ECONOMICS OF SANI-CARE

Average horse excretes = 50 lbs manure/day 2.4 gals urine/day

Soiled bedding = 2X volume of manure (flakes) & 3X volume of manure (shavings)

50 lbs manure/day X 1 cu ft manure/62 lbs (density of manure) = 0.8 cu ft manure/ day

Soiled bedding/day = 0.8 cu ft manure/day X 2 for flakes = 1.6 cu ft soiled flakes /day

0.8 cu ft manure/day X 3 for shavings = 2.4 cu ft soiled shavings /day

Siftable Sani-Care = 0 cu ft soiled bedding/day

2.4 gals urine/day X 0.134 cu ft/1gal = 0.32 cu ft urine/day
Since Sani-Care is 100% absorptive 0.32 cu ft soiled Sani-Care/day

$$\frac{\text{1.6 cu ft soiled flakes}}{\text{0.32 cu ft soiled Sani-Care}}$$ equals 5 times more waste with flakes

$$\frac{\text{2.4 cu ft soiled shavings}}{\text{0.32 cu ft soiled Sani-Care}}$$ equals 7.5 times more waste with shavings

Economic Summary: Sani-Care lasts 5 to 7.5 times longer than flakes or shavings and in addition:

1. No stripping of stall which saves labor
2. No harmful organic vapors or aromatics equals no veterinary respiratory bills
3. Five to 7.5 times less waste equals reduced disposal costs
4. Finally a clean stall - no hidden contaminents

While the initial costs may be higher, the above data proves that Sani-Care is the most cost effective bedding with long-term savings.

Note: Data derived from Rutger's Extension Fact Sheet #537

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Fact sheet

Horse Manure Management: Bedding Use

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***Stall Waste Production*:** A 1000-pound horse will defecate from 4 to 13 times per day. This horse will produce 35 to 50 pounds of manure daily, or about 9 tons per year. On the average, about 31 pounds of feces and 2.4 gallons of urine daily, totaling up to 50 pounds of raw waste per day in feces and urine. Typically a ton of horse manure from an exercising horse will contain 12 pounds of nitrogen (N), 6 pounds of phosphorous (P_2O_5), and 9 pounds of potassium (K_2O). (A ton of horse manure from a sedentary horse will contain 7 pounds of N, 2.5 pounds of P_2O_5, and 2.5 pounds of K_2O.) A horse kept in a stall will require 8 to 15 pounds of bedding per day. This could be a wood byproduct (sawdust, shavings, or chips), straw, hay, or paper. Manure plus bedding will have a volume of 2 to 3 cubic feet per day[2,3,5].

Soiled bedding should be removed from stalls daily and replaced with fresh bedding. Soiled bedding may equal 2 to 3 times the volume of manure, depending on management practices. Each stalled horse may require the removal of 60 to 70 pounds of waste per day. This results in between 12 and 13 tons of waste per stall per year with 9.0 tons being manure, and the remainder, bedding from a 1000-pound horse. The density of horse manure is about 62 lb/ft^3, not counting bedding. Annual stall waste from one horse will fill a 12' x 12' stall about 6-feet deep. This leads to a steady stream of manure to handle.

***Bedding Materials*:** There are several materials commonly used [1,3,4] as bedding for horses. Tables 1 and 2 describe some of these. The following are not recommended for horse stall bedding: black cherry or walnut wood products.

Table 1. Density of bedding materials[3]	
a. Loose bedding	**Density lb/ft^3)**
Straw	2.5
Wood Shavings	9
Sawdust	12
Non-legume Hay	1.0-1.3
b. Baled bedding	
Straw	5
Wood Shavings	20
Peat Moss	1.8-2.5
c. Chopped bedding	
Straw	7
Newspaper	14

Black walnut (*Juglans nigra*) shavings will cause laminitis or founder, so all hardwood shavings are often avoided on the chance that walnut is mixed in. Be careful when getting shavings from a lumber yard or similar source, hardwoods may be mixed in.

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Although straw is traditionally the most widely used bedding source, many other sources are used. Pine shavings or sawdust will result in less disposable material than straw but cannot be disposed with mushroom producers as straw can. Wood shavings, sawdust, and straw are all relatively absorbent. Straw may not be the bedding of choice for horses that have a tendency to consume it. Oat straw is generally more palatable than wheat, rye, or barley straw. Straw can also be musty or contain straw mites. Many horse producers, particularly owners of racing or performance horses, prefer shavings because they are less dusty and may result in less respiratory irritation.

Corn stalks or corn cobs can be used if ground prior to use. These are absorbent but may not always be available. Recycled newsprint may also be used. It is pollen-free and has less dust than straw or shavings. Although it is soft, it soils easily and is not as absorbent as other bedding sources. A further concern is its combustibility. Non-traditional sources such as pelleted wood products may provide acceptable bedding. A number of these products are available commercially. They expand readily when water is added, are absorbent and easy to handle, and may be especially useful on small horse farms.

The type of bedding used will also affect the fertilizer value of manure. For example, wood products (especially pine) will break down much slower than straw and many cause nutrients to be released more slowly from the manure. Although a variety of bedding sources can be used effectively, they should all be considered as part of a farm's management plan. Any nutrient management plan implemented on a farm should take into account how the bedding source used will influence the management of manure nutrients on a farm.

Bedding Selection: The following should be considered when selecting bedding[1]: 1) availability and price, 2) absorptive capacity, 3) ease of handling, 4) ease of clean-up and disposal, 5) non-irritability from dust or allergens, 6) texture and size, and 7) fertility value of the resulting manure. Please see Table 3 for other bedding properties.

Table 2. Absorption of bedding materials[3]

Material	Water Absorption (lb water absorbed per lb bedding)
Wood	
Tanning bark	4.0
Fine bark	2.5
Pine	
Chips	3.0
Sawdust	2.5
Shavings	2.0
Needles	1.0
Hardwood chips	1.5
Shredded newspaper	1.6
Corn	
Shredded stover	2.5
Ground cobs	2.1
Straw	
Oat	2.5
Wheat	2.2
Hay, chopped mature	3.0
Peat Moss	9.0-10.0
Shells, hulls	
Cocoa	2.7
Peanut/Cottonseed	2.5

Bedding should be absorbent, non-toxic, dust-free, comfortable to horses, available, disposable, unpalatable, and affordable. The more absorbent a bedding is, the less that will have to be used. All beddings should be stored in well-ventilated areas to remain as dry as possible prior to use.

Wastes: It is important that other materials such as trash, plastic bags, baler twine, needles, syringes, veterinary supplies, and pesticide containers be removed from bedding. They should never be allowed into the manure pile. Needles in particular will pose a health risk to anyone who comes in contact with them. These kinds of materials should never be disposed of with bedding, regardless of how bedding is disposed.

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Table 3. Bedding Comparison Chart (modified after [4])

	Dust Control	Odor Control	Absorption	Cushion	Cleaning Ease	Composting Rate	Palatability	Comments
Straw	Low	Low	Medium	Medium	Low	High	Medium	*shifts easily exposing bare floor if not deeply bedded or if animal is very active
Shavings	High	Medium	Medium	Medium	Medium	Low	Low	*do not use treated wood *verify wood type is not toxic to your animal (e.g., walnut, cedar) *kiln dried recommended *limited availability
Corrugated Kraft	High	Medium	Medium	High	Medium	Medium	Low	*air trapped in corrugation provides springy cushion *good for fiber animals (eg. llamas, alpacas, sheep)
Sawdust	High	Medium	Medium	Medium	High	Medium	Low	*often very dusty *variability between products *kiln dried recommended *enhances performance of straw and shavings when used as base layer
Wood Pellets	High	High	High	Medium	High	Medium	Low	*see comments for shavings *do not use on outside stalls or dirt floor; pellets readily absorb moisture from ground and air
Peat	High	High	High	High	High	Medium	Low	*up front cost is high, but maintenance cheaper than straw or shavings *dust issue easily managed *excellent for horses with respiratory or skin allergies *limited availability

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