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Calf –Heifer- Bull Feeding

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# CALF FEEDING

- A newborn calf is vulnerable to infections or is facing various care and nutrition problems.
- Maintenance and nutrition to be applied during the calf period are the most important factors that are effective in reaching the yield capacities of the heifers.

# THE DIGESTIVE TRACK IN CALF

- The real stomach, called abomasum, is the widest and most functional part of the it with a 60% capacity at birth.
- Rumen and reticulum capacity increase rapidly due to feeding pattern and reach 60% at 6 weeks. After about 3 months of age, the development of the rumen is completed and the normal diet is passed.
- The function of rumen bacteria reaches to that of adult ruminant the 9-13.th weeks.. The nutrient requirements of the preruminant calf are similar to those of single-pied animals, differing from adult ruminants.

- Calf's rumen grows very slowly. For this reason, a weekly calf feeds more with liquid foods.
- The indication of the development of the rumen is the length of the **villius**. Essential fatty acids influence the development of **villages** positively.
- In this respect, it is of great importance to give good quality herb or clover to the calves from the second week with concentrate feed. Liquid foods have negative effects on development.
- The digestion of nutrients in calves is possible with enzymatic activity in the true stomach and small intestine as in the first week animals.

- Proteolytic effect, which is initially low in the small intestine, increases gradually.
- Abomasum has a high protease activity from week 1, but the pepsin-chloric acid function is low.
- For this reason, newborn calves can not properly evaluate both vegetable proteins and other animal proteins other than milk.

- After birth calves in the digestive tract:
  - 1) high lactase activity,
  - 2) low maltase activity,
  - 3) There is no sucrose activity at all.
  - 4) Pancreas amylase, which affects CHO and fat digestion, gradually increases from the first week of pancreatic lipase.
- Esterase activity is found only in the stomach. Essential fatty acids such as linoleic, linolenic and arachidonic acid are met by colostrum and milk fat.
- The inclusion of high levels of unsaturated fatty acids in calf rations can lead to delayed growth and deterioration in health of the offspring, and even death.

- Calves can break down good quality grass at 10-15 days of age. Therefore, it is not recommended to give the calves 8-10 days without roughage.
- If it is not possible to give rough feed from the point of view of business, the cellulose of the starter feeds can be increased up to 9-11%.

# Colostrum schedule to be applied in the first week

Age of Calf	Number of meal and amount of colostrum
1. day	3-4 x 0.5-1.5 l (Total 4 lt)
2. day	2-3 x 1.5-2.0 l
3. day	2 x 2.0-3.0 l
4.-7. day	2 x 2.5-3.0 l

**The calf consumes colostrum and milk up to 10% of the live weight.**



# Calves (0-3 month):

- The calf should be kept in individual compartments to eliminate the risk of disease transmission until the liquid is removed from the food.
- Up to this time, 8-10% of the live weight of liquid food is given.
- The following week is roughly broken and the calf starter containing delicious nutrients is put in front of them. As the calf grows, daily consumption reaches 700 g and can be cut from milk (liquid food).
- Those who leave the milk are given rough food such as alfalfa and dry grass. Water should be provided from the first day.

- The newborn calf must be fed with colostrum.
- In the first 15 minutes and 4 hours following the birth of colostrum, the prescribed calfs protect against diseases.
- This is because;
  - 1- The transfer of macromolecules without loss,
  - 2- The nutrients have changed into normal milk composition

- There is a greater amount of immunoglobulin in the first milking colostrum
- Natural antibodies are not available to protect against new diseases until the newborn is given colostrum.
- It can be easily infected by bacteria that have a highly pathogenic effect in this term.
- The amount of immunoglobulin consumed within the first few hours after birth is also of great importance.

- In order to ensure complete protection from the disease, the calf should take 300-400 g of immunoglobulin within the first 24-48 hours. This amount of 4 meals to be given in 7 kg colostrum provides.
- Since the bacteria settling in the small intestine adversely affect the absorption of immuno-globulins, calves should be separated from other animals in the first period and should be fed with colostrum bottle.
- The combination of colostrum taken from more than one cows to calves is more effective against infections compared to colostrum taken from the mother.

**Table 1: Colostrum structure (first 24 hours after birth): - Comparison of nutrient content of the Holstein (Church, 1980)**

Food Stuffs, %	Colostrum	Milk
Oil, %	3.6	3.5
Nonfat dry matter, %	18.5	8.6
Protein, %	14.3	3.25
Kazein, %	5.2	2.6
Albumin, %	1.5	0.47
$\beta$ -laktoglobulin, %	0.80	0.30
$\alpha$ -Laktoglobulin, %	0.27	0.13
Serum albumin, %	0.13	0.04
Immunglobulin, %	5.5-6.8	0.09
Laktose, %	3.10	4.60
Ash, %	0.97	0.75

- The temperature of the colostrum should be 35°C.
- Low temperature prolongs the time of collapse in the abomasum, and some of the colostrum settles in the small intestine and causes digestive disorders.
- Colostrum is less laxative than milk. Calves fed with excess fat milk, diarrhea is seen due to high lactose. It is not seen in the feeding with colostrum that contains less lactose.
- After birth a special calf is taken in the mother of a calf within 12-24 hours. It is best practice to allow the calf to suck the mother 4-5 times in a while, 5 minutes at a time. It is recommended that the calf be given 2 liters or 4 liters of colostrum in 2 meals during this time. The calf leaving the mother is given by the bucket until the end of the 4th day.

- Cows give as much colostrum as calf can not drink in the first days following birth.
- Can be frozen or stored as fresh. It can then be melt-fed.
- The colostrum can also be stored by souring. Formic acid (0.3%), acetic acid (0.7%) and propionic acid (1%) can be protected to prevent storing colostrum stored in summer.

## Colostrum structure changes with time,%

Besin maddesi	After Birth	After 12 hours	After 24-36 hours	Normal Milk
Dry Matter	27-37	14.5-15.5	12.8-13.5	13
Crude Protein	14-17.6	4,8-6	3.9-4.5	3.5-3.9
Albumin/globulin	11,3	3	1,5	0.9
Oil	5.1-8.5	3.8-5.7	3.4-4.1	3,8-4
Lactose	2.1-3.6	3.5-4.3	4.2-4.7	4,8
Mineral	1,4	0.9	0.8	0.7



Some applications that need to be considered in the cultivation: From 1st to 4th week:

It is the biggest obstacle that runs for an effective growth and good health. Control strategies of this age group are grouped into 3 groups.

a. Colostrum should be given early, especially during the first 3 days of the calfs life. It provides protection against microorganisms that cause diarrhea. B-The strong, pathogenic microorganisms should be replaced by contact. Clean, ventilate, disinfected calf- shelters should be used. c. When problems occur, fast diagnosis and treatment should be performed. There should be a very rare electrolyte treatment against diarrhea, which is the cause of the diarrhea.



## Full-fat milk feeding of the calves

- After the colostrum period, the amount of daily milk given (8-10% of the body weight) with a daily weight gain of 300-400 g.



# *Application of Non-fat Milk*

Especially for male calves to be taken in young cattle fattening in the future, whole milk in decreasing amounts between 2-4 weeks, skim milk is given in increasing amounts starting from the second week.

In the case of breeding calves, they feed on whole milk or whole milk + skimmed milk from week 2 until the 16th week.

Feeding of Normal Calf			Feeding Breeding of Calf after 2 weeks	
Age, week	Full-fat milk, kg	Non-fat milk, kg	Full-fat milk, kg	Non-fat milk, kg
2.	5	2	6	1*
3.	3	5	5	3
4.	2	6	5	3
5.	1	7	4	4
6.	-	8	3	5
7.	-	8	2	6
8.-12.	-	8	-	8
13.-15.	-	8-6	-	8-6
Total	100	500	200	400

# Milk Replacement (MR)

- The crude protein is at least 22%; crude oil at least 5%; crude cellulose up to 3%;
- Skimmed milk powder should be at least 50%. Vit A should be at least 16000 IU / kg, Vit D should be at least 2000 IU / kg, Vit E should be at least 20 mg / kg.
- Flaxseed meal, soybean meal, peanut meal up to 25%; milk powder up to 90%; cereal bran or flour up to 30%; dried yeast can mix up to 10% and lactose up to 20%.
- Protein and fat are important in milk substitution.
- Protein can be provided if sufficient amount of milk powder is given. If soybean meal is added, 22-24% protein can be found.





- Single-cell proteins such as milk powder, soybean, whey, butter juice, soy products, fish protein concentrates, bacteria and yeasts can be used as protein sources such as meat meal, bone meal.
- Oil is used as oil, peanut oil, palm oil and seafood oil.
- In a good milk substitution feed the oil level should be at least 10% and should be increased up to 30% if necessary.
- High levels of fat reduce severe diarrhea and provide additional energy to the calf.
- Quality animal fats should be preferred to vegetable oils. Internal oil + coconut oil is better at 70% + 30% than 100% internal oil performance.

- In newborn calves, starch is evaluated and sucrose (sucrose) is not evaluated.
- It is mandatory to add antibiotics to MR if the source of calves from different locations is unknown. Tetracyclines stimulate growth in calves by 10-30%, and diarrhea cases decrease.
- Milk substitutes are prepared by melting 100-125 g of water in one liter of water according to the cultivation direction of the calf and the calves are fed with about 600 liters of diluted substitution in a 13 week period.



# Tablo. Example of Milk Replacement

Feed Stuffs	Amount	Feed Stuffs	I	II	III
Milk Powder	37.9 kg	Non-fat milk powder	58	50	73
Oil Mix	33.0 kg	Oil	24	30	15
Glycose	25.3 kg	Glycose	14	16	8
Mineral Mix	363 g	DCP	2.15	1.70	2
Vitamin Mix	697 g	Mineral Mix	1.20	0.36	1
DCP	1.5 kg	Vitamin Mix	0.40	0.70	0.50
Cobalt Salt	1 kg	Antibiotic	0.25	0.24	0.50
Antibiotic	250 g	Cobalt Salt	-	1	-
Property of this feed					
Dry Matter, %	94.8				
Total Oil, %	10.0				
Crude Protein %	20.9				

# Tablo. Raising Calf with Milk Replacement

Age, week	Diluted Milk, litre/day	Adding mix per litre, g
2	6-7	100-125
3-12	8	100-125
13	6-4	100-125

Calves can be fed once a day with liquid feeds after 5-7 th day without side effects.

Fresh, clean water for the calf should always be available. Milk replacement should be given at 35 C for the 5th week and 14-17 C for the elderly.

## Calves (3-6 Month):

- Weaned calf is taken into common compartments and consumes high quality ration.

When calf intake feed consumption reaches 2.3 kg / day, the calf amplification feed is started and can be given to calving.

High quality roughage feed consisting of alfalfa, vetch + grass and herbs.



- Giving green meadow grass and silage should be limited.
- Excessive intake of coarse feeds containing high levels of water should be avoided as it may limit the consumption of DM and nutrients.

Poor quality roughage should not be given until female calves are aged 4 months.

Good quality vitamin mineral should be used.

## Age of Weaning:

- Normally, breeding calves until the 16th week, young cattle in the future will be taken calves 8.-12. until the week they feed on milk.
- Calves that are weaned at an early age are given calf starter feed containing 19% protein. Healthy calves can be weaned successfully in 3-4 weeks.

- The weight gain in early weaned calves is 400-600 g per day in the first 7-8 weeks.
- However, in parallel with the increase in dry feed consumption in 12-16th weeks, the body weight gain is 900-1100 g. Thus, an average of 700-800 g is reached.



# CALF STARTER FEED

- Calf starter feeds are concentrated foods with high digestibility to calves from week 1 to week 12.
- It should not be finely ground feed in calves feeding.

Calf starting feed should contain 19% CP, 2800 ME kcal / kg.

Consumption should be limited to 1.3-1.8 kg per day.

As a general rule, animals should not be weaned without consuming the starting feed in an amount of 450 g / day.

# CALF GROWER FEED

- **Calf growth feed; At least 2600 kcal / kg ME should be supplemented with at least 17% CP, at least 2% C fat, not more than 10% C.fiber, vitamins and minerals.**
- **It is given after the twelfth week. In practice, it is used from the first week, and calves consume about 1 kg of calf growth bait at the 10th week.**

# The level of energy and nutrients that should be found in calf start and grow feed according to feed norms

Energy ve Feed Stuffs	Buzađı Bařlangıç Yemi	Buzađı Būyütme yemi
ME, kcal/kg (en az)	2800	2600
DM (en az) %	88	88
CP (en az) %	19	17
HS (en çok) %	12	12
HK (en çok) %	8	10
HCl'de çözünmeyen kül		
(en çok) %	1.0	1.0
Kalsiyum (en az-en çok) %	1.0-2.0	1.0-2.0
Fosfor (en az) %	0.6	0.6
Sodyum (en az- en çok) %	0.1-0.4	0.1-0.4
NaCl (en çok) %	0.40	0.40
Vitamin A (en az) IU/kg	5000	5000
Vitamin D3 (en az) IU/kg	600	600
Vitamin E (en az) mg/kg	25	25

(1): Buzađıların 12. hafta sonuna kadar beslenmesinde kullanılır.

(2): Buzađıların 3. aydan itibaren 6. ayın sonuna kadar beslenmesinde kullanılır.

**Calf intake feed consumption reaches 2.3 kg daily  
Or, if the calves have reached the age of 8 weeks  
(2 months) .it feeding the CALF GROWTH FEED.  
Calf growth feed; minimum 2600 kcal / kg ME, at  
least 17% CP, at least 2% CFiber, maximum 10%  
CF, vitamin, mineral supplement**

# **CALF GROWER FEED**

It is used for age of 2-5 month.

- Dry grass and dry clover must be leafy.  
Dry grass consumption is 0.5 kg until 10 weeks, 800-1000 g after 13 weeks.
- Grain-rich silages are given after the 12th week..

# **BREEDING HEIFER FEEDING**

**(6 month – Up to birth)**



- Concentrated feed application should be continued with high quality beans.
- When the feed is given as much as it can consume, the concentrate feed requirement of an animal 2 to 6 months old is 1.8-2.7 kg.
- Juice-rich foods are given in small amounts until 6 months (or 180 kg) of calves.

**Riched energetically concentrated feeds and roughage such as corn silage should not be given too much.**

**Overfeeding leads to ovarian cysts and the problem of fertility.**

## **Heifer (6-12 Month):**

- In this period, they can consume green grass and silage. Dry clover and herb mix can be given.
- They should consume 1.5-2.3 kg daily from concentrated foods such as calf growth.
- If the pasture or roughage is of poor quality, this amount should be increased to 2.7-3.6 kg.

**The greatest evil that is to overfeed it  
(Heifers).**



- If high quality roughages are provided, there will be no delay in growth.
- The nutrient content of the concentrate is adjusted according to the rough feed.
- Heifers are normally used in breeding at 14 months of age.

## Daily Live Weight Gain Levels of Calf and Heifer

Age, month	Ave. DLWG, kg	Weight gain/month, kg
4-12.	0.700	20,5
13 – 24	0.800	22,7

**Heifers should be fed to provide 700-750 g / day live weight gain.**

Every day after 12 months of age;  
Good quality roughage; 3-4 kg

If the quality of roughage is not good; 4-5 kg  
should be fed.



Fresh sugar beet leaf or its silage can be up to 10 kg provided that it is given in increasing amounts from the age of 6 months.

## Example of ration (900 g/day Live Weight Gain, 5-12. months)

	Diet 1	Diet 2	Diet 3
Good meadow silage	12 kg	7 kg	7 kg
Good corn silage	-	6 kg	6 kg
Grain	-	-	1 kg
Concentrate	2 kg	-	-

- Feeding heifers between 12 months and calving
- The nutrient requirements are mainly met by roughage of dry grass or silage.
- 1-1.5 kg of compound feed containing similar vitamins and mineral mixtures can be given daily.

- The concentrate to be given to the dill before calving provides the adaptation of the food to be consumed in the lactation period. For this purpose, 1% of the BW is recommended as concentrated food every day.
- They should be well fed in a period of 14 to 16 months.

Excessive, inadequate or unbalanced feeding of the heifer adversely affects offspring and milk yields in later periods.

- The desired growth rate in heifers from birth to 14 months is 700-750 g / day.
- 4.-14. They should gain 800 g BW per day between months.
- Thus, at the 14th month they reach a weight of 350 kg and can be used in breeding.

- The fact that growth falls below the optimum level (700 g / day) shortens the productive time in the life of the heifer is not economical.
- Heifers who are undernourished reach late into sexual maturity and show no anger. They do not reach the appropriate weight for breeding.



## Energy deficiency during growth of the heifers:

- 1) Delays in achieving optimum live weight.
- 2) It affects the normal development of the skeletal system.
- 3) The dwarves, who can not reach enough live weight, will show their first rage very late.
- 4) Debris problems arise in low weights.
- 5) Less milk is obtained in the first lactation.

- Lubrication and thus the lubrication of breast tissue;
- Heavily fed heifers which gain 1 kg / day live weight gain fat.
- Estrus duration is affected (may fall to 7th month)
- Problems arise in pregnancy,
- It adversely affects milk yield in the future.
- Lubrication leads to a 15% reduction in milk production. The duration of the animal's milk production is shortened,
- Reproductive life is reduced.
- Early onset heifers give 17% less milk than normal pregnant women.

Meadows and pastures can not meet the needs  
of young breeders alone

Breeding calves cannot consume enough green  
grass to meet nutrients requirements

After 6 years of age, mainly female concentrate  
consuming concentrated feeds start to consume  
more roughage after this age.

- **In pregnant heifers 3 months before to birth, nutrition should change.**

Feeding should be changed to 3 months to birth. Good quality dry weed should be fed as well as 2 kg per day from a concentrate diet containing at least 2500 kcal / kg ME. If it is feed only straw, concentrate feed amount should be increased to 3-4 kg.

# Feeding of advanced pregnant heifers and preparing heifers for lactation

- Between 8-6 weeks before the birth of animals "concentrated eating" are gradually accustomed. In the last month of pregnancy, quality feed should be included in the ration.
- In this period, dry matter consumption capacity is 8.5 kg.

- At 8 – 6. weeks 1 kg of concentrated feed is given.
- In the last month of pregnancy, the amount of concentrate is increased over 2 kg and vitamin and mineral needs are applied as 150 g / day.

Good quality hay and 4-5 kg per day  
Heifer Feed (1% of live weight)

If only straw is available, 5-6 kg Heifer Feed  
should be given.



**3 weeks to birth must be  
prepared and given preparation  
for milk-feed**

# BULL FEEDING

- The male calves devoted to breeding reach approximately 150 kg BW after 16 weeks of milk absorption.
- The average CAA (daily live weight gain= DBWG) per day during the growth period is 1100-1200 g.
- The level of nutrition applied affects the breeding power and duration significantly. Intensive nutrition reaches sexual maturity earlier than those fed low.
- As a general rule, although young male cattle show anger at the age of 1, they are not used for breeding before the age of 1.5.

- Breeding male calves in the first 4-5 months of their life is the same as the female calves. At 4 months of age, they are separated from the females and fed into the feeding program.
- The need for other nutrients, especially energy, is high as they show a faster growth than females.
- Under normal feeding program delays the onset of puberty and leads to poor quality semen production. Concentrate to be given in free amounts and additionally, good quality dry grass should be given to young bulls.
- About 10 months of age, a large part of the ration of pasture, silage, green fodder or dry grass can create.
- Concentrated feed is continued by adhering to the quality of rough feed. However, giving too much concentrate to feed will cause fatigue.

- If an elderly or adult Bull is given roughage such as high-quality legumes or grasses, the protein content of the concentrated feed mixture can be kept at about 12%. For each 100 kg of bull, 0.5 kg of dry hay and 0.5 kg of concentrated feed per day is recommended.
- According to this, 9 kg of grass and 4.5 kg of concentrated feed are given to a bull weighing 900 kg. So the body condition of the bull can be corrected. Mature bulls should be avoided without excessive lubrication. Because this situation destroys their sexual vitality, it causes various stresses.
- Calcium in the old bulls is particularly problematic. For this reason, when mixed with leguminous feed, concentrated Ca mix Ca should not be added. Excess calcium causes osteomalacia, urealitiasis and leads to P insufficiency.

- Rats of adult bulls can be given 4 kg / 100 kg BW silage.
- A bull does not need as high as the cow with high milk yield.
- Increasing the amount of protein in the ration, enriched in mineral matter and vitamins were observed to increase the quality of semen. Wheat bran, peas, flaxseed meal, fish and meat flour, skimmed milk, eggs, yellow corn, carrots have a positive effect.

- During the resting period, during which the male breeders do not overheat, the feeding period and the feeding period should be different.
- Male breeders fed with normal rations during the rest period are fed into the overcurrent condition with a regular feeding program by gradually changing the variety and amount of the feed ingredients 1-1.5 months before the season.
- It should also be programmed in good practice. Good feeding and training prevent lubrication of male breeder; ensures that they are healthy, vibrant and highly efficient. There is a close relationship between the sperm yield and the feeding of the bulls.

- Feed for male breeder rations;
  - 1- Have high digestibility,
  - 2- Large amounts of juicy and roughage should not be added to the ration.
  - 3- The quality of the dry grass to be rational should be very good and the herb variety should be at least 2.



- Some amino acids have a special effect on insemination.
- It was determined that sperm decreased in the bulls fed with inadequate rations and tryptophan deficiency caused infertility and lysine plays a positive role in sperm synthesis.

Protein requirements vary according to the number of bulls. If a bull exceeds once a day, 80-100 g per 100 kg BW requires 100-140 g CP if it overruns twice.

It is of great importance in bull rations. If energy is not sufficient, testosterone synthesis decreases and sexual activity decreases accordingly.

- K, Ca, P, Mn are important in increasing the insemination power of semen. In carotene, Vit A deficiency, the concentration of sperm decreases and the number of abnormal semen becomes pathological. Sperm movements slows down. Degeneration occurs in the testicle epidermis cells. As a result, infertility may occur.
- The daily carotene requirement of a bull is about 100 mg. 1-2 kg of carrot is given to try to meet the need for carotene.
- Oat is used in concentrate feeds to be used in 50% of the content, linseed meal, soybean meal, wheat bran, such as the amount and quality of the sperman positively affecting substances are included.
- Animal proteins have a positive effect on the desire for overgrowth and the seeding power of sperm. For example, 250 g of fish flour per day, 2-3 kg of skimmed milk powder is appropriate. Fish flour should be produced according to fresh and technically.

In the winter, 1.5-2.0 kg grain feed + 0.5 kg oil seed meal should be consumed with dry clover. According to the activity during the seeding season, the amount of grain feed and pulp is increased by 25-50%.

The young breeder is given to males up to 15 months of age and 1/2 of them is given as 2.5-3% of the live weight per day. From now on, it is sufficient to give the majority (50-70%) of the roughage up to the age of 3 to 2-2.5% of the BW. Adult bulls consume up to 1.5% of the BW feed. The whole given feed can be good quality roughage.

A neglected dirty skin reduces the bull's strength. The bull should be given twice a year for nail care and cleaning.

- Effect of nutrition on fertility
- Endocrine organs can be damaged as a result of feeding the animals both below and below normal. Treatment of this condition is not possible later. As a result of prolonged overfeeding;
- animal matures very early
- adjective
- excessive lubrication causes anger to be very weak
- intensive feeding shortens the yield period of the animal.

İYİ GÜNLER .....

Happy days.....