اسمدة متقدم 9

Urea- Formaldehyde (U F) --38% N

-Largest share world wide*

-IST . group on which research concerning slow-* release of N was carried out

In 1924 in Germany

In 1947 in USA

*Commercial production began 1955.

*Five types of the product are manufactured In USA

It is formed by :-

Formaldehyde + Excess urea

controlled condition

Mixture of methylene urea with different

Long polymers

(hand out –table 1p.20 in controlled –release and stabilized fertilizers in agr., U F solubility)

Different Chain Lengths

Methylene Urea

N-C-N

N-C-N-C-N-C-N

N-C-N-C-N-C-N-C-N-C-N

N-C-N-C-N-C-N-C-N-C-N-C-N-C-N

Urea Formaldehyde

N-C-N

N-C-N-C-N-C-N-C-N-C-N

N-C-N-C-N-C-N-C-N-C-N-C-N-C-N

N-C-N-C-N-C-N-C-N-C-N-C-N-C-N-C-N-C-N

N-C-N-C-N-C-N-C-N-C-N-C-N-C-N-C-N-C-N-C-N-C-N

Chain Length Determines Solubility

The longer the chain, the less soluble it is, and the slower it will be mineralized. Some may be so long that they are essentially insoluble, and won't break down.

Products

Formolene 30-0-2

FLUF 18-0-0

Nitro 26 CRN 26-0-0

Nitroform (Powder Blue, Blue Chip) 38-0-0

CoRoN 28-0-0 (25% of total N is urea)

Ureaform and Methylene Urea

*Designed to release N for 8-12 weeks

*Contains unreacted urea, fast greening

*Requires soil microbial activity

- temperature sensitive, soil at 78^{o} F is four times as active as soil at 42^{o} F

- moisture sensitive

*Seasonal response

Mineralization

The decomposition of complex, N-containing organic molecules and the resulting release of NH_4

The release pattern of N from UF is a

multi-steps process

Dissolution and decomposion

*some proportion of N slowly release (fraction l) followed by amore gradual release over period of several month (3-4 mon.) (fraction ll) depending on the type of product.

*Release pattern depends temp., H_2O, and

soil organisms .

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Isobutylidene diurea (I B D U)- 32% N .

It is formed by :-

Isobutyraldehde (liquid) + urea

Condensation

IBDU

Theoretical N content is 32.18%

The AAPFCO definition requires a min.

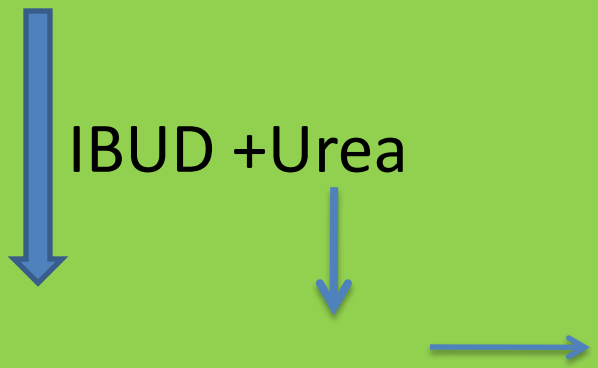
of 30% of which 90% is cold water insoluble

(prior to grinding) .

L9

The release mechanism

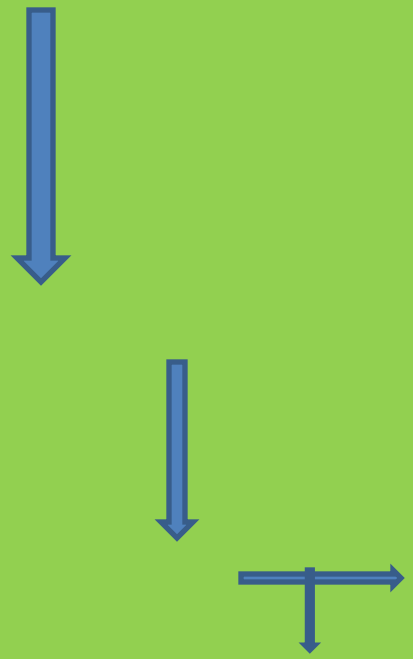
Sparingly water insoluble N gradual hydrolysis



NH_4^+ NO_3^-

Nitrification

- The release mechanism
- Sparingly water insoluble N
- gradual hydrolysis
-
- IBUD +Urea
-
- NH_4^+ NO_3^-
- Nitrification



- The rate of N release is function of
- a- particle size
- as particle size , the rate of N release
-
- b- moisture , Temp., and PH .
- Agronomic response and safety margin
- good with turf
- Green house crops :-
- Phyto toxicity has been some time observed,

- Crotonylidan diurea (CDU)---32% N
- It is formed by acid – catalyzed RX. of urea and
- Acetic aldehydes . When dissolved in water it gradually decompose to urea and crotonaldehyde.
- As particle size decrease ,the of N release increase
- CDU is decompose by both hydrolysis and microbial
- Process in soil.
- Rate of release depends on :-
- -Temp. ,soil moisture ,and biological activity in soil
- Even in acid soil degradation is slower than that of IBUD
- Produce in Japan