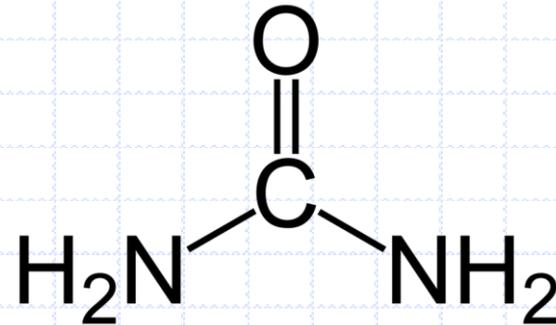
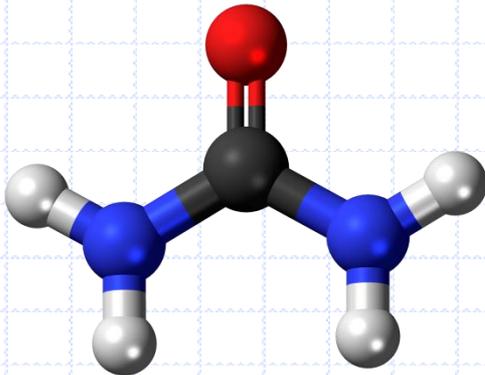


# UREA FEEDING IN RUMINANTS

Dept of Animal Nutrition,  
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# What is Urea?

- Organic compound with chemical formula  $\text{CO}(\text{NH}_2)_2$
- Colourless, odourless, solid, highly water soluble



# Uses of Urea

- **Nitrogen release fertilizer**
- **Raw material in chemical industry**
- **Explosive making**
- **Flavor enhancer for cigarette**
- **Urea-containing creams are used as topical dermatological products to promote rehydration of the skin**
- **Component of animal feed providing a relatively cheap source of nitrogen**



# Urea as Animal Feed



- **Non-protein nitrogen (NPN) compound**
- **46% Nitrogen = 287% crude protein**
- **Deficient in sulfur in contrast to natural protein**
- **Deficient in all minerals**
- **No energy value**

# How Urea is Utilized?

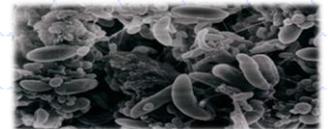


**cont...**

- **Microbial protein digested in abomasum & small intestine**
- **Microbial protein → amino acids → absorbed in small intestine**
- **Host ruminant builds body protein**

# Factors Affecting Urea Utilization

- **N:S ratio 10:1**
- **Readily available energy source**  
**eg. Starch (1 kg/100 g Urea), molasses etc..**
- **Lower levels** → **Better utilization**
- **Feeding at frequent intervals**
- **Other Ingredient of diet not too high in NPN content**
- **Lower protein diet (<13%)**
- **Adaptation period for rumen microbes - 2-4 wks**



# Methods of Feeding Urea

## □ Mixed in Concentrate

**1 % of total DM**

**or**

**2-3 % of concentrate feed**

→ **Maximum safe limit-136 g per animal over 360 kg BW**



# Methods of Feeding Urea...

## ❑ In Dry Roughages

**Straw-100kg, Urea- 4kg, Clean water- 50 L**

## ❑ Silage- @0.5% of wt of fresh forage

## ❑ Urea-molasses-mineral Blocks

**Molasses- 45%, Urea- 15%, Min. Mix- 15%,**

**Cottonseed meal- 10%, Salt- 8%,**

**Calcium powder- 4%,**

**Sodium bentonite- 3%**

## ❑ Urea-molasses Liquid Feed

**Urea - 2.5 parts**

**Fresh water - 2.5 parts**

**Min. Mix - 2 parts**

**Salt - 1 parts**

**Molasses - 92 parts**



# Urea Toxicity

**Excess urea ingestion**



**Rapid formation of excess ammonia**



**Increases rumen fluid pH**



**Ammonia crosses rumen wall**



**Increases blood ammonia**

# Urea Toxicity..

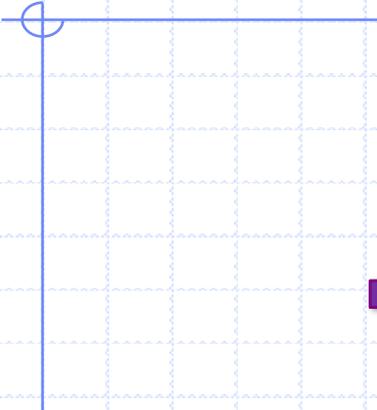
- **Rumen ammonia level > 80mg/100ml**
- **Blood ammonia level > 1mg/100ml**
- **Tetany, respiratory difficulty, bloat, excessive salivation, ataxia, convulsion and bellowing → Death in 30 min-2.5hr**
- **Treatment**
  - **Drenching 20-40 L cold water**
  - **Drenching 4-5 L 10% acetic acid**

# Precautions in Urea Feeding

- **Never be fed in calves below 6 months**
- **Never be mixed with raw soybean as it contains urease**
- **Mixed uniformly with feed**
- **Frequent feeding**
- **Use urea to provide no more than one-third of the total protein requirement in the ration**

# Highlights

- ❖ **Urea is a NPN compound with 46%N**
- ❖ **Nitrogen portion of urea is used as the building block for the production of protein by rumen microbes**
- ❖ **Level of inclusion - 1% of DM**
- ❖ **High urea intake causes toxicity**
- ❖ **Treatment for toxicity by drenching cold water or acetic acid**



**Thank You**