



**Westway**  
FEED PRODUCTS



**Cattle  
aren't  
Hogs**

# NPN Utilization



- Popular Misconceptions about Urea
- How to use urea
- Why use NPN
- NPN Math

# Why use NPN



- Cost -- Protein from NPN in Converter costs less than natural protein
- Competition -- NPN is one of the advantages beef has over ham and chicken.
- Convenience -- fed in liquid supplements or blocks, NPN saves labor.

# Popular Misconceptions

- Urea causes reproduction problems
- Urea is unpalatable
- High producing dairy cows can't use urea
- Calves can't use urea
- Urea causes nitrate toxicity
- Urea is toxic to horses and other monogastrics

# “Nutritional Ecology of the Ruminant”

Dr. P.J. Van Soest

*“The utilization of NPN is limited in poor quality diets by the low digestibility of energy. Diets such as straw... have limited capacity for NPN use because of the low energy content and the slow rate of digestion of the carbohydrate which is available.”*

***Dr. D.C. Church***

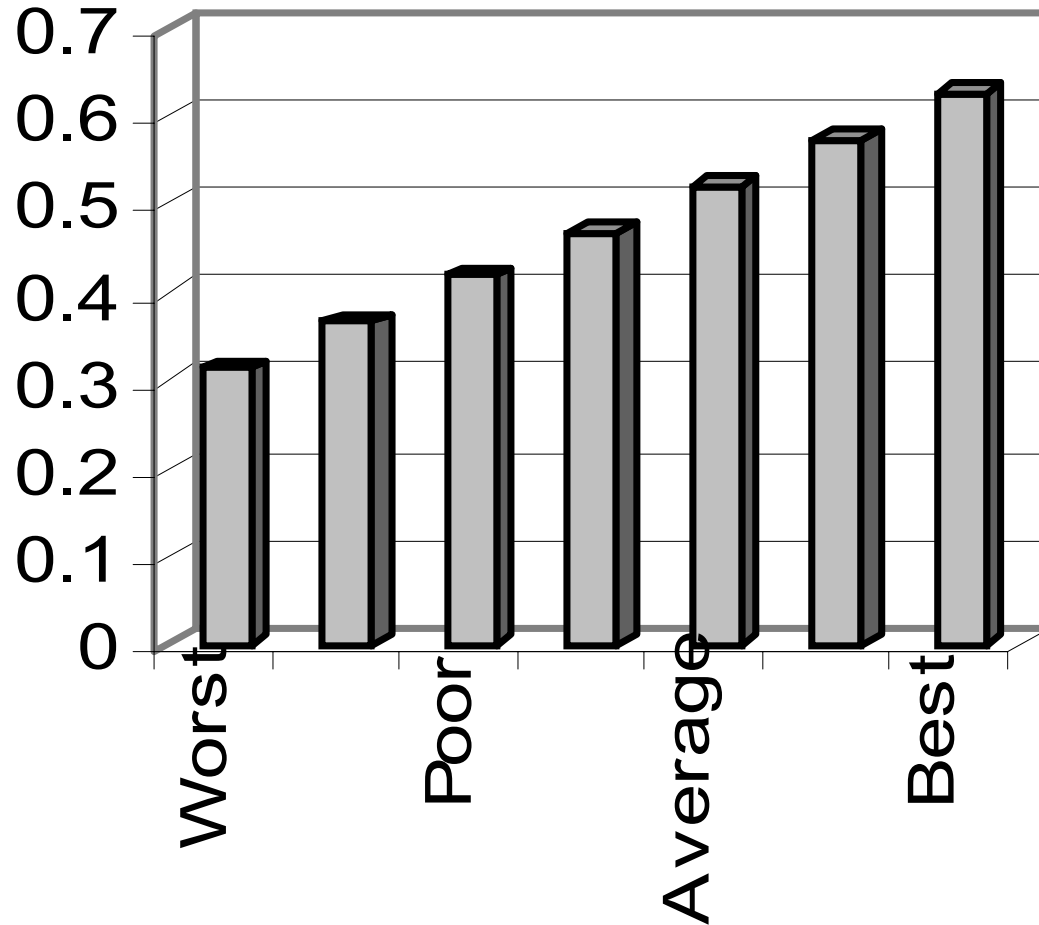
**“Digestive Physiology and Nutrition of Ruminants”**

“...administration of molasses with urea reduced rumen ammonia concentrations, rumen pH and markedly reduced blood ammonia and urea.... Any dietary component which reduces ruminal pH will likely reduce toxicity.”

# To Improve NPN Utilization

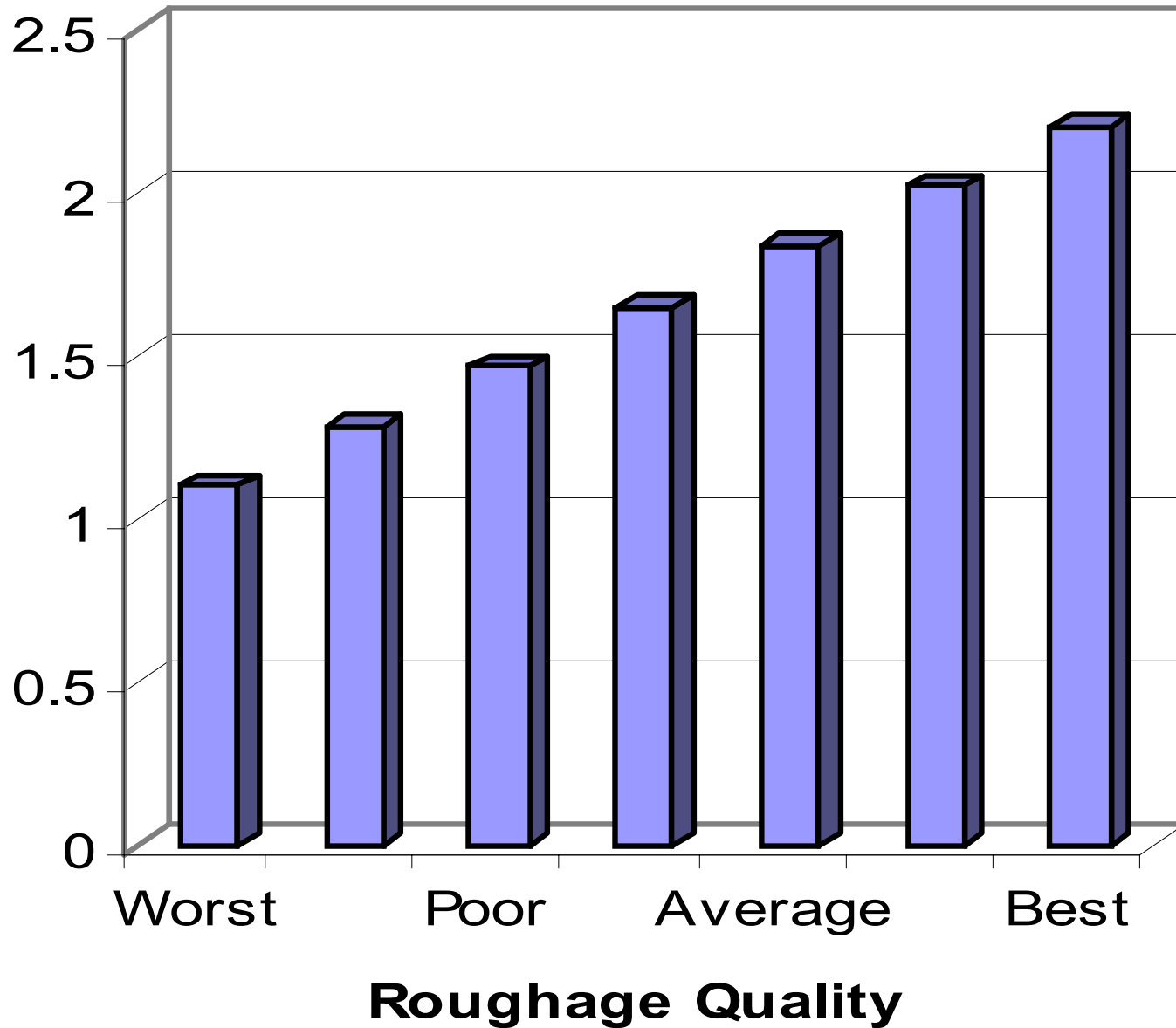
- Allow 7-14 days to adapt to NPN
- Make sure NPN is always available
- Use only where needed
- Provide NPN in a palatable carrier
- Make sure the ration is balanced
- Provide soluble carbohydrates - about 1% for each % crude protein from NPN

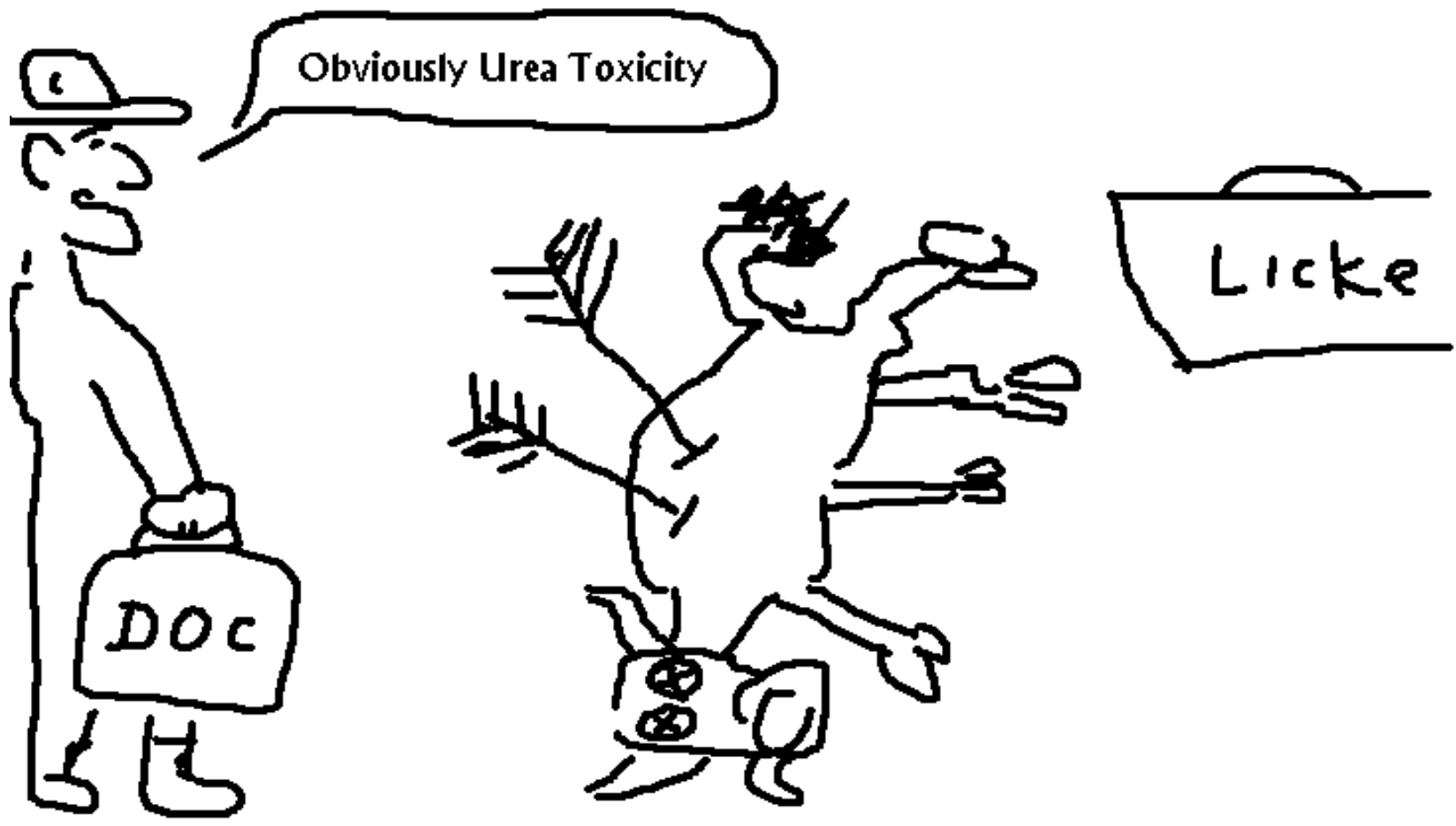
# Lb Protein From NPN



**Roughage Quality -  
30% to 60% TDN**

# Utilizable lbs of Westway 35





***Dr. D.C. Church***

**“Digestive Physiology and Nutrition of Ruminants”**



“..the amount of urea or other NPN required to kill an animal may be modified by various factors...The rapidity of consumption is one of the most critical... Provided consumption is spread throughout the day, toxicity does not develop.”

# ***Dr. D.C. Church***

## **“Digestive Physiology and Nutrition of Ruminants”**

“ The chief problems on the farm or ranch are poor mixing and sudden and rapid consumption by hungry or fasted animals, particularly animals that are not adapted to diet containing urea.”

# ***Dr. D.C. Church***

## **“Digestive Physiology and Nutrition of Ruminants”**

A Toxic Dose must be consumed  
“within a time span of 30 minutes for  
lethal effects...if consumption is  
spread throughout the day, toxicity  
does not develop.”

# How much Urea does it take to cause Toxicity?

- 0.3 - 0.8 grams/Kilogram BW  
= .14 - .36 grams/lb

# How much Urea does it take to cause Toxicity?

- 0.3 - 0.8 grams/Kilogram BW  
= .14 - .36 grams/lb
- 1100 lb cow
  - 154 to 396 grams urea
  - or 3.4 to 8.8 lb Westway 35 for toxicity

# How did we figure that?

**Westway 35:**

**28.5% CP from urea x 454 gm/lb**

**= 129.4 gm CP from Urea**

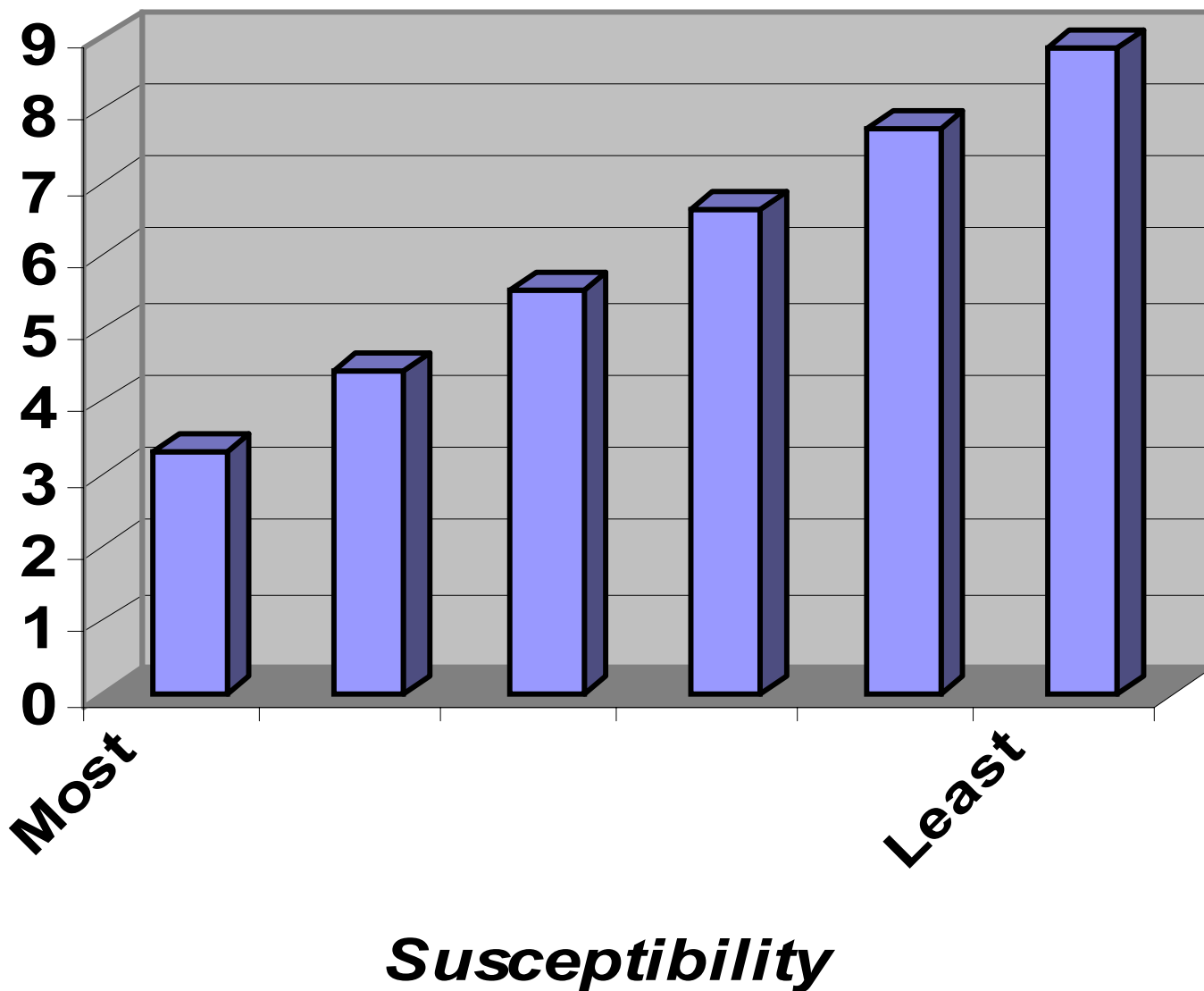
**x 35% Urea in CP**

**= 45 gm urea/lb Converter**

**154 gm for toxicity/45 gm/lb = 3.4 lb**

**396 gm for toxicity/45 gm/lb = 8.8 lb**

# Lbs of Westway 35 for Toxicity if Consumed in 1/2 Hour



# Factors that reduce NPN Utilization

- Inadequate NPN Adaptation
- Intermittent NPN Intake
- Inadequate Sulfur Supplementation
- Ration already adequate in protein
- NPN in unpalatable carrier
- Ration not nutritionally balanced
- Insufficient soluble carbohydrates

# Urea Toxicity

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## Vulnerable

- Unadapted to NPN
- Hungry
- Can eat entire dose in 30 minutes

## Resistant

- Fed NPN for more than 10 days
- Adequate roughage available
- Consumption spread throughout the day

# NPN Basic Facts

- *NPN* stands for Non Protein Nitrogen
  - Not urea, nitrate, or protein
- *Natural* Protein contains C, H, O, S, and **16% N**
- *Crude Protein* includes all sources of nitrogen in a feed and is the amount of natural protein that can be made from the nitrogen in a feed

# **NPN Conversions**

<u>Multiply</u>	<u>By</u>	<u>To Get</u>
% Crude Protein Eq.	0.35	% Urea
% Crude Protein Eq.	0.16	% NPN
% Urea	2.875	% Crude Protein Eq.
% Urea	0.46	% NPN
% NPN	6.25	% Crude Protein Eq.
% NPN	2.17	% Urea

# NPN Summary



- Microbes in the rumen of cattle and sheep require NPN
- Ruminants can make meat and milk from NPN
- NPN is more economical than natural protein
- Feeding NPN efficiently requires more efficient management than feeding all-natural protein

# NPN Summary



- Cattle can't beat hogs at being hogs.
- Hogs can't beat cattle at being cattle.  
Take advantage of cattle's ability to use NPN.