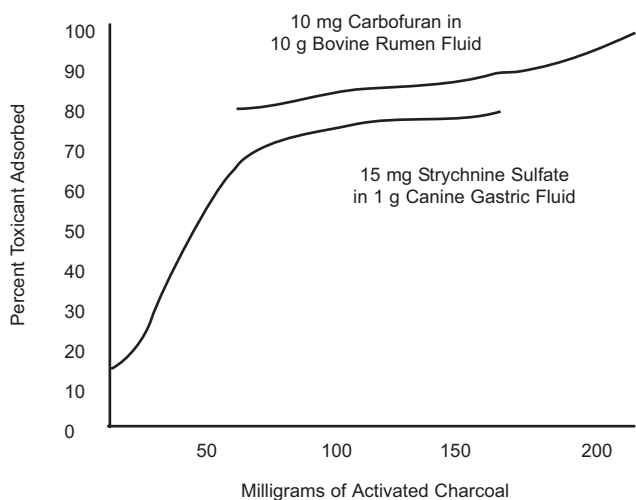


ToxiBan Suspension and ToxiBan Suspension with Sorbitol*

Measure	Equivalent Measure	Activated Charcoal	Kaolin	Sorbitol
1 level teaspoonful	5 mL	0.5 g	0.3 g	0.5g
1 level tablespoonful	15 mL	1.5 g	0.9 g	1.5 g
1 level cupful	240 mL	25.0 g	15.0 g	24 g
One liter	1,000 mL	104.0 g	62.5 g	100 g

*ToxiBan Suspension does not contain therapeutic amounts of sorbitol. 2 grams ToxiBan Granules is equivalent to the charcoal activity of 9 mL ToxiBan Suspension.



IN VITRO ADSORPTION FOR RUMEN CONTENTS SPIKED WITH CARBOFURAN AND FOR CANINE GASTRIC CONTENTS SPIKED WITH STRYCHNINE SULFATE

Storage Conditions

Store at room temperature. Avoid excess humidity.

HOW SUPPLIED

- ToxiBan Granules, 454 g (1 pound) 12 per carton (NDC 11789-042-30)
- ToxiBan Granules, 5 kg (11 pound) Pails (NDC 11789-042-20)
- ToxiBan Suspension, 240 milliliters 12 per carton (NDC 11789-115-10)
- ToxiBan Suspension with Sorbitol, 240 milliliters 12 per carton (NDC 11789-115-50)

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ToxiBan® Granules

ToxiBan® Suspension

ToxiBan® Suspension with Sorbitol

DESCRIPTION

ToxiBan® Granules, ToxiBan® Suspension and ToxiBan® Suspension with Sorbitol are intended for use as adsorbents of orally ingested toxicants.

ToxiBan Granules contain 47.5% activated charcoal, 10% Kaolin, 20% Sorbitol and 42.5% wetting and dispersing agents, including sorbitol, and is free-flowing and wettable for rapid reconstitution in water. It may also be mixed in the dry form with food.

ToxiBan Suspension contains 10.4% activated charcoal and 6.25% kaolin in an aqueous base. It is a stable suspension which is intended for use as a convenient emergency treatment of small animals or small numbers of large animals.

ToxiBan Suspension with Sorbitol is a convenient, ready-to-use, activated charcoal suspension containing 10% activated charcoal, 10% sorbitol and 6.25% kaolin in an aqueous base with special suspending agents and preservatives intended for use as an emergency treatment of small animals.

Medicinal grade of activated charcoal, contained in all three products, is a small particle size type of vegetable charcoal that possesses a relatively high activity as an adsorbent of organic chemicals. It has been processed by LLOYD, Inc. to enhance its adsorptive power and reduce dustiness. Its adsorptive activity exceeds the USP standard for activated charcoal.

CLINICAL PHARMACOLOGY

Activated charcoal is the most valuable single emergency antidote, since it acts by inactivating many organic toxicants by adsorption, a surface-active phenomenon. It is considered a universal antidote. Charcoal, with a small particle size, is most effective; plant charcoal is more effective than animal charcoal. Most organic ring compounds are adsorbed by charcoal in a more-or-less nondiscriminatory manner. Nevertheless, adsorption sites are somewhat selective and larger heterocyclic molecules may be adsorbed competitively in place of smaller molecules. Therefore, the dose of charcoal needed to inactivate a given dose of toxicant depends on the following factors: (1) the intrinsic activity of the charcoal type; (2) the dose of toxicant; (3) the types and amounts of other competitive compounds in the gastrointestinal ingesta.

It has been reported that 1 gram of activated charcoal would adsorb the following substances in the amounts (in mg) indicated in parentheses: mercuric chloride (1800), sulfanilamide (1000), strychnine nitrate (950), morphine hydrochloride (800), atropine sulfate (700), nicotine (700), salicylic acid (550), phenol (400), phenobarbital (350), and alcohol (300). These data were derived from in vitro aqueous solutions, however, and do not reflect the true situation in the gastrointestinal compartments. In *in vivo* systems, natural substances in ingesta adsorb or absorb low levels of most toxicants. Conversely, normal non-toxic compounds present in ingesta compete for binding sites on orally administered charcoal.

It has been determined that charcoal inactivation of a toxicant in gastrointestinal contents appears to be approximately stoichiometric and dose related in a linear fashion up to 70% to 85%. Above these levels increased levels of charcoal are needed to improve the percent of inactivation. This has been shown to occur with strychnine in canine gastric contents and phorate and carbofuran in bovine rumen fluids. See Graph.

As a general rule it is safe to assume that 1 gram of activated charcoal will adsorb 70 mg to 90 mg of an ingested organic toxicant.

Sorbitol is a hexahydric sugar alcohol which primarily serves as an osmotic cathartic. It is poorly absorbed during its transit through the gastrointestinal tract. Sorbitol that is absorbed is metabolized by the liver and slowly converted to fructose. Insulin is not necessary for intracellular transport of sorbitol. Therefore, customary cathartic doses can be safely used by animals with diabetes mellitus.

As a hyperosmotic cathartic, sorbitol produces a hygroscopic action resulting in increased water in the large intestine and increased intraluminal pressure which stimulates catharsis. Sorbitol does not compromise the adsorptive capacity of activated charcoal.

Activated charcoal given alone becomes stationary in the gastrointestinal tract, releasing its adsorbed toxin which may subsequently be absorbed by the intestinal mucosa to again produce toxicoses. Sorbitol is an effective cathartic for use with activated charcoal in monogastric animals. It promotes passage of the activated charcoal and adsorbed toxin via the feces.

Kaolin is a naturally occurring hydrated aluminum silicate which is powdered and refined for pharmaceutical use. It is not absorbed from the gut after oral administration. Colloidal kaolin is an intestinal protectant for inflamed GI mucosa. Its well-known adsorptive properties in removing bacteria and endotoxins from gastrointestinal contents aid in preventing absorption of these and other GI toxins.

INDICATIONS AND USAGE

ToxiBan Granules, ToxiBan Suspension and ToxiBan Suspension with Sorbitol are most effective when administered as soon as ingestion of a toxicant is suspected. They can also be used in some toxic emergencies when absorption of the toxicant is nearly complete or the exposure was via a parenteral route. This application usually involves repetitive or multiple dose activated charcoal use. Multiple doses of charcoal may be useful in adsorbing toxins which undergo enterohepatic circulation. Drugs such as digitoxin which are subject to biliary secretion are constantly secreted into the gastrointestinal tract and are reabsorbed resulting in prolonged toxicity. Frequent doses of activated charcoal can adsorb those toxins, interrupt the enterohepatic circulation, thereby preventing their reabsorption, and enhance toxicant elimination from the body into the gastrointestinal tract. Treatment with ToxiBan should be designed to inactivate at least 80% of an ingested toxicant. Normal body detoxification mechanisms combined with specific or symptomatic antidotal therapy are used to inactivate or counteract the toxicant that is not adsorbed by ToxiBan.

Adsorption of a toxin can occur anywhere along the gastrointestinal tract. However, to be most effective, ToxiBan should be administered as soon as ingestion of a toxicant is suspected or at the onset of signs of toxicosis. If an oral emetic, such as syrup of ipecac, hydrogen peroxide, or apomorphine is used, ToxiBan should not be used until after emesis. There should be a delay of thirty to sixty minutes between the conclusion of emesis and the administration of ToxiBan Granules, ToxiBan Suspension or ToxiBan Suspension with Sorbitol to avoid regurgitation of the treatment.

When gastric lavage is used to facilitate stomach evacuation, a single dose of ToxiBan may be administered in the early stages of this procedure. The primary advantage of using ToxiBan with gastric lavage is that early administration of activated charcoal permits prompt adsorption of the toxicant. The only disadvantage is that the lavage returns will be black, thus making it difficult to visually evaluate the ingesta. Only ToxiBan Suspension or Granules should be used with this technique. After completion of the lavage procedure, ToxiBan Suspension with Sorbitol may be administered via the lavage tube before its removal.

Multiple dose activated charcoal is also used in what is termed gastrointestinal dialysis in which the toxin passively diffuses along a concentration gradient between blood perfusing

the gastrointestinal tract and the luminal fluids. Multiple treatment doses adsorb the toxin preventing its reabsorption which further maximizes the concentration gradient which permits diffusion of even more toxin into the GI tract. While not all toxins respond to this treatment, lipophilic, uncharged and not extensively protein bound compounds are effectively eliminated in this way. Phenobarbital and theophylline are examples of toxins which can be eliminated more rapidly using this concept.

ToxiBan Suspension with Sorbitol should not be used in each dose of the multiple dose activated charcoal regimen unless it is necessary to achieve catharsis. Since ToxiBan Suspension with Sorbitol contains sorbitol, it may produce excessive catharsis and resultant fluid and electrolyte problems if used at each dosage interval (SEE PRECAUTIONS). ToxiBan Suspension should be used at the dosage intervals when ToxiBan Suspension with Sorbitol is not being used.

Catharsis should only be used intermittently during multiple dose activated charcoal use.

There are no specific recommendations established for when to stop multiple dose charcoal therapy. Clinical judgment should be used in conjunction with consideration of which agents were ingested, serum concentration, clinical status of the animal, and any pertinent considerations specific to the animal being treated.

If catharsis of activated charcoal does not occur within eight hours following the use of ToxiBan Suspension with Sorbitol, an additional dose of sorbitol at 1.5 mg per kilogram may be administered. Or if desired, a saline cathartic such as magnesium citrate or sodium or magnesium sulfate may be used at a dosage of 1 gram/kilogram if the patient's renal function is not compromised.

In most herds with accidental acute poisonings, the dosages of the toxicant are obviously unknown and the decision relative to which animals to treat and the dosage levels of ToxiBan Granules are judgmental. In instances involving valuable or prized animals or small herds it is probably prudent to treat all animals which were possibly exposed. In large herds, treatment with ToxiBan may be delayed until signs of toxicosis are elicited. In any case, overdosing with ToxiBan will cause no untoward effects.

ToxiBan Granules will be used to treat acute toxicosis in most cases, but it may be administered daily or mixed in feed in subacute or chronic toxicosis, to enhance the body clearance and excretion of certain already absorbed drugs or toxicants. An example of the latter is the hastening of excretion of chlorinated hydrocarbon insecticides from body fat of food-producing animals. When ToxiBan is administered repeatedly on a daily basis, ToxiBan will also depress the action of oral antibacterials, such as sulfonamides and antibiotics, when used concurrently with such drugs.

Chlorinated Hydrocarbon Insecticides

Chemicals in this group include aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, lindane, mirex, methoxychlor, perthane, TDS, and toxaphene. Clinical signs of poisoning from these compounds usually occur within 24 hours after ingestion or dermal application and are predominantly neuromuscular, characterized by hyperexcitability and tonic convulsions. ToxiBan should be administered whenever signs are noted. It may be necessary to control convulsions, before or after administering ToxiBan, by use of light anesthesia with pentobarbital or chloral hydrate or by tranquilizing. The animal should be cooled if body temperature increases exceedingly. If toxicosis is from dermal applications the pesticide should be removed by bathing with water and soap. ToxiBan administration should be repeated every 6 to 8 hours until signs subside.

Organophosphate Insecticides

Chemicals in this large group include Abate, azinphos methyl, azodrin, bidrin, carbophenothion, Ciodrin, chlorfenvinphos, coumaphos, dasanit, demeton, fensulfothion, dichlofenthion, dichlorvos, dimethoate, dioxathion, disulfoton, dursban, dyfonate, EPN, ethion, famphur, fenthion, Imidan, malathion, methyl parathion, methyl trithion, mevinphos, moccap, parathion, naled, phorate, phosdrin, phosphamidon, rabon, ronnel, Ruelene, tepp, and trichlorfon.

Carbamate Insecticides

These chemicals include baygon, BUX, carbaryl, carbofuran, and landrin. The organophosphate (O-P) and carbamate insecticides have largely replaced the chlorinated hydrocarbons for agricultural use. Both of these types of chemicals are acetylcholinesterase inhibitors, and acute toxicosis is due to over stimulation of the parasympathetic nervous system. Signs generally include salivation, gastrointestinal hypermotility, dyspnea, miosis, twitching and stiffness of skeletal muscles. Small animals may exhibit excess CNS stimulation. Signs of poisoning by carbamates and O-P pesticides are usually evident within minutes to hours after ingestion, but may be delayed for several days in the case of the systemic O-P compounds, such as coumaphos and ruelene.

Atropine sulfate is the preferred pharmacologic antidote for carbamates and O-P insecticides. The recommended dosage is 0.5 mg/kg body weight in all animals. The average horse may receive 65 mg; the average dog may receive 2 mg. Initially, approximately 1/4 of the dose should be injected intravenously, and the rest given intramuscularly or subcutaneously.

If animals are known or thought to have ingested any of these toxicants, ToxiBan should be given first followed by atropine when signs first appear. Atropinization usually lasts 2 to 4 hours, and if signs persist, atropine injections should be repeated every 2 to 4 hours. Two or three doses of atropine injections may be necessary. ToxiBan administration should be repeated every 6 to 8 hours until signs subside.

Oximes, such as 2-PAM (protopam chloride, TMB-4, pralidoxime) are useful treatments for O-P toxicosis, but not for carbamate poisoning. Intravenous dosages of 20 mg/kg body weight are recommended and can be given with atropine and ToxiBan. The opiates, succinylcholine and phenothiazine tranquilizers are contraindicated for treatment of carbamate and O-P poisonings.

Alkaloids

Strychnine, nicotine (cigarettes) and many poisonous principles in weeds are alkaloids. ToxiBan is effective in inactivating alkaloids, but the animal must be treated to alleviate the signs due to the absorbed alkaloids.

Animals poisoned with strychnine should be anesthetized with intravenous injections of pentobarbital sodium or by other suitable methods and then given ToxiBan by oral infusion. The prognosis is poor in animals poisoned by nicotine, but ToxiBan should be given by oral infusion followed by artificial respiration and administration of oxygen. Animals known or thought to have ingested a toxic alkaloid should be given prophylactic doses of ToxiBan.

Synthetic Herbicides and Fungicides

Generally speaking the organic herbicides and fungicides are not toxic at their normal application rates. Animals may be poisoned by voluntary ingestion of the pure chemical or by careless incorporation into rations during farm feed mixing.

Ethylene Glycol

ToxiBan is effective and increases survival rate if used early in the treatment of cases of ethylene glycol (antifreeze) poisoning. To be effective, ToxiBan must be administered within 4 hours after ingestion of the antifreeze occurs. Any history of ethylene glycol ingestion should be handled as a medical emergency and the animal treated immediately unless advanced clinical signs have occurred. **TESTS FOR ETHYLENE GLYCOL MUST BE CONDUCTED BEFORE TOXIBAN IS ADMINISTERED TO PREVENT FALSE POSITIVE REACTIONS.**

Miscellaneous Use for ToxiBan

ToxiBan is indicated whenever synthetic organic drugs have been administered accidentally or mistakenly in overdoses. Included in this list are the barbiturates, tranquilizers, narcotics, salicylates (aspirin), pyrazolon drugs (phenylbutazone), stimulants, and diuretics.

ToxiBan can be used in cases of toxic bacterial enteritis and in ruminants with toxic overload as an adsorbent of putrefactive toxins, as well as the catecholamines and bacterial endotoxins. It should be used as an adjunct with other treatments, such as rumenotomies, fluid therapy, and restoration of acid-base balance by adding sodium bicarbonate at about 2 mg per kg mixed in the slurry with the ToxiBan. Charcoal has been reported to adsorb mercuric salts, but is not considered a generally satisfactory antidote for heavy metal poisoning.

ToxiBan is indicated in "garbage poisoning" of dogs.

CONTRAINDICATIONS

There are no known absolute contraindications to the use of activated charcoal. However, it is not equally effective as an adsorbent for all toxins. Chemicals that are not effectively adsorbed by activated charcoal include caustic materials (bleach, lye), ethanol and methanol, fertilizer, fluoride, heavy metal salts, iodides, nitrate and nitrite, sodium chloride and chlorate. It should be used with caution, if at all, in animals that have ingested corrosive agents since the activated charcoal may not be advised if the animal has significant fluid and/or electrolyte abnormalities. It should not be given simultaneously or shortly before the oral administration of other therapeutic agents such as antibiotics, vitamins, or amino acids. Antibiotic therapy should be administered parenterally when ToxiBan is used.

PRECAUTIONS

All three ToxiBan products are adjuncts in the management of poisoning emergencies. Prior to their use, proper basic life support measures must be implemented as well as the appropriate gastric emptying technique if indicated. Since more than an hour may pass before activated charcoal can be administered without regurgitation after an emetic has been given, it may be more effective to give ToxiBan immediately because adsorption of a toxicant may be a more effective removal than vomiting.

When ToxiBan therapy is used, it should be noted the products will produce black stools. These stools may have a diarrhea consistency and may persist for several hours. Since a profound cathartic effect may occur following the use of ToxiBan Suspension with Sorbitol, proper attention should be provided to the animal's fluid and electrolyte needs.

ToxiBan Suspension with Sorbitol should be used cautiously in animals receiving multiple dose activated charcoal therapy. Osmotic cathartics may be associated with electrolyte disturbances (hypernatremia) due to loss of excess free body water in the gut. Dehydration and hypotension have been reported with excess catharsis. Cathartics should only be used with the initial charcoal dose. If charcoal is still required, use ToxiBan Suspension or Granules at the lower dosage every 6-8 hours for 3 treatments.

ADMINISTRATION

Give ToxiBan Suspension or ToxiBan Suspension with Sorbitol orally by causing the animal to drink the calculated dose either as is or mixed with a small amount of cold water. To reduce viscosity and improve flow, shake the container thoroughly. The container has head room which allows for the addition of water to reduce viscosity and improve flow. Rinse the liquid receptacle with cold water and administer the rinsing. Consult a veterinarian should administration by stomach tube be needed. **Discard within 48 hours of opening.**

DIRECTIONS FOR PROFESSIONAL USE ONLY:

ToxiBan Suspension or ToxiBan Suspension with Sorbitol can be poured through a funnel attached to a stomach tube in most animals. Alternate methods are use of a stomach pump or syringe to inject the suspension through a stomach tube.

Dilute suspensions of ToxiBan Granules should be stirred or agitated frequently during administration to keep the liquid uniform and prevent equipment clogging. A stomach tube or rumen tube is preferred for administration in all animals, but an oral drench may be used in an emergency.

An effective method for administering activated charcoal slurries to large animals is to use a plastic enema bag or a calf milk feeding bag. These containers allow manipulation of the slurry to keep it agitated as it is introduced into the stomach tube. Administration equipment should be flushed with a dose of cold water before removing the stomach tube. Equipment used to administer ToxiBan cleans easily with water and detergent or water alone.

Stomach tubes can be passed nasogastrically or orogastrically. First measure from tip of nose to the last rib to predetermine the length of tube needed to be inserted. The position of the tube can be checked by injecting one mL of sterile saline. Coughing will normally occur if the trachea has been intubated. For a detailed description of oral administration of liquids refer to pages 536 - 540 of the 5th edition of *Handbook of Veterinary Procedures & Emergency Treatment* by Kirk et al.

Poisoned animals should be watched closely after treatment, since specific or systemic treatment may need to be repeated. Repeated doses of activated charcoal given every 4 to 6 hours for 24 to 48 hours may interrupt the hepatoenteric circulation of the toxicant in cases of acute toxicosis.

DOSAGE

ToxiBan Granules - To make a thin suspension mix one volume measure with 5 to 7 parts of cold water (Ex: one level cup ToxiBan Granules to 6 cupfuls water) and shake or stir vigorously for 10-30 seconds until good suspension is obtained.

Large Animals - The recommended dosage is 0.75 to 2.0 grams per kilogram (0.35 to 0.9 grams per pound) body weight. One pound (453.6 grams) will normally treat an animal weighing 225 to 600 kilograms (500 to 1300 pounds).

Small Animals - 2 to 4 grams per kg (1 to 2 grams per pound) body weight.

ToxiBan Suspension or ToxiBan Suspension with Sorbitol

Small Animals -10 to 20 mL per kg (5 to 10 mL per pound) body weight.

Large Animals - 4 to 12 mL per kg (2 to 6 mL per pound) body weight.

ToxiBan Granules				
Measure	Equivalent Measure	Activated Charcoal	Kaolin	Sorbitol
1 level teaspoonful	2 g*	1 g*	0.2 g*	0.4 g*
1 level tablespoonful	6 g*	2.9 g*	0.6 g*	1.2 g*
1 level cupful	110.0 g*	52.3 g*	11.0 g*	22 g*
One pound	453.6 g	215.5 g	45.4 g	90.7 g
One kilogram	1,000 g	475.0 g	100.0 g	200 g

* Approximate