

## 4.6.2. CHOPPING, WETTING AND SOAKING

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### INTRODUCTION

In many areas of India it is customary to chop and or soak the straw that is to be fed. The two treatments are restricted to certain regions and this chapter will explain some of their backgrounds. It first discusses chopping and after that it reviews some reasons and ways of soaking and wetting.

### CHOPPING

Chopping is done to reduce the size of the feed particles, whether stems, leaves or whole plant parts. The length of chopping is variable, it ranges from 10 - 30 cm. for stovers of millets, sorghum and maize in some parts of the country and to pieces between 1 - 3 cm. for straws of wheat and rice in other areas. The most extreme way of reducing particle size is the grinding of the material to a size of 0.1 - 0.3 cm. or less. Grinding is a very energy intensive process, particularly for straws and stovers. Due to the extreme reduction of size, grinding might affect the surface area of the straw exposed to digestive action in the rumen. It will not be discussed further

because of its cost, and because the increase in digestibility is likely to be offset by a higher rate of passage resulting in a lower digestibility.

### ***Regional differences***

In the North-Western Gangetic plains, the wheat straw is not cut on purpose, but it happens to come in small particles from the threshing machine, the so-called wheat bhoosa (#5.2.). When bullock threshing is in use, the wheat straw is threshed to small pieces by trampling the animals on it. The rice straw is normally stored and fed in its long form, even in farming systems where wheat straw is fed in its short form. In the North-Eastern states, West-Bengal and Orissa however, the wheat straw is kept in its long form and the rice straw is chopped, with a knife (Figure 1). Finger millet straw in some areas of the South is, just like the wheat straw in the North, crushed during threshing, though under a heavy granite roller, and not in a machine. Chopping is quite common in the North-West, usually by mechanical choppers, but mainly on lush green feeds like berseem and the stovers of sorghum and maize (Figure 2).

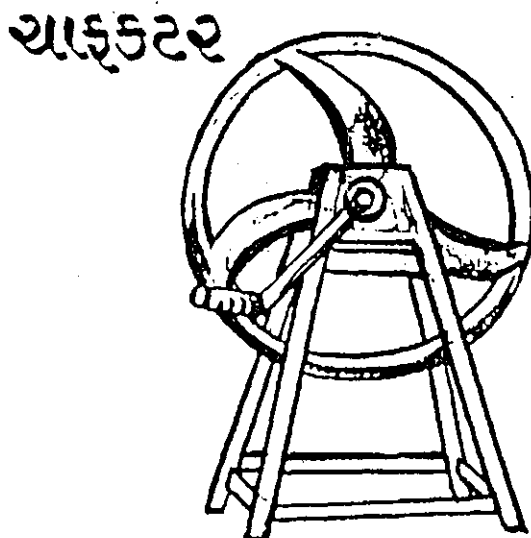
### ***Reasons for chopping***

When all these differences between regions and straw types are taken into account, there must be several reasons for chopping, not solely one. A series of questions remains: does chopping increase the intake and digestibility of straw and/or berseem? Would chopping of stovers to a length of 10 - 30 cm. be done to increase the intake and digestibility?

**Figure 1.** A women in West Bengal chopping the rice straw by hand over a knife (courtesy J.G. Muylwijk)



**Figure 2.** A common wheel with knives used in the North-West for chopping of green feed, either hand or mechanically driven. (courtesy BAIF-Baroda)



There is some information indeed from literature that chopping increases intake and or digestibility, but this is countered by evidence to show that there is no or negative effect. Of course, when a long coarse or tough straw is chopped it will be easier for an animal to consume that feed, but will it eat more, and if so, is it (or the farmer) then better off? Why should the farmer force the animal to eat poor quality stems? It appears that chopping can be done to achieve a reduction of the amount of residues and/or waste, i.e. to make sure that the animal will eat what it is offered.

Even though there is not always an advantage in forcing the animal to eat more (#4.4.), it is possible to think of some reasons to do so. First, animals on lush green feed or high concentrate rations can obtain benefit from a certain amount of fibrous material in the feed. It helps to avoid bloat and to improve or maintain rumen function. Second, if stems and other low quality parts are fed the quantity of the ingested feed would increase, though at the expense of the quality. This is a reasonable strategy for farmers that do not aim at high production of milk and meat, but who like to have many animals, if necessary low milk producers, that produce dung and status nevertheless. For farmers with cows that have to achieve high individual productions it is not attractive to feed the animal with low quality stems, unless again the straw is fed as a means to maintain rumen function or for example to increase butterfat content.

Other reasons for chopping can be that it can to some extent increase the bulk density of the straw (#4.6.3.). Also, for making dung cakes it is convenient to use short straw which is easily mixable with the dung.

## WETTING AND SOAKING

Water can be added to the feed in two ways, either by soaking the feed for some time, or by moistening it just prior to feeding. The former, soaking, is most common. Mostly farmers, particularly in the farming systems of states like West Bengal and Orissa are used to soak the fine straws. They feed it in a manger with water, quite often mixed with concentrate. Also in this case there are regional differences. Obviously, no soaking or wetting is done where water is scarce.

### *Reasons for soaking*

Regional differences make it also doubtful whether there are any clear and consistent nutritional advantages to the soaking. Though it is claimed that soaking removes excess oxalate, e.g. in rice straw, it still remains to be proven that oxalate is really harmful to a ruminant (#3.5.). In systems where the straw is soaked, it is often done together with the concentrate, cakes or the salt available on-farm, almost in the form of a gruel. In that case, the soaking fulfils a similar function as the chopping, it reduces waste, and it makes sure that the animal is "forced" to eat what it otherwise might not like to consume.

If there is a nutritional advantage from soaking it might well lay in the fact that one may expect the rumen microbes and their enzymes to penetrate quicker in a prewetted feed, or that the wet straw is less abrasive to the animals' mouth. But again here, the evidence from the literature is contradicting. On the other hand, soaking is sure to cause a loss of nutrients

by removing a part of the soluble carbohydrates. One would expect therefore that soaking would be to the detriment of straw nutritive quality unless the straw is fed together with the water that it is soaked in. There is a final possibility that when soaking is done in alkaline water from soil reservoirs, some treatment effect, however small, might occur.

## CONCLUSIONS

Soaking, wetting and chopping can be done in several ways, but the reasons are not very clear. The literature with regard to the nutritive quality is contradicting, and effects are generally small or insignificant. The major reason for farm men and women to spend time and energy on either chopping and/or soaking might be that it forces the animal to eat what otherwise would go "waste". Less straw is thrown out of the manger, and in this way not more nutrients are ingested on a daily base, and less straw is refused, i.e. more animals can be kept over a longer period of time, but production of milk per animal per day will go down (#3.2.).

## SUGGESTED READING

- Badurdeen, A.L., Ibrahim, M.N.M. and Schiere, J.B., 1986. Methods to improve utilization of rice straw: I. Effect of moistening, sodium chloride and chopping on intake and digestibility. *Asian-Australasian Journal of Animal Science* 7: 159-164.
- Chaturvedi, M.L., Singh, U.B. and Ranjhan, S.K., 1973. Effect of feeding water soaked and dry wheat straw on feed intake, digestibility of nutrient and VFA Production in growing zebu and buffalo calves. *J. Agric. Sci. Camb.* 80: 393-397.
- Van der Honing, Y. 1975. Intake and utilisation of energy from rations with pelleted forages by dairy cows. Ph.D. Thesis Wageningen, published as *Agricultural Research Reports* 836, PUDOC, Wageningen, The Netherlands.