse's blood sugar level. The horse's pancreas secretes the hormone insulin to regulate blood sugar concentration, and to ensure that the absorbed glucose is used directly for energy when needed or else stored as glycogen in liver and muscles and as fat in adipose tissue.

When horses are fed a lot of starch-rich concentrate, blood glucose may rise substantially in spite of increased insulin secretion. They may then easily become 'hot-tempered' and some horses may be difficult to control. However, this varies widely. It is not proven that one particular type of starch, e.g. from oats, is more likely to make a horse "hot" than another type of starch, such as from barley. Most often, it is the amount they are fed that is decisive.

If horses in training have days off, without their rations being reduced, they can easily develop muscle problems resulting in stiffness, 'tying up', or the more serious condition of muscle degeneration (myoglobinuria). Always remember that horses who work or exercise hard should receive a reduced concentrate volume on days off, usually about half the amount they receive in the days of training.

Horses that are susceptible to these problems should preferably exercise lightly, even on their off days.

When horses receive a large amount of concentrate in one meal, a portion of the starch passes through the small intestine without being absorbed and thus comes into the large intestines. Here, the starch is utilized rapidly by the intestinal flora and the fermentation can lead to a fall in pH, making the environment in the gut more acidic, and thus less favourable for the digestion of fibre. In addition, it may create other imbalances that, in severe cases, can lead to colic or laminitis.

A horse in hard training, as mentioned above, will eat quite a lot of feed, and it is important that the concentrates given are distributed over the course of several meals. A common rule of thumb is that a single meal should not contain more than 1.5 grams of starch per kilogram of the horse's body weight. A horse of 500 kg should therefore not receive more than 750 grams of starch per meal. Consequently, 1,5 kilos of concentrate would be equivalent to the upper recommended amount of starch to be given in one meal.

As mentioned, the most important concern when feeding a high proportion of starch-rich concentrate in your rations is to monitor the amount of starch that the horse receives in every single meal. In our PC-Horse program, we certainly include starch as a factor in our feed-calculator. For this to be meaningful, it is important that you use the program's function for allocation of the daily ration into meals. Then the program will calculate the amount of starch per meal and warn if the amounts exceed the recommended intake of 750 grams per meal. This way, you can easily monitor and correct the ration or the number of meals so that the risk of illness or adverse side effects is minimized.



Reinventing Horse Feed

Pegasus Horsehealth Cube is a low starch fully fortified feed, containing the super fibres and high energy fat supplement. This Slow release energy feed is suitable for breeding, growing & performance Horses. Research has shown that low glycaemic feeds produce more balanced energy levels due to lower blood sugar and insulin spikes following a meal. Pegasus Horsehealth Cube provides energy from fat and digestible fibre, with a reduced portion of energy from starch resulting in a lower glycaemic response to feeding.

A Low Starch & Glycaemic feeding Innovation designed for:

- Tying up
- Colic
- Hindgut acidosis and associated digestive disorders
- Ulcers
- Nutritionally related developmental orthopaedic disease
- Horses sensitive to grain
- Laminitis

Low GI - High Performance

The benefit of feeding high oil feed products is furthered by their inherent low glycaemic index. The glycaemic index measures the effect the feed has on blood glucose (sugar) and insulin – a high glycaemic index means the feed produces a rapid rise in glucose and insulin, followed by a rapid fall in blood sugar. The reason this is important, is because a drop in blood sugar indicates a lack of glucose availability for the muscle and brain – and this has a negative effect on performance. The concentrations of glucose in the blood plasma of horses on oil-enriched diets are higher compared to horses fed high-starch diets.


This effect on the glucose concentration, also known as a 'glucose sparing effect', has been described repeatedly in horses on oil-rich feeds, both during and after exercise. Raw grains cause a large increase in blood sugar which predisposes the horse to early fatigue as blood glucose and carbohydrate stores in muscle are rapidly used up and fat utilisation is inhibited. Increased insulin also increases muscle permeability, which in turn is detected by increased plasma muscle enzyme levels (blood CK). The highest glycaemic response occurs with sweet feed, followed by oats and corn, however; supplementing high starch diets with an oil-rich concentrate such as Pegasus Horsehealth Cube decreases this all important glycaemic response. A low glycaemic index means the feed causes a slow and sustained rise in blood glucose. Oils have a low GI, rice bran also has a low GI and this, combined with its high oil content; makes it the ideal feeding supplement for maintaining blood sugar levels in race horses. Research shows that rice bran supplemented horses also show lower lactate levels and lower heart rates during exercise, giving an added edge. Lactic acid accumulation after exercise can limit performance, and any factor that can lower lactate production can be beneficial for performance. The effects of feeding heat-stabilized rice bran versus corn oil were compared in a scientific study. During strenuous exercise, horses fed rice bran had lower lactic acid levels, lower heart rates, and subsequent shorter recovery periods than horses fed corn oil. This is also true when fats (like rice bran) were compared to high-starch feeds




HORSE HEALTH CUBE

Low Starch Formula


Low GI
High Performance




Healthy Digestion

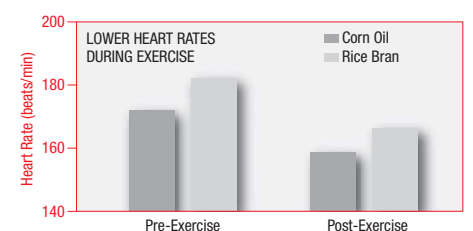
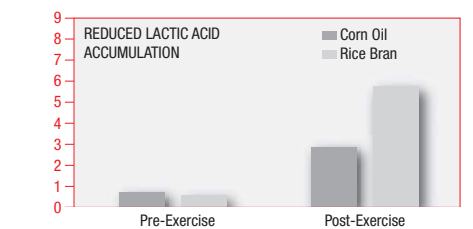
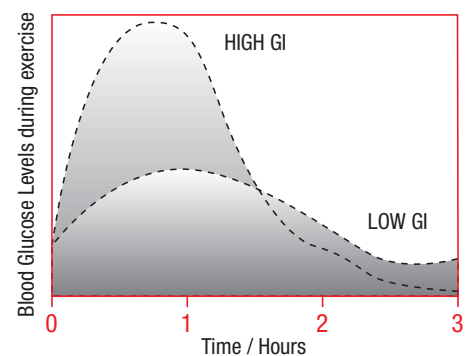


Bone Development



Muscle Development





Prepare for Good Grazing this Spring

After a long winter horses will again be back on lush pastures. The transition from indoor feeding to grazing requires proper preparations, if you are to avoid digestive problems and maintain a good health.

Needless to say, fences and gates must be in good technical condition. Take some time to tidy up the field. Remove accumulated trash (plastic, bottles, and sharp items) that have 'stranded' in the pasture during winter. Control the water supplies, and provide salt licks (sodium chloride). Horses should be wormed before they are let out to graze. Contact your veterinarian and get a plan for anthelmintic treatment schedules that functions in your district and matches your horses.

A gradual transition from indoor feeding to pasture is crucial. During this transition period, when the horses gradually gain access to more and more grass, you should continue to give roughage (hay or silage) in the morning (before pasture) and in the evening, while reducing the amounts of concentrate. Allow for a gradual increase in the time on pasture over one to two weeks, before the horse will be out all day.

Horses graze pastures unevenly, and have favourite areas where they quickly eat most of the available grass, whilst avoiding other areas (typically where manure is dropped). Often it looks as if there is plenty of grass left in a field, while in reality there is much less that the horses will eat. Monitor the amounts of "available" grass carefully, and be sure to move the horses to new pastures in time.

Mares with foals and young horses should have the best pastures. It is important to monitor grass abundance and quality. There should always be plenty of grass available in the pasture, or you will find that both broodmares and young horses quickly lose body condition. If practical, large pastures should be subdivided and the smaller plots be used on a rotational basis.

Adult horses and ponies can do well on pastures of lower quality, provided that they are not trained or used excessively for riding. For horses with a history of laminitis more extensive pastures will be convenient.

Periods of drought may be expected at different times during the spring and summer season. Pasture quality drops quickly when the soil humidity is low. Look carefully for changes in grass availability and reduced body condition during a draught period!

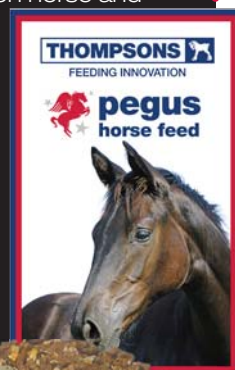


WHICH MIX?

COOL MIX (LITE)

A special formulated low molasses, oat free mix with a blend of grains and fibres. This delicious mix has been developed with cooked grains and fibres coated with soya oil for cool energy. Offering a lower sugar index than standard feeds. Providing a slower release of energy for the excitable competition horse and pony. Fully fortified with Pegus Equine pre-mix supplement ensures that your horse has their fully daily balanced vitamins and minerals.

Call Allison on
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HI PERFORMANCE MIX

Highly palatable blended sweet feed mix designed to meet the demands of horses in hard work or requiring a faster release speed of energy. Provides the organs and tissues with essential vitamins and minerals for improved function.

Also includes Pegus Equine pre-mix supplement and proteins for excellent muscle tone and tissue strength during exercise, higher levels of antioxidants which are essential to aid recovery and reduce tissue damage.

Pegus blended oil aids stamina and reduces lactic acid production, a major factor in limiting performance.

Call Eugene on
+353 86 174 0300



Pegasus Sponsorship

The Leinster region of Showjumping Ireland have announced details of the 2015 Leinster Summer Tour, which this year welcomes onboard a new title sponsor - Pegasus Horse Feed. The Pegasus L.S.T (1.35M) will take place at 14 venues across the province, kicking off at Louth County Show on Sunday April 26th with the final round taking place at the Irish Breeders Classic in September.

The 2015 Pegasus L.S.T (1.35M) is expected to attract many of Ireland's top riders along with new and exciting emerging talent, with a total prize fund in excess of €20,000. Each leg of the Pegasus LST will be worth €1,000 with a further €5,000 on offer for the top three riders at the end of the series. Pegasus Horse Feed will also provide additional prizes from its range of products that includes equine health supplements.



Connections at the launch of the Pegasus L.S.T (1.35M) at Killashee House



Pegasus launch Pony Club Area 17 Championships with Vanne Campbell (Iveagh DC) and members of the Iveagh Pony Club. The sponsorship will cover Games (North Down 30 May), Dressage (North Derry 13 July) and Tetrathlon (East Down 9&10 July)



Jim Newsam winner of the Pegasus Young Event Horse qualifier, Ravensdale



Tony Hurley, Pegasus Horse Feed, Colman Purcell and Donal Buckley of Dairygold presenting the connections of Just for James winning the Pegasus Point to Point series at Cork Racecourse on Easter Monday

Pegasus Horse Feeds will be sponsoring at the following events during the summer. Come by and say hello!

Pegasus Pony Club Area 17 Championships

Showjumping Tullylagan 19th July

Eventing Seskinore (Monaghan) 26th July

Eundurance Downpatrick 27th June

Polocrosse 8&9 April

Home Championships Mid Antrim 29 August

Pegasus Kilgurry International July

Pegasus Puissance Mullingar June

Pegasus Young Event Horse Balmoral

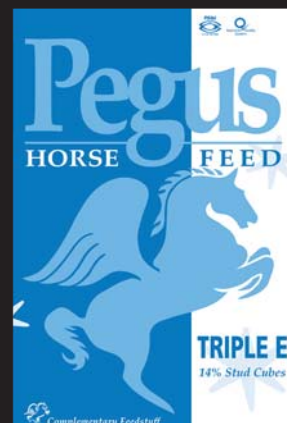
Connaught Grand Prix

Lenister Grand Prix League

TRIPLE E STUD CUBES

Triple E have been a popular and trusted part of many Irish breeders' feed plan for decades. This highly digestible, energy, vitamin and mineral-dense cube uses only the best Irish grains and cooked cereals to provide readily available energy to meet the needs of the broodmare during periods of gestation and lactation, both critical in the foal developments and broodmare health. Triple E is laced with essential minerals from Pegasus Equine breeder pre-mix for the very important final 3-4 months of pregnancy where the foal lays down the building blocks for strong tissue and skeletal foundation for future strength. The energy dense cubes and bio-available mineral ensures high quality milk yields in lactation when the foal requires the mother's calorie and mineral-rich milk. Triple E benefits stallions during the covering season with essential energy levels and higher Vitamin E levels improving fertility and libido.

Call Tony Hurley on 087 251 4215.



Hands-On Hogan



The town of Cloughjordan is in the North West corner of County Tipperary, roughly half way between Roscrea and Nenagh. The poet Thomas MacDonagh, a native of Cloughjordan, described it as a place 'in calm of middle country'. One man with a calm head under pressure is trainer and jockey Denis Hogan who runs his busy mixed yard of flat and national hunt horses. Self-confessed, he was bred to be a farmer rather than jockey but when introduced to ponies and riding lessons at former champion jockey and neighbour Charlie Swan's, the racing bug bit.

Like many of today's jockeys, the influence of pony racing helped cut his teeth and at that early age Dennis got the feel for speed. He then progressed into the Point to Point series. A period at Mike Halford's riding work, is today something

that Dennis always reflects back as where he listened, watched and found guidance. That would lead him to pay attention to every small detail from riding, feeding and training; all these small details add into a percentage that could turn a performance up or down

The J P Manus-owned and Charlie Swan-trained 'On the Other Hand' provided his first major winner as a jockey at the Galway Festival. Again at Galway, winning the Premier Handicap 'Kasellahan' was his first big trainer's prize. 'My heart was going at 100, I got some kick out of that' he told Tracy Piggot after the race.

There are many ways to train horses and every trainer has their own view and system. But the hands on approach in Dennis Hogan's yard provides this

young trainer with a unique insight into each horse's ability and brain for the job. Feeding duties every morning are done by himself, he opens every door and sees every feed bowl - what they eat and how much and he adjusts as they need it. When a trainer feeds them, works them, gallops them and races them, it provides information that not many other trainers know at first hand. This summer will see 35 horses in training at the yard keeping Dennis and his right hand man John O'Mara busy travelling the network of racecourses in England and Ireland. In a recent poll, Cloughjordan was voted as one of the top 10 places in Ireland to live, that must also apply to racehorses too.

For the latest news from Denis's yard, follow him on twitter: @d_g_hogan



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