Hay-making

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Methods of Forage Preservation

- Hay
- Silage
- Haylage

Why forages preservation?

- Forages are important for nutrition and economical production
- Fresh forages are available only 6 months
- The forages like grasses and legumes that have been cut and then dried under sunlight.
- It is used when there is shortage of forages (during winter or drought summer)
- All kind of forages can be preserved by hay making

Principle of Hay Making

- Haymaking is to reduce moisture content of green forage from 70 - 90% to 15 % or less.

- When plant cell dehydrate it can stable and can be
- safely stored and easily transported without danger of spoilage.

Suitable Time for Hay Making

- For legume harvesting is done at the start of flowering (April and June)
- For grasses harvesting should be done when there is emergence of head (after rainy season)
- Legumes or grasses have maximum nutrients at these stages. (optimum stage of maturity)

Hay Making Steps

- Mowing or Cutting
- Tedding
- Raking
- Baling

Curing Step One: Mowing

Curing Step 2: Tedding

Curing Step 3: Raking

Baling

Methods of Hay Making

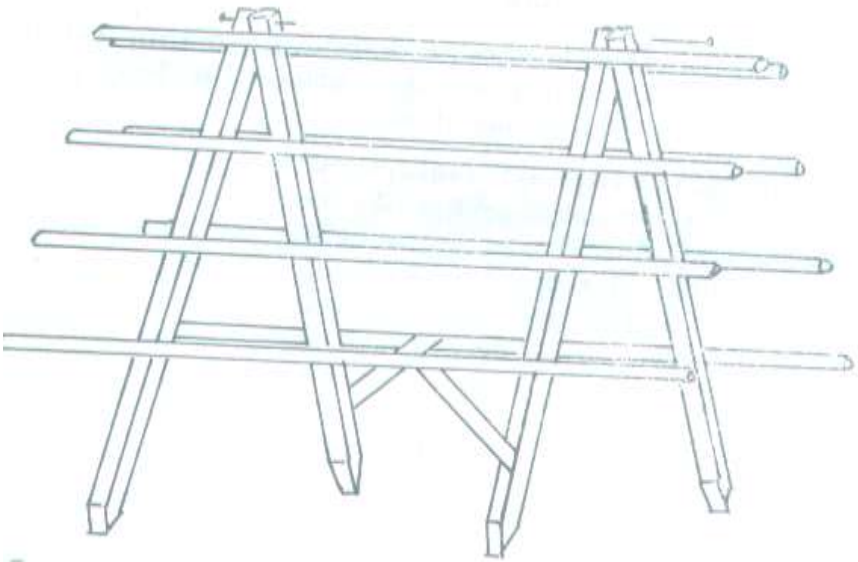
- 1. Natural Drying
- -In the field
- -On the table

- 2. Artifical Drying
- -Unheated air drying
- -Warm air drying
- -Hot air drying
- Only for high quality herbage

Natural Drying

- After cutting the crop is dried in the field under sunlight + wind

- High nutrient losses



- **Drying in the field**
- -Depends on whether condition
- High nutrient losses
- Not suitable for rainy regions

- **Drying on the table**
- Less nutrient losses
- Less damage from rain
- Rain slides on the surface of grass
- wind and sushine well diffuse into the mow-rapidly dry

losses in haymaking

- 1.Respiration
- Plants live and, respiration continue until its dry matter content reaches 62%
- After then plant will die and stop respiration
- During respiration: sugars convert to CO_2 and H_2O
- Nutrient content decrease
- Sellülose and lignin increase
- As soon as possible dry matter content should be increased 62%

losses in haymaking

- **2.Fermentation**
- Bacteria and moulds on the crop surface causes losses (Tedding and turning, storing)
- generation of heat
- Maouldy hay is unpalatable and harmfull.
- It may lead to production of mycotoxin
- Oxidation and fermantation: carotene may be reduced from 150-200 mg/kg to 2-20 mg/kg in the dry matter

losses in haymaking

- **4.Leaching losses** occurs if rain falls on the crop during the curing process. Re-wetting of partially dried hay is much more serious than rain on newly-cut herbage, and can cause both leaching and increased mould damage.
- Water soluble nutrients (sugars, soluble proteins, minerlas-Na, K, P, vitamines..) losses with rain

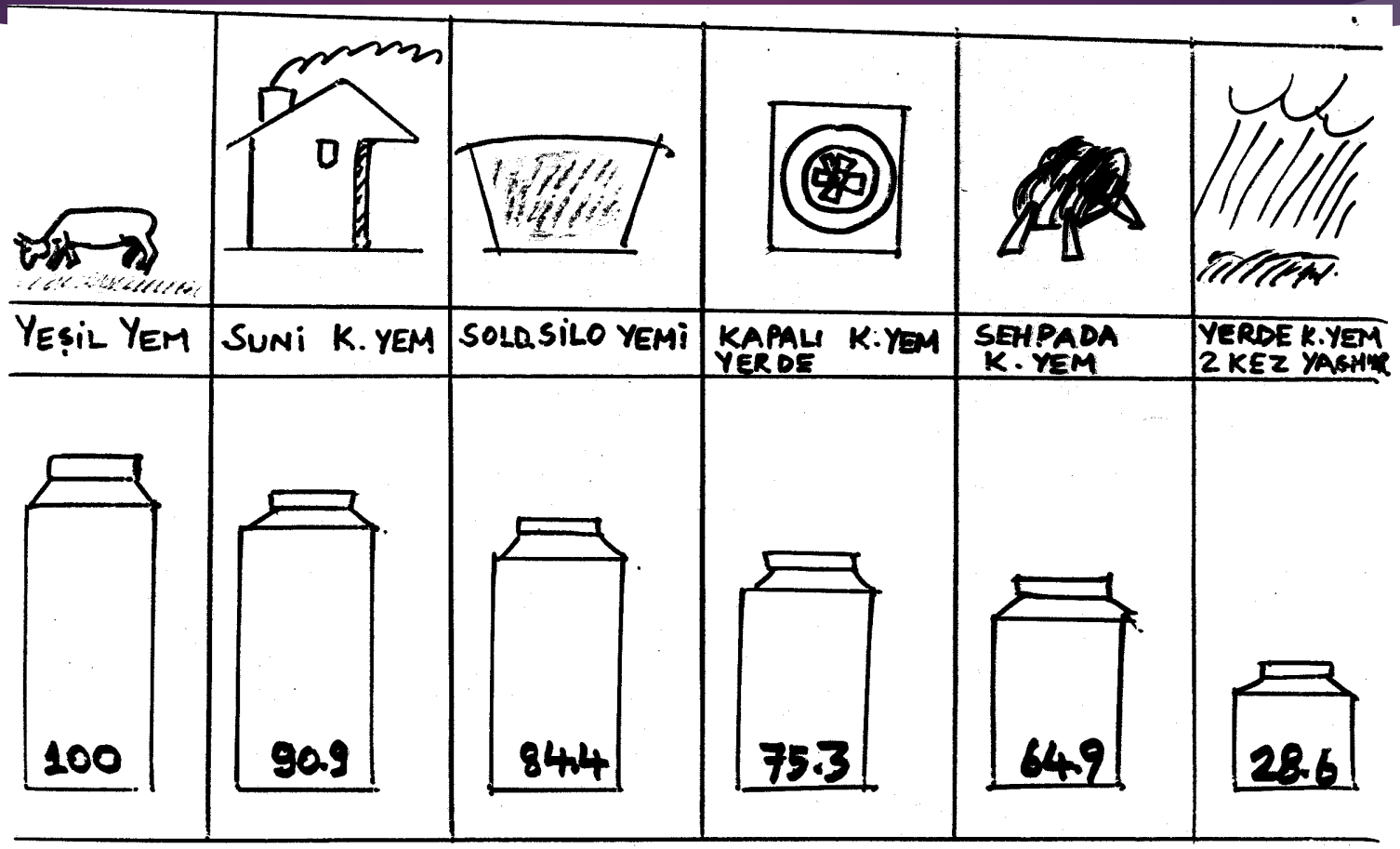
losses in haymaking

- **3.Mechanical losses (Leaf)** occures during tedding and field handling. Also further mechanical losses occurs during collection, transport and baling.
- LEAVES are more nutritious than STEMS
- most susceptible to loss

- Leaves contain 2 to 3 times as much protein as stems. Leaves are also richer in carotene, B-vitamins, minerals, and energy.

losses in haymaking

- **Microorganisms**
- Because of unsuitable weather conditions, longer drying time bacteria and moulds grow on the crop.
- Moulds produces aflatoxins
- Toxic for animals


YEŞİL YEM
SUNİ K. YEM
SOLOSİLO YEMİ
KAPALI K.YEM YERDE
SEHPADA K. YEM
YERDE K.YEM 2 KEZ YAŞMIR
100
90.9
84.4
75.3
64.9
28.6

Characteristics of good quality Hay

- **1.Chemical characteristics:**
- Crude fiber: ADF
- NDF
- Moisture: < 15%

Characteristics of good quality Hay

- **Physical Characteristics**
- *Leaf: < 40%
- *Color: Brillant greeny
- *Aroma
- *Softness-flexibility
- *Foreign materials (No dust, mud, metal etc)

- **Preservatives** for safe storage of hay with high moisture
- Propionic acid
- Anhydrouse ammonia
- Urea

Good Quality Hay

Poor Quality Hay