

---

## **Urea Treatment Technique on Wheat Straw for Its Better Appropriation by the Ranchers**

**Gaurav Jain<sup>1\*</sup>, Aslam<sup>2</sup>, Ngangkham James Singh<sup>1</sup>**

Department of Animal Husbandry and Dairying SHUATS Prayagraj U.P.<sup>1</sup>

Aslam, SRF, ABTC, NDRI Karnal Haryana<sup>2</sup>

**\*Author for Correspondence: Email Id: gauravj888@gmail.com**

---

### **ABSTRACT**

*Urea treatment of straws is thus far the only chemical treatment with practical potential for farmers' conditions. Urea is available in many parts of the country; it is a relatively safe chemical that is easy to store and also easy to dissolve in water. Urea treatment can be done in different ways, depending on the local conditions and preferences. Of all treatments, the economics and feasibility of urea treatment is best understood. Though on a limited scale, urea treatment is done by farmers under practical conditions in different places of the country. All these aspects will be covered in this chapter, and some attention is given to aspects of animal health in relation to feeding of urea treated straw.*

**Keywords:** Ranchers, Urea Treatment, Wheat Straw.

---

### **INTRODUCTION**

Straw is the most abundant of all agricultural residues. In general, straw is used for burning, composting, paper making and animal husbandry. The main component of straw is fiber, including cellulose and hemicelluloses. Some cellulose and hemicelluloses are bound to lignin and resistant to microbial attack. Cereal straws are an important feed resource in Iran and many developing countries and despite of its low digestibility, a significant amount is fed to ruminants. To improve the nutritive value of fibrous crop residues, urea treatment of straw was developed. Urea-treated straw is more palatable and digestible. The dry matter (DM) digestibility increases by approximately 10 per cent, the total digestible nutrient (TDN) value increases by 10 to 15 per cent and the CP content increases almost three times. The feedback received from the farmers involved in on-farm trials has been largely positive. In spite of the technology appearing to be quitesound, it was almost entirely rejected by livestock farmers in the tropical region, barring some exceptional situations [1,2].

### **UREA AS A CHEMICAL**

Urea is a white crystalline solid organic compound, widely used as a nitrogen fertilizer. Pure urea has a nitrogen concentration of 46.6 percent, equivalent to a crude protein content of 290 grams per 100 gram of urea since protein itself has only 16% nitrogen. Urea is easily broken down to ammonia by the urease enzyme that is produced by soil or rumen microorganisms. As an NPN-source urea can replace part of the dietary protein in the ruminant diet. Rumen microorganisms first break down urea to ammonia, which then serves as a nitrogen source for the production of microbial protein, ultimately serving as a protein source for the host ruminant [3,4,5].

### **STEPS OF UREA TREATMENT [6]**

- 1) Take 100 kg of straw or stoves and put them on the cemented/pakka floor.
- 2) Take the fertilizer grade urea @ 4 kg.

- 3) Dissolve the urea (4kg) in 30-40 liters of water and mix it till it completely dissolves
- 4) Spray the urea solution with any sprayer on straw lot.
- 5) Mix urea solution and straw thoroughly with hand fork (about 5-6 turnings).
- 6) Stock under the plastic sheets/gunny bags cover to have anaerobic condition and allow it to react for 3 weeks.
- 7) Take the straw out farm stack. Give 2 to 3 turning so that excess of ammonia gets evaporated in the atmosphere.
- 8) The colour of the straw is changed from yellowish to dark brown during the reaction time. Treated straw is ready to use as animal feed for livestock.

### **PRECAUTION [7]**

- 1) Uniformly sprays urea solution on straw lots and thoroughly mix.
- 2) Provide complete anaerobic condition for better reaction while stacking the treatment straw.
- 3) Precaution should be taken to save the treated material from rains etc.
- 4) Keep the children away from the stock to avoid the ill effect of ammonia.



*Fig .1. Observation of urea treated straw in AH&Dairying department SHUATS.*

### **ADVANTAGES [8]**

- 1) The ingredients are readily available in the market
- 2) It is not hazardous during the process/ treatment of roughages
- 3) The urea gets converted into ammonia and then ammonia reacts with fiber to complete the reaction.
- 4) Being a source of alkali it helps in breaking the lignocelluloses bonds and thereby increases the digestibility of the energy producing components.
- 5) The digestibility of organic matter and crude fiber also increase leading to higher amount of available energy to the livestock.
- 6) It increases protein content by two to three time.
- 7) The urea treatment of straws does not cause any pollution problems.
- 8) The urea treatment straw does not create urea toxicity in the animal.

## FEEDING

The treated material serves as maintained ration. However, supplementation of concentrate mixture as well as green fodder will improve the performance of the producing animals especially lactation animal. The treated straw can be fed to growing calves, producing and non producing adult animal of cattle, buffalo, goat and sheep.

The treated straws become soft and more pliable, thus increase its palatability and increased voluntary consumption of straw. The animal fed on such treated straw should be provided with sufficient quantity of common salt and commercially prepared mineral mixture. The supplementation of vitamins may also be beneficial, which can be supplied through commercial preparation.

The treated material can be fed to any ruminant animals having more than six month age. The change in colour of the treated straw happens due to reaction of the chemical with straw and does not affect straw quality [9].



*Fig 2. Urea treated straw after twenty one days*

## CONCLUSION

Wheat straw provides in excess of 80% of the winter roughage for small ruminants (sheep and goats) in India. Urea treatment improves the nutritive value of straws, in terms of total content, energy digestibility and intake. The crude protein content is also increased. Farmers have confirmed these technical results in practical conditions. The technology is technically feasible, yet in practice many farmers feel constrained to adopt the method. The most important constraints are probably the marginal returns from the technology, the non-availability of sufficient straw, urea, or too high levels of animal produce. It is well established however, that the technology can be adopted where:

- 1) Grasses or other green fodder are not available;
- 2) Straw is cheap and readily available;
- 3) Concentrates are relatively expensive;
- 4) Water is freely available;
- 5) There is a ready market for milk, fetching good prices to the farmer.

Health hazards of feeding urea treated straw are unlikely. Deficiencies of minerals and vitamin A which can cause fertility problems can be easily overcome by supplementation, and they are due to the feeding of straw, not to the treatment.

## REFERENCES

- 1) Walli, T.K., Oberoi, P.S., Rai, S.N., Gupta, B.N. and Schiere, J.B. 1988. Urea treatment of straw and problems in its adoption under field conditions, pp. 2-7 in: Kiran Singh and J.B. Schiere (Eds.). Proc. of Intern. Workshop on Fibrous Crop Residues as Animal Feed held on 27-28 Oct., 1988 at NDRI Southern Regional Station, ICAR, Bangalore, India
- 2) Schiere, J.B. and A.J. Nell., 1993. Feeding of urea treated straw in the tropics. I. A Review of its technical principles and economics. *An. Feed Sei. and Technol.* 43: 135-147.
- 3) Cloete, S. W. P. and Kritzing, N. M. 1984. A laboratory assessment of various treatment conditions affecting the ammonization of wheat straw by urea 1. The effect of temperature moisture level and treatment period. *South African Journal of Animal Science*, 14:55-58
- 4) Ibrahim, M.N.M., Fernando, D.N.S. and Fernando, W.S.M.A., 1984. Evaluation of different methods of urea-ammonia treatment for use at village level. In: The utilization of fibrous Agricultural Residues as Animal Feeds (Ed. P.T Doyle). University of Melbourne, Printing Service, pp. 131-139.
- 5) M.A. Jabbar, H. Muzafar, F.M. Khattak, T.N. Pasha and A. Khaliq (2009) "Simplification of urea treatment method of wheat straw for its better adoption by the farmers" *South African Journal of Animal Science*, 39 (Supplement 1).
- 6) P B O'Donovan, F M Soomro, J P Wagenaar, Shafiq-ur-Rehman and Farhat Abbas Bukhari (1997) "Urea treatment of straw: a farmer - friendly system improved upon in Balochistan" *Livestock Research for Rural Development*, Volume 9, Number 5.
- 7) Sundstol, F., Coxworth, E. and Mowat, D. N. 1978. Improving the nutritive value of straw and other low-quality roughages by treatment with ammonia. *World Animal Review*, 26:13-21
- 8) T.K Walli, A. SubbaRao, Mahendra Singh, D. V Rangnekar, P.K. Pradhan, R.B. Singh and M.N.M. Ibrahim (2019). "Urea treatment of straw" *Handbook for Straw Feeding Systems* Kiran Singh and J.B. Schiere (eds.), ICAR, New Delhi, India
- 9) Younesi Alamouti, M. and Zahedifar, M. (2015). "Mechanized urea treatment of wheat straw (part ii: modification of small rectangular baler and evaluation of treated straw)" *International Journal of Current Research* Vol. 7, Issue, 08, pp.18871-18875.