



# HEALTHY HOOVES™ EUROPE

## Technical & Operating Data

### THE COPPER DELIVERY SYSTEM

- Maintains healthy dairy herds
- Sustains consistent active copper Levels in the footbath
- Reduces copper sulphate use by 50 –80%
- Protects the environment

#### Description:

The over use of copper sulphate in the treatment of Hairy Hoof Wart (Papillomatous Digital Dermatitis) is hazardous to the environment. **Healthy Hooves** is an innovative, safe, (low pH) buffered product designed to maximizes the available copper and effectively treat the herd while reducing the amount of copper sulphate use by 50-80%.

**Healthy Hooves** was developed to be used with copper sulphate (CuSO<sub>4</sub>) or acidulated copper sulphate

**Healthy Hooves** contains a unique patented chelant that produces a predictably higher sustainable concentration of hydrogen ions in a broad range of water conditions. These sustainable ions bond (chelate) the copper ion (Cu<sup>++</sup>) to keep it in suspension, preventing copper precipitation. Field-testing has shown that **Healthy Hooves** provides a consistently effective footbath life throughout the processing of 500 – 750 head of cattle. ‘

Extensive testing in the United States has confirmed the safety and efficiency of this unique product.

**Healthy Hooves** is protected under a United States Patent for broad usage and in addition, under Patent Cooperation Treaty (PCT) application in 81 countries.

#### Physical Properties:

Form:	Liquid
Specific Gravity	1.16
Colour:	Clear, Colourless
Solubility:	Complete in Water
PH (Neat):	<1.0
PH 1% tap	1.8



## Footbath Application

Mucky soil containing urine and manure provides a perfect environment for bacteria. Cattle are inevitably exposed to these bacteria, which leads to cases of PDD.

Footbaths are an effective method for treating herds for PDD. The cattle walk through footbaths filled with **Healthy Hooves**, water and copper sulphate to expose the hoof area to the treatment.

The number of applications and the dilution used depend on several factors, including weather, herd conditions, introduction of new animals to the herd etc. The effectiveness of the treatment also depends on the construction and set-up of the footbaths, as well as the coverage of the hooves. Ideally, two footbaths should be used in tandem – one as water only pre-wash and one containing a topical treatment consisting of **Healthy Hooves**, water and copper sulphate.

Typically, in a 200 litre footbath, the following copper activity levels are possible with **Healthy Hooves** @ 2% by volume with copper sulphate addition to the footbath.

Kg. Cu SO <sub>4</sub> (addition to footbath)	Potential Cu <sup>2+</sup>	Active/Available Cu <sup>2+</sup>	Inactive Cu <sup>2+</sup> (Precipitated)
	ppm	ppm	ppm
1 kg.	1,200	1,020	180
2 kg.	3,000	2,550	450
5 kg.	6,000	5,200	900
9 kg.	12,000	10,200	1,800

### Important Note:

**Healthy Hooves** sustains the active copper ion level in the footbath. The benefit to be achieved is a 50 – 80 % reduction of copper sulphate required to treat the herd. We suggest the reduction of copper be approached incrementally.

### Dilution

#### For Footbath Application:

**Healthy Hooves** should be used at 2% by volume. A typical dilution is 1:49 (4 Litres **Healthy Hooves** with 200 Litres of water). A 2% dilution allows a predictable level of copper ion (Cu<sup>2+</sup>) to be active and sustained in solution. Copper is added to the footbath as a separate product.



### Volume of the Footbath:

To determine the volume of the footbath, multiply the Length x Width x Height in centimetres and divide by 1000 to obtain litres.

$$(L \times W \times H) \text{ cm}^3/1000 = \text{Litres of solution}$$

## THE SCIENCE BEHIND THE TECHNOLOGY

### Healthy Hooves – the Copper Delivery System

#### Old Science:

Science has a less than complete understanding of the chemical and biochemical interaction of biologically active bodies of water, manure pits, sewage lagoons and decomposing wastes.

Biochemists and researchers have sought to identify chemical interactions that occur in these areas. These complex biochemical processes create practical and environmental problems that cannot be clearly solved because we do not clearly understand the interaction at the subatomic level. This applies to the use of copper to micro organisms.

#### New Science:

Current scientific evidence suggests that the toxic concentrations of copper depend on a number of factors, including the form of copper used, the specific organism to be treated and the characteristics of the substrate, including its chemical composition. The specific complexes that copper sulphate will form when dissolved in water or more complex substrates, such as liquid animal wastes, cannot be accurately predicted. It has been hypothesized that the complexes of copper that are most toxic are those formed by weak-field monodentate ligands (an atom or group of atoms capable of donating a pair of electrons to form a covalent bond) while the monodentate and polydentate complexes, which are less stable, are thought to be less toxic. Therefore it is the form of copper that determines toxicity, not just the presence and concentration of copper alone.

#### The Difference:

The critical difference between copper sulphate dissolved in water and copper sulphate dissolved in **Healthy Hooves** is the degree of toxicologically active copper complexes that are formed. Because of the abundance of hydrogen ions in the **Healthy Hooves** product, predictably higher concentrations of active copper complexes ( $\text{Cu}^{2+}$ ) are held in suspension in a stable weak field chelated chemical bond, thus preventing the precipitation problem that is common with copper sulphate in water alone.



### The Result:

When copper sulphate is dissolved in water, the copper must chemically change to an active form before it can kill micro organisms. The extent of these chemical changes is difficult to predict. But with **Healthy Hooves**, the copper is already in its active form and requires no chemical change. Thus, the copper concentration can be precisely predicted with **Healthy Hooves**.