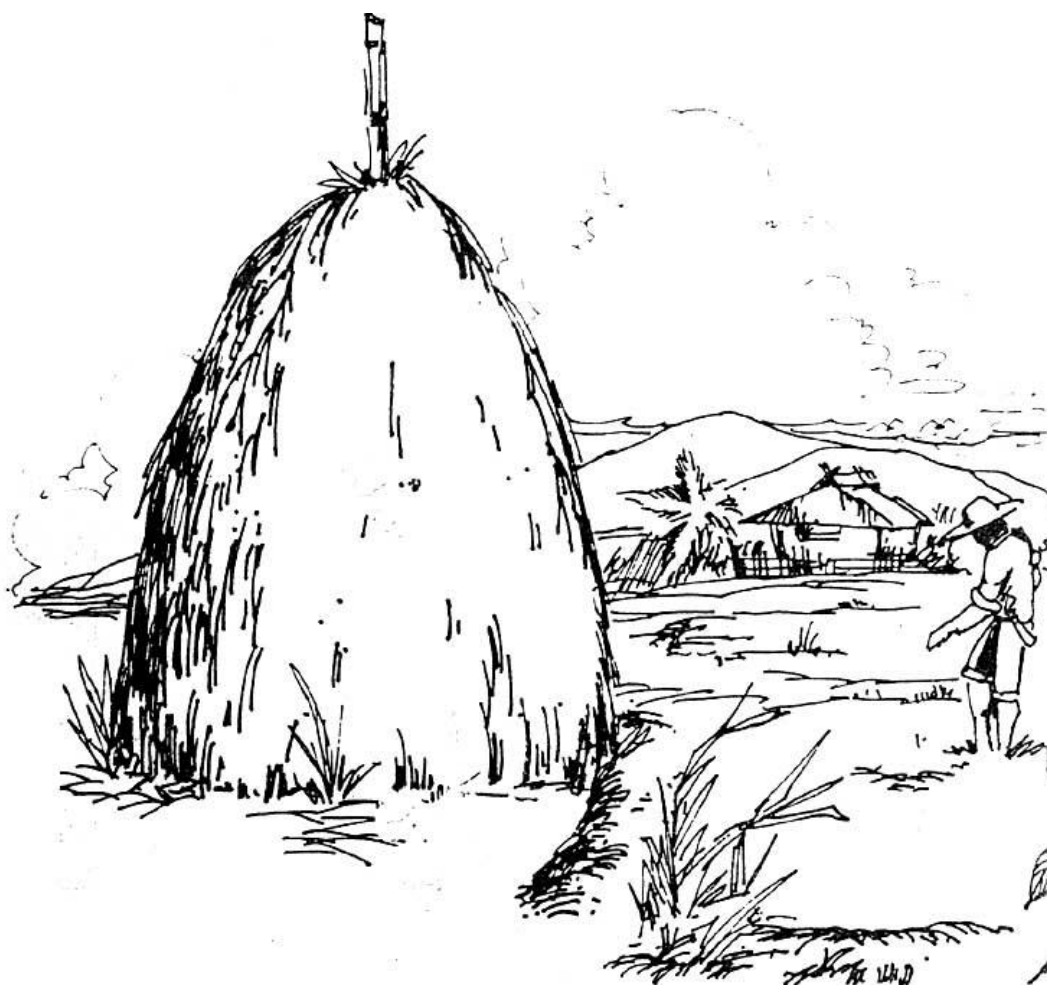


# UREA TREATED RICE STRAW TECHNOLOGY



Publish by the JOCV Volunteer; Koichi Asada (Veterinary surgeon)

## INTRODUCTORY NOTE

For developing countries, urea treatment is considered as the most practical method to improve the feeding value of rice straw at the local village level. This is particularly true in countries where urea is subsidized. However, idle farmers cannot carry out this process. Hard-working farmers are the best persons who could implement this process.

Research findings at the Dairy Training and Research Institute revealed that satisfactory performance and profitable economic gains could be obtained from feeding urea-treated straw to beef cattle, dairy replacement heifers and lactating dairy cows.

Recognizing the importance of this technology in milk shed areas, most especially to small-hold dairy farmers who are very much dependent on rice straw as the main source of roughage for their animals, we introduced the "Urea-Treated Rice Straw Technology" in a Japanese-Philippine study version. The farmers enthusiastically accepted this technology not only in the STDC but also in the other Dairy Farmers Association.

Our constant interaction with farmers during lecture-demonstrations led us to revise the first brochure based on the feedback of the farmers. The revised brochure, which comes in two versions, English and Tagalog, will include important pieces of information that are oftentimes asked by the farmers. We sincerely hope that this technology will, in a modest way, contribute to the development of the local dairy industry.

This method is the most effective and the cheapest given the Philippine context.

It is too difficult to continue good condition of dairy animals for Philippines situation. Because dairy animals, especially Holstein's variety which includes Holstein-Sahiwal, need the urea-treatment concentrate in order to produce plenty of milk. However, most of the dairy animal cannot get this needed concentrate because most of the farmers are idle. The farmers want to request for donation only like beggars. They have to change their mindset first, otherwise, they can never improve.

I am willing to support the farmers who are hard working and cooperative. I will not support idler farmers again.

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## UREA-TREATED RICE STRAW TECHNOLOGY

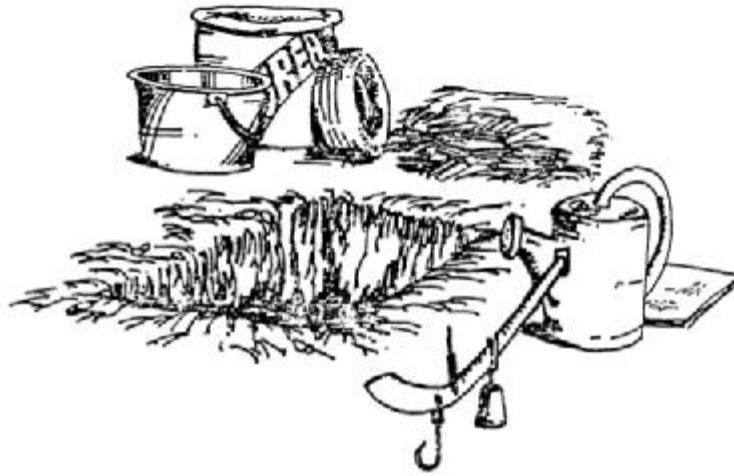
This brochure contains 3 portions: The first part contains stepwise description of urea -treatment procedure; part II gives some characteristics of urea-treated rice straw; and the last part shows how to make the best use of urea-treated straw in terms of obtaining optimal performance of the animal and consequently best economic returns.

### PART I - HOW TO PREPARE UREA-TREATED STRAW

#### **The ten steps to follow:**

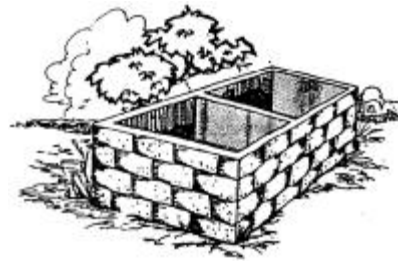
##### 1. Materials needed for the treatment:

Treatment pit	Weighing scale
Rice straw	Plastic sheets
Water	Sprinkler: garden can
Urea	Weights: old tires/stones/wood



## 2. Prepare the treatment pit

You can dig an underground pit or build one above the ground. The number of animals you are feeding determines the size of your pit. A one cubic meter ( $1 \text{ m}^3$ ) pit is good for 100 kg dried rice straw, more than enough for 10-day feeding of a dairy cow.

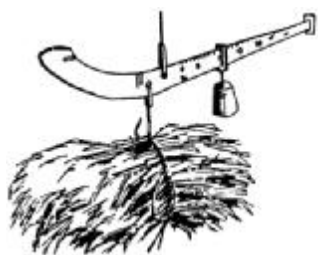


We recommend a 2-pit feeding system for continuous supply of urea-treated straw (UTS) for your animal. While one pit is being used for feeding, straw in the other pit undergoes treatment, which lasts for 10 days.

Please see Appendix 1 for pit sizes in relation to animal holdings.

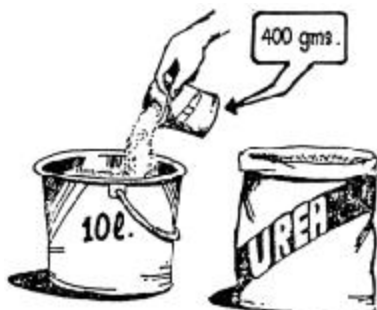
## 3. Weigh 10 kg of dried rice straw (For wet straw, please refer to Appendix 2).

## 4. Spread the straw in the prepared pit (For unpaved ground, placing plastic sheets on the pit's floor will prevent dirt from mixing with the straw).



## 5. Dissolve 400-g urea into 10-L water

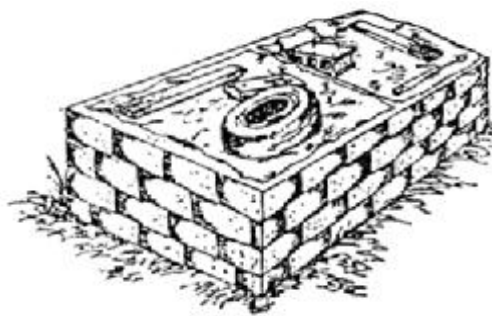
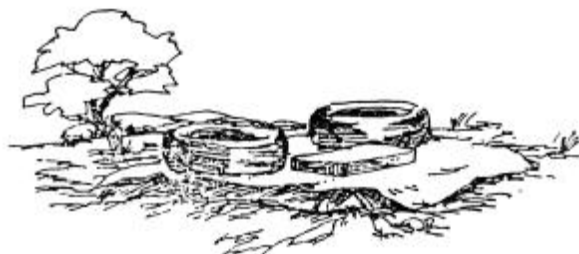
## 6. Transfer the urea solution into a sprinkler. Sprinkle evenly onto the rice straw inside the pit.



## 7. Gently turn the straw by hand or with the aid of a hay fork to facilitate thorough mixing of urea solution and straw.

Compact the treated straw by trampling.

## 8. Repeat steps 3 to 7 until the pit is filled up.



9. Cover the pit with plastic sheets. Airtight condition is important to avoid loss of ammonia.
10. Place old tires, stones or wood over the pit as weights to hold down the treated straw for effective treatment.

## PART II - GETTING TO KNOW YOUR PRODUCT

### The Do's and Don'ts

1. Urea treatment requires duration of 7-10 days. Urea treated straw (UTS) should not be used if the treatment period is less than 7 days; it may be toxic to your cow.
2. Always use new straw and avoid moldy straw. There is no point treating rice straw that has been left rotten in the field.
3. Dry straw, newly threshed straw and rain-soaked straw are equally good for the treatment. Please consult Appendix 2 for the ratios of urea: straw: water.
4. Do not keep UTS in the pit for more than 1 month; it may become moldy.

### What is urea-treated straw?

1. Compared to untreated straw, UTS is 30% higher, in energy value and 100% higher in protein value. It is equal to fair quality grass in nutritive value.
2. Urea-treated straw has the characteristic "ammonia smell". Do not feed UTS without this-smell; it may be toxic to your animals.
3. Ammonia odor is not toxic to your animal but you must avoid excessive inhaling of this gas. Use facemask or handkerchief to cover your nose and mouth while feeding your cow.
4. Urea-treated straw is inexpensive:

	Rice straw Concentrated		Urea-treated Straw	
	kg	P	kg	P
Rice straw	0.71	0.07	0.96	0.10
Urea			0.04	0.12
Concentrate	0.29	0.99		
Total	1.00	1.06	1.00	0.22

Compared with concentrate supplementation to untreated straw having equal energy and protein values with 1 kg of urea-treated straw, you save 84 centavos with urea treatment.

### PART III - HOW TO GET BEST RESULTS FROM UREA-TREATED STRAW FEEDING

Urea treatment is not a miracle. Overnight improvement can not be expected from your animal fed UTS. One must be patient and follow some basic requirements in order to obtain optimal performance from the animal, hence best economic returns from the Technology. Most animals would eat UTS readily while others would need a week or so to get used to the taste. Introduce UTS to your cow gradually.

#### Minimum Requirements

When UTS is fed *ad libitum*, you have to give the following supplements:

1. Minerals such as salt block or loose salt (a mixture of salt and bone meal in equal parts) to be offered free choice; and
2. Fresh forage (grass or legume) to be given at the rate of 1-2 kg a day for each animal.

#### For Optimal Production

On top of the minimum supplementation mentioned above, profitable production can be expected from your animal if a small amount of concentrate (2 parts of copra meal and 1 part of rice bran) is given.

1. For growing cattle, with daily feeding of 0.5 -0.7 kg concentrate, average daily gain of 450 g may be expected.
2. For milking cows, a daily milk yield of 6-9 kg may be expected if 1.6 - 3.5 kg of concentrate is fed, respectively.

#### Are you better off without this Technology"?

Yes, under the following circumstances:

1. Abundance of green forages/pastures, these are cheaper and may be more nutritious than UTS; or
2. Unusually cheap and plentiful supplies of concentrate feeds. There is supplies of concentrate feeds. There is no point treating straw if daily concentrate feeding is more than 2 kg/head for growing animals or 4 kg/head for milking cows.

### CONCLUSION

Urea treatment of rice straw is a simple and inexpensive technology for backyard dairy farmers. Economic benefit can be realized from feeding UTS when supplemented with minerals, 1-2 kg green forage and a small amount of concentrate daily.

### ACKNOWLEDGEMENT

The authors are grateful to PCARRD for funding the Development Project on "Feeding Urea-Treated Straw at the Village Level". Wholehearted and unselfish supports of Rajeev Pradhan, Hisaya Tobioka are sincerely appreciated. For clerical assistance of DTRI UPLB, I am very thankful.

#### APPENDIX1. RECOMMENDED SIZES RELATION TO ANIMAL HOLDINGSOF TREATMENT PIT IN

1. One-cow Module: Two pits of 1.0 m<sup>3</sup> (cubic meter) each.

Suggested measurements for each pit:

Length (L) - 1.5 m

Width (W) - 0,7 m

Height (H) – 1.0m

2. Two-cow Module: Two pits of 2.0 m each. Suggested measurements for each pit:

2mL x 1mW x 1mH

3. Three-cow Module: Two pits of 2.0 m each. Suggested measurements for each pit:

2.5mL x 1.2mW x 1mH

4. Four-cow Module: Two pits of 4.2 m each. Suggested measurements for each pit:

2.8mL x 1.5mW x 1mH

5. Five-cow Module: Two pits of 5.25 m each. Suggested measurements for each pit:

3.5mL x 1.5mW x 1mH

## APPENDIX 2. PROPORTIONS OF UREA TO RICE STRAW IN RELATION TO KINDS OF RICE STRAW

1. Dry rice straw                      400g urea  
    10L water  
    10kg rice straw

2. Freshly-threshed rice straw                      400g urea  
   20kg rice straw

(If rice straw is rather dry, 5L of water maybe used to dissolve urea)

3. Rain-soaked rice straw                      400g urea  
   30kg rice straw

(Urea should be scattered/sprinkled evenly)



DO NOT BURN RICE STRAW +++

Your Cattle and Buffaloes can convert Rice straw into Meat and Milk when green grass is scarce.  
Try UREA TREATED RICE STRAW TECHNOLOGY