

CEREAL CROPS STRAWS

- Obtained after threshing the matured cereal grains
- In ruminant and horse nutrition, fulfills some of the roughage requirements
- Poor in CP, CF and Ca as compared to the legume straws
- Example: Barley, wheat, rye, rice, millet, corn, oat straws

Wheat Straw: It is most commonly used as roughage material in our country, especially during winter when good quality roughages are not available.

Nutrient digestibility is lesser than barley and oat straws

Oat Straw

- Animals like eating oat straw. It is used in cattle and horse nutrition
- Other straws can cause hardness of butter
- Most favorite among all straws
- Higher cell content, less cell wall and cellulose content. Nutrient content is higher
- Higher leaf content results in good quality and tastiness. Husk is softer, delicate and of good quality

- **Rice straw:** Digestibility is similar to the oat straw. Ash 17% (Silica), lignin 6-7%.
 - **Maize straw:** The remainder after removing the cobs from maize stalks is higher than the other straws.
- Barley straw:** is hard, rough and tasteless.

Nutrient contents and energy values of some cereal straws (DM basis)

	DM %	CP %	CF %	EE %	Ash %	DCP* %	ME MJ/kg
Barley straw	86	3,8	39,4	2,1	5,3	0,9	7,3
Wheat straw	86	3,4	41,7	1,5	7,1	0,1	5,6
Oat straw	86	3,4	39,4	2,2	5,7	1,1	6,7
Rye straw	86	3,7	42,9	1,9	3,0	0,7	6,2
Rice straw	91	4,5	35,1	1,4	17	0,9	6,6

*Digestible crude protein

LEGUME STRAWS

- Vetch, beans, pea, lentils, soya
- Rich in protein, Ca and Mg
- **Lentils straw**: Good taste, rich basic nutrient content, thus, liked by animals.
- **Beans straw**: Liked by animals. Digestibility 50%
- **Pea straw**: Highest quality
- Suitable for sheep, cattle and horse nutrition
- **Vetch Straw**: ↑ ↑ CF ↓ CP

Nutrient contents and energy values (MJ/kg) of some legume straws (DM basis)

	DM	CP	CF	EE	Ash	DCP*	ME (MJ/kg)
Pea straw	86	10,5	41	1,9	7,7	5,0	6,5
Bean straw	86	5,2	50,1	0,9	5,3	2,6	7,4
Soya straw	88	5,2	44,3	1,4	6,4	1,5	6,5
*Digestible crude protein							

HUSK

- Bitkilerin taneleri harman yerinde kalan kılıf, kabuk, örtü, yaprak kırıntıları, kırılmış parçaları ve bunların tozlarından ibarettir. Kavuz, genellikle buğdaygiller için kullanılır.
- Çiçeği kavuz ve kapçık sarar, kavuzlu arpalarda bunlar daneye yapışmıştır ve harmanda ayrılmazlar. Danenin ortalama % 10 - 13 kadarı kavuzdur.

KES

- Kaba yemlerden kültüre alınmayan ve gelişi güzel yetişen çeşitli bitkilerden (yabani ot, dikenler vb) elde edilen samana benzeyen yemlerdir.

OTHER FILLER FEEDS

- For ruminant nutrition, in our country, when quality roughage feed is not available or costly, materials like straw rich in cellulose can be used up to 25% of total roughage feed
- Beet pulp,
- Cotton seed pods,
- Corn cobs
- Cotton seed pods, CP 3.5-10.5%, CF 41-49%.
- Corn cobs, low protein, high fiber.
- Low quality roughages (straws, sugar beet pulp, pods), can not fulfill the energy needs of young and lactating ruminants

- **Increasing the NUTRITIVE VALUE of straws**
- physical, chemical and biological methods can be applied.
- **Physical method:** cutting into pieces, grinding, wetting, steam treatment, boiling, pelleting and exposure to gamma rays.
- **Chemical method:** Purpose: to increase the nutritional value by breaking down the chemical and physical bonds between cellulose, hemicellulose and lignin.
- Urea, NH₃, NaOH treatment can be used. NaOH treatment is not suitable because of its cost as well as from environmental pollution point of view. Urea and NH₃ treatment can increase CP content from 3% to 7-8%.
- **Biologic (microbiological) method:** Three biological methods are used to remove the lignin from the cell wall of plants such as straw.

BIOLOGICAL METHODS

- **FUNGI:** Some fungi breaks down the lignin and releases the polysaccharides.
- **Bacteria:** Some bacteria types (like Pseudomonas, Xantomanas, Nocardia) have shown the capability of breaking down the lignin.
- **Insects:** Some insect types (like Nasutitermees exitious, Coleoptera, Isoptera, Hyemenoptora) have shown the capability of digesting the lignin.