Kanatlı Beslemede Yemler Yönetim ve Değerlendirme Stratejileri

2017-2018

ZZT424-Kanatlı Hayvan Besleme Ders Notları

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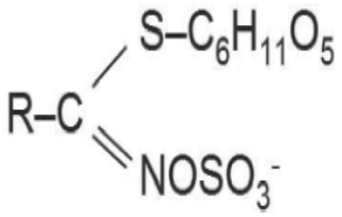
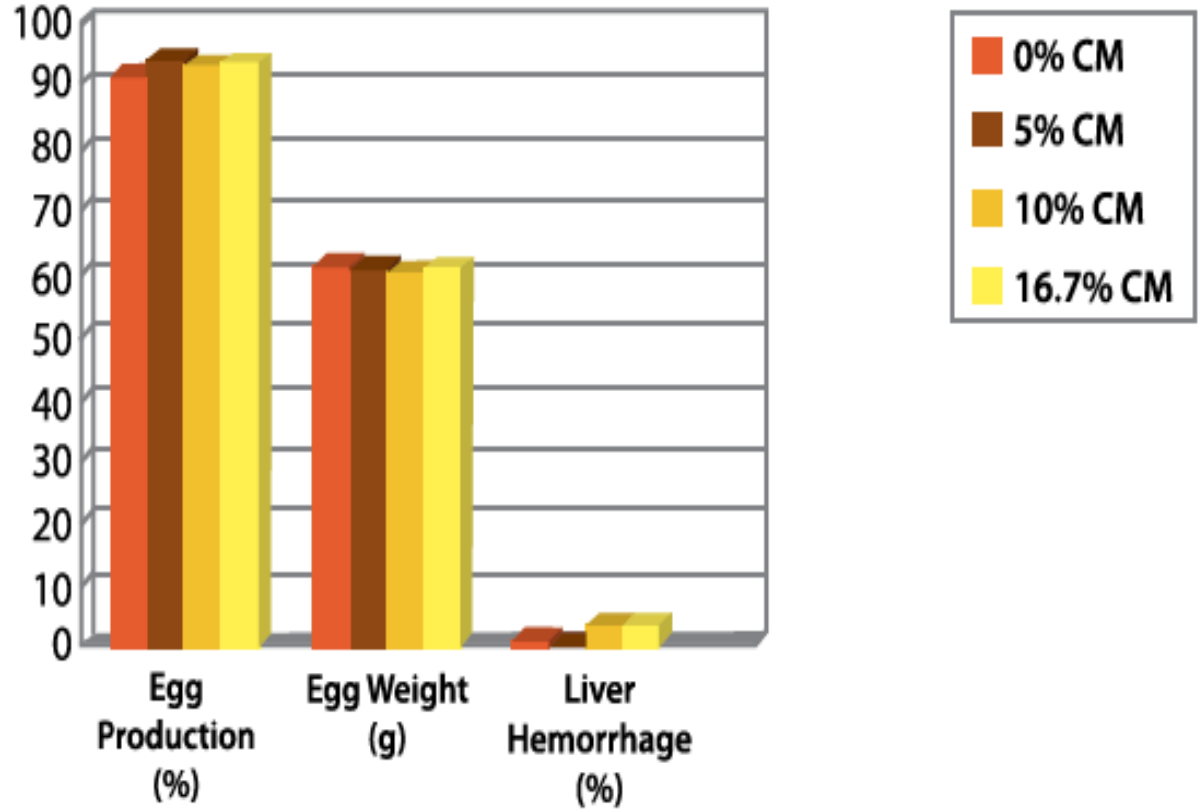
Kanola Küspesi-Kanatlı Besleme Açısından Özellikleri



- Glukozinolatlar (Glukonapin, glukobrassikanapin, glukobrassisin, 4-hi
- Glukozinolat kendisi toksik değil;Mirosi hidroliz ettiğinde:izotiyonat, goitrin, nitril, tiyosiyonat oluşur. Bu ürünler tiroid bezi ve karaciğer hasarı yapar. Performans olumsuz etkilenir.
- Mirosinaz enzimi kanola tohumunda bulunur ve kör bağırsak bakterileri tarafından da üretilir.
- Enzim sıcaklıkla ve küspe elde esnasında çoğunlukla tahrip olur

- Glukosinolatlar yumurta tavukları için daha çok toksiktir.
- $4\ \mu mol$ **Üzerine çıkmaması gerekir. BU durumda Broyler yemlerine % 20 katılabilir**

Figure 1. EFFECT OF FEEDING CANOLA MEAL (CM) TO LAYING HENS ON EGG PRODUCTION, EGG WEIGHT AND MORTALITY FROM LIVER HEMORRHAGE (AVERAGE OVER 40 WEEKS OF PRODUCTION- CLASSEN 2008, UNPUBLISHED DATA)



Kanola Küspesi- Tanen İçeriği

- **Kompleks polifenolik bileşiklerdir ve tohuma koyu-kahverengi renk verir.**
- **Acı lezzettedirler ve barsakta protein ve sindirim enzimleri ile kompleks oluşturup sindirilebilirliği azaltırlar.**
- **Endojen amino asit kaybı özellikle (metiyonin, histidin ve lisin olumsuz etkilenir. Suda çözünebilir tanik asitler temel nedendir.**

Kanola Küspesi- Sinapin İçeriği

- Sipanik asitin kolin esteridir ve % 1-1,5 kadar bulunur. Acı tat verir
- **Kahvarengi yumurta tavuklarında balık kokusuna neden olur.** Sinapin trimetilamin e dönüştüğünde koku oluşur. Bazı kahverengi hatlarda trimetilamin oksidaz enzimi olmadığı için dikkatli olmak gerekir. Kahverengi Broyler damızlıklar etkilenmez.
- Trimetilamin mikroorganizmalar tarafından kolin den de sentezlenir.
- Yem tüketiminde azalma ve ve küçük yumurta

Kanola Küspesi- Fitik Asit ve Sülfür Fazlalığı

- Kanola Küspesinin Fitik asit içeriği de soya ile karşılaştırıldığında daha yüksektir. **Soya da toplam fosforun %60 ı iken kanolada %66 ya kadar çıkıyor.**
- %1.4 kadar sülfür içeriyor. Soya 0.44. Yüksek sülfür Ca ile bağlanıp sindirimini azaltır.
- Dolayısı ile bacak kusurlarına da yol açabiliyor
- Sinir sisteminde oksidatif mekanizmayı bozar ve merkezi sinir sistemi hastalıklarına(poliensafomalezya) yol açar

Kanola Küspesi- Elektrolit Dengesi

- **Kanola küspesi soya küspesine göre daha az K içerir (11.4 e 19.6 g/kg).** Daha az Na içerir.
- Elektrolit dengesi kanatlılar için kritiktir. Broyler piliçler için 250 idealdir.

Table 2. Mineral content of canola meal and soybean meal (10% moisture basis)

Mineral	Canola meal[1]	Soybean meal[2]
Ca (%)	0.67	0.33
P (%)	1.02	0.66
Na (%)	0.08	0.01
Cl (%)	0.10	0.05
K (%)	1.17	2.00
S (%)	0.65	0.44
Mg (%)	0.56	0.28
Electrolyte balance (mEq/kg) Na + K – Cl	307	504
Dietary cation-anion difference (mEq/kg) (Na + K) – (Cl + S)	103	366

[1]Average values calculated from Bell and Keith (1991); Newkirk (2009); Rogiewicz et al. (2012).

Kanola Küspesinin Broyler Damızlıklarda Döllenme, Kuluçka Randımanı ve Civciv Kalitesine Etkisi

Table 2. EFFECT OF CANOLA MEAL IN BREEDER DIETS ON EGG FERTILITY AND HATCHABILITY AND CHICK QUALITY*

Measurement	Control	Canola 5%	Canola 10%
Egg production, %	79.5	79.8	80.3
Egg weight, g	58.9	58.2	57.7
Fertility, %	95.9	94.4	94.0
Hatchability, %	86.8	88.8	87.8
Live chicks/365 d	242	244	242
Chick weight, g	40.1	38.5	37.5
Thyroid wt, mg/100g BW	7.53	8.30	8.97

Kanola Küspesi Amino Asit Sindirilebilirliği

Amino Acid	Broiler chicken apparent ileal digestibility (%) [2]	Turkey apparent ileal digestibility (%)[3]	Duck apparent ileal digestibility (%)[3]
Alanine	79	75	66
Arginine	86	79	71
Aspartate + asparagine	75	72	60
Cystine	74	67	67
Glutamate + glutamine	82	86	81
Glycine	73	72	59
Histidine	84		
Isoleucine	72	75	65
Leucine	76	79	73
Lysine	78	76	66
Methionine	79	86	80
Phenylalanine	81	75	73
Proline	75	n/a	n/a
Serine	71	74	70
Threonine	69	73	64
Tryptophan	78[4]	n/a	n/a
Tyrosine	58[5]	n/a	n/a

Kanola Küspesi
Enerji İçeriği

Table 7. AVAILABLE ENERGY VALUES FOR CANOLA MEAL (12% MOISTURE BASIS)

Animal		Average value
Broiler Chickens*	AMEn (kcal/kg)	2000
	TMEn (kcal/kg)	2070
Laying Hens**	AMEn (kcal/kg)	2390

Soya Küspesine Göre Daha Düşük Amino Asit Sindirilebilirliği

Table 1. POULTRY TRUE DIGESTIBILITY COEFFICIENTS OF SOME KEY ESSENTIAL AMINO ACIDS IN CANOLA MEAL AND SOYBEAN MEAL

Amino Acid	Canola meal digestibility (%)	Soybean meal digestibility (%)
Lysine*	0.79	0.90
Methionine*	0.92	0.93
Cystine**	0.82	0.82
Threonine*	0.71	0.81
Tryptophan***	0.78	0.84

Kanola Küspesi Optimum Kullanım Oranları

Kanatlı Hayvan Türü	Maksimum Kullanım,%	Maksimum Sınırlama Nedeni
Broyler Başlatma	10	-
Broyler Büyütme	20	Enerji Düzeyi
Hindi Büyütme	30	-
Yumurta Tavuğı	10	Ölüm oranını artırması
Damızlık	5	Küçük yumurta ve düşük civciv ağırlığı
Ördek-Kaz	15	

Soya Flaklerini Otoklavlamanın Civciv Performansı, Yem Dönüşümü, KOH Protein Çözünebilirliği, Üreaz indeksi, PDI(Protein Dağılabilirlik İndeksi), ve Tripsin İnhibitör İçeriğine Etkisi .(Batal ve ark., 2000)

Otoklav Süresi	Canlı Apırlık,g	Ağırlık Kazancı:Yem	KOH Çözünebilirliği*	Üreaz İndeksi (pH değişimi)	PDI*,%	Tripsin inhibitör, u/g
0	178	0,578	97	2,4	76	44,2
6	180	0,557	93	2,2	63	31
12	189	0,599	93	2,1	63	26,8
18	204	0,671	94	1,8	47	12,3
24	207	0,685	81	0,2	30	3,4
30	205	0,678	81	0,3	32	4,5
36	210	0,682	78	0,1	24	2,6
SBM	210	0,693	-	-	-	
SEM	3		1			2,1

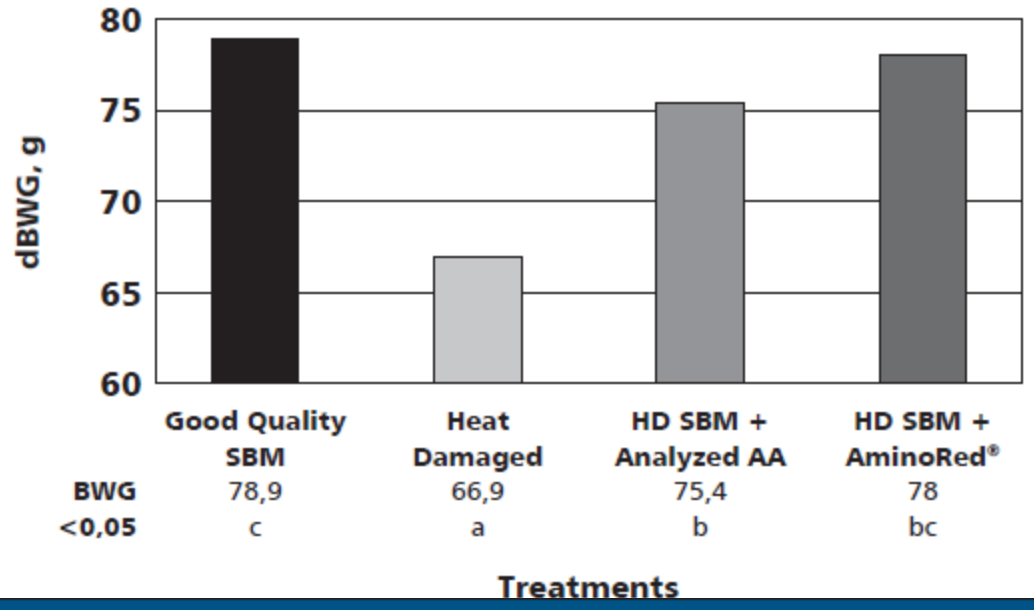
PDI:30 civarı ideal, 45 üzeri yetersiz işleme ve 10 altı aşırı pişirmeyi ifade eder.

KOH:70 in altı değerler aşırı pişirmeye işarettir

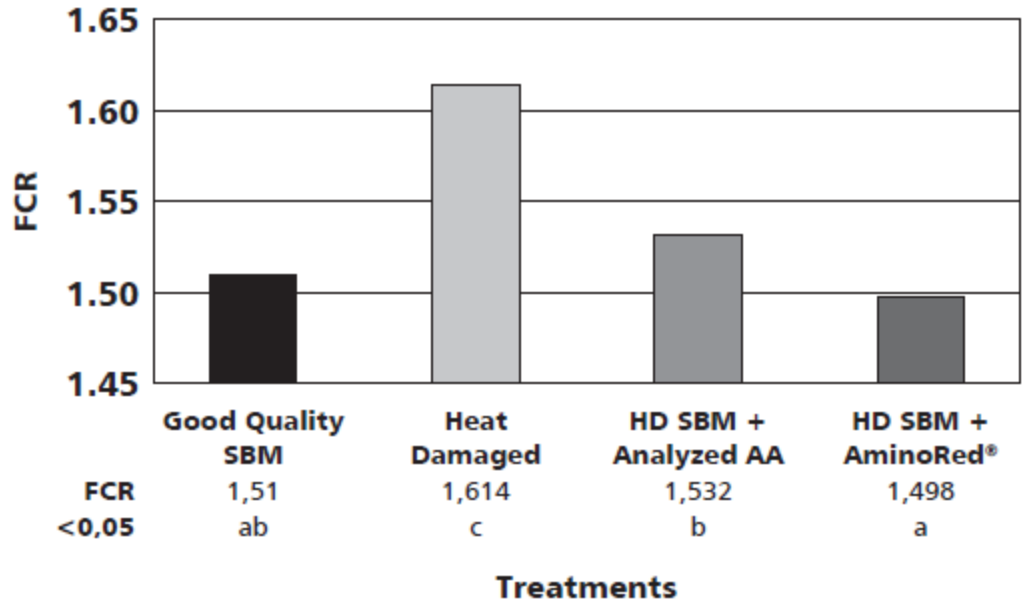
Soya Küspesini Sıcaklıkla Muamelesinin Kanatlılarda Amino Asit Sindirilebilirliğine Etkisi(Parson ve ark.,1992)

Otoklavlama Süresi(dakika)	Amino Asit İçeriği,%			
	Lizin	Sistin	Metionin	Treonin
0	3,27	0,70	0,71	1,89
20	2,95	0,66	0,71	1,92
40	2,76	0,63	0,70	1,87
Sindirilebilirlik,%				
0	91	82	86	84
20	78	69	86	86
40	69	62	83	80
Sindirilebilir Amino Asit İçeriği				
0	2,98	0,57	0,61	1,59
20	2,30	0,46	0,61	1,65
40	1,90	0,39	0,59	1,50

German Trial: Daily bodyweight gain



German Trial: Feed conversion ratio



Enerji Kaynağı Tahıllar ve Kanatlı Beslemede Kullanımında Önemli Hususlar

Mısır-Corn
Kanatlı Beslemede Dikkate Edilecek Özellikleri

The energy value of corn is contributed by the starchy endosperm, which is composed mainly of amylopectin, and the germ, which contains most of the oil. Most corn samples contain 3 – 4% oil, although newer varieties are now available which contain up to 6 – 8% oil, and so contribute proportionally more energy. These high-oil corn varieties also contain 2 – 3% more protein, and proportionally more essential amino acids. The protein in corn is mainly as prolamin (zein) and as such, its amino acid profile is not ideal for poultry. This balance of amino acids, and their availability, must be seriously considered when low protein diets are formulated, because under these conditions the corn prolamin can contribute up to 50 – 60% of the diet protein. Corn is also quite high in the yellow/orange pigments, usually containing around 5 ppm xanthophylls and 0.5 ppm carotenes. These pigments ensure that corn-fed

Depending upon the growing season and storage conditions, molds and associated mycotoxins can be a problem. Aflatoxin contamination is common with insect damaged corn grown in hot humid areas, and there is little that can be done to rectify the horrendous consequences of high levels of this mycotoxin. There is an indication

blending and mixing. Zearalenone is another mycotoxin that periodically occurs in corn. Because the toxin ties up vitamin D_3, skeletal and eggshell problems can occur. With moderate levels of contamination, water-soluble D_3 via the drinking water has proven beneficial.

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Table 2.1 Corn maturity and energy value

Corn description	*Moisture at harvest (%)*	*100 kernel wt at 10% moisture (g)*	*AMEn (kcal/kg) at 85% dry matter*
Very immature	53	17	3014
Immature	45	22	3102
Immature	39	24	3155
Mature	31	26	3313

Damaged kernels and foreign material are going to reduce the economic value of corn. However, Dale and co-workers at Georgia suggest the energy value of these contaminants is little different from whole corn. Broken kernels were just 200 kcal/kg lower than the AMEn of corn, while foreign material tested 600 kcal/kg lower than corn. Therefore having #4 grade corn with 10% damaged kernels and 5% foreign material vs 5% and 3% respectively for #2 grade, relates to a reduction of just 25 kcal/kg for this #4 vs #2 grade corn.

lower digestibility values. Corn presents some problems to the manufacture of pelleted diets, and often good pellet durability in diets containing 30% corn can only be obtained by inclusion of pellet-binders.

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Mısır-Besin Maddesi Özellikleri

Nutrient Profile: (%)

Dry Matter	*85.0*	*Methionine*	*0.20*
Crude Protein	*8.5*	*Methionine + Cystine*	*0.31*
Metabolizable Energy:		*Lysine*	*0.20*
(kcal/kg)	*3330*	*Tryptophan*	*0.10*
(MJ/kg)	*13.80*	*Threonine*	*0.41*
Calcium	*0.01*	*Arginine*	*0.39*
Av. Phosphorus	*0.13*		
Sodium	*0.05*	*Dig Methionine*	*0.18*
Chloride	*0.05*	*Dig Meth + Cys*	*0.27*
Potassium	*0.38*	*Dig Lysine*	*0.16*
Selenium (ppm)	*0.04*	*Dig Tryptophan*	*0.07*
Fat	*3.8*	*Dig Threonine*	*0.33*
Linoleic acid	*1.9*	*Dig Arginine*	*0.35*
Crude Fiber	*2.5*		

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Kanatlı Rasyonlarında Kullanım Oranı ve Kısıtlamalar

Formulation Constraints:

Bird age	*Min.*	*Max.*	*Comments*
0-4 wk	-	*60%*	*Usually no problems with upper limits. From 0-7d, birds may not digest as well as adult birds.*
4-18 wk	-	*70%*	
Adult layer	-	*70%*	*Higher levels cause more problems with pellet durability.*

QA Schedule:

Moisture	*CP*	*Fat*	*Ca/P*	*AA's*	*Other*
All deliveries	*Wkly*	*6 mos*	*12 mos*	*12 mos*	*Molds – mycotoxins, AME,12 mos*[1]

[1] *Assay to be conducted within 30 d of yearly harvest.*

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Buğday-Wheat

main criterion is whether wheat is soft or hard, because this will have an effect on composition, and especially on protein. Because of developments in plant breeding, the seed color and time of planting can now be more variable. Hard wheats have a greater proportion of protein associated with the starch and so contain more protein that is also higher in lysine. The proteins in hard wheat are useful in bread making, while the soft wheats are more useful in manufacture of cookies and

The composition of wheat is usually more variable than that of other cereals. Even within the hard wheats, protein level can vary from 10 to 18%, and this may relate to varietal differences and variance in growing conditions. Most hard wheats will not have to be dried after harvest, although drying conditions and moisture

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content compared to corn, and provide only slightly less energy, there are some potential problems from feeding much more than 30% in a diet, especially for young birds. Wheat contains about 5 – 8% of pentosans, which can cause problems with digesta viscosity, leading to reduced overall diet digestibility and also wet manure. The major pentosan components are arabinoxylans, which are linked to other cell wall constituents, and these are able to adsorb up to 10 times their weight in water. Unfortunately, birds do not produce adequate quantities of xylanase enzymes, and so these polymers increase the viscosity of the digesta. The 10 - 15% reduction in ME of wheats seen with most young birds (<10 d age) likely relates to their inability to handle these pentosans. Variability in pentosan content of wheats *per se* likely accounts for most of the variability of results seen in wheat feeding studies, together with our inability to predict feeding value based on simple proximate analyses. These adverse effects on digesta viscosity seem to decrease with increased storage time for wheats. Problems with digesta viscosity can be controlled to some extent by limiting the quantity of wheat used, especially for young birds, and/or by using exogenous xylanase enzymes (see Section 2.3 g).

during pelleting. Compared to corn, wheat is also very low in levels of available biotin. Whereas it is sometimes difficult to induce signs of biotin deficiency in birds fed corn diets devoid of synthetic biotin, problems soon develop if wheat is the major cereal. While newly hatched chicks have liver biotin levels of around 3,000 ng/g, this number declines to 600 ng/g within 14 d in the wheat fed bird. Adding just 50 µg biotin/kg diet almost doubles the liver biotin reserve, while adding 300 µg/kg brings levels back to that seen in the day-old chick. There is also concern that wheat causes a higher incidence of necrotic enteritis in broiler chicks. It seems as though wheat provides a more suitable medium for the proliferation of certain pathogenic bacteria. The problem is most severe when wheat is finely ground, and incidence of necrotic enteritis can be tempered by grinding wheat through a roller mill rather than a hammer mill. Fine grinding of wheat can also cause beak impaction in young birds. The proteins in wheat tend to be 'sticky', and so adhere to the beak and mouth lining of the bird. Severe beak impaction tends to reduce feeding activity, increase feed deposited in open bell drinkers, and provides a medium in the mouth region that is ideal for bacterial and fungal growth. These problems can be resol

Wheats also contain α-amylase inhibitors.

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Using wheat in diets for meat birds does however improve pellet durability. The same proteins that enhance the baking characteristics of hard wheats, also help to bind ingredients during pelleting. Adding □ 25% wheat to a diet has the same effect as including a pellet binder in diets that are difficult to pellet.

One advantage of wheat, is that it can be fed as whole grain to birds after 10 – 14 d of age. Offering whole wheat and a balancer feed with adequate minerals and vitamins provides a very economical way for farmers to utilize home-grown wheat. In recent studies we offered broilers a conventional three diet program, or after 7 d of

Table 2.3 Broiler performance with free-choice wheat

Diet	*Body Wt 49d (g)*	*Feed:Gain*	*Protein Intake (g/kg Bwt)*	*Energy Intake (kcal/kg Bwt)*	*Carcass Wt (g)*
Control	*3030*	*1.93*	*370*	*6044*	*2230[b]*
Free-choice wheat	*2920*	*1.99*	*364*	*6106*	*2135[a]*

broilers is greater control over coccidiosis. Whole wheat feeding stimulates gizzard and gastric motility and the enhanced activity within this acidic environment is thought to reduce oocyte viability.

Nutrient Profile: (%)

Dry Matter	*87.0*	*Methionine*	*0.20*
Crude Protein	*12 - 15*	*Methionine + Cystine*	*0.41*
Metabolizable Energy:		*Lysine*	*0.49*
(kcal/kg)	*3150*	*Tryptophan*	*0.21*
(MJ/kg)	*13.18*	*Threonine*	*0.42*
Calcium	*0.05*	*Arginine*	*0.72*
Av. Phosphorus	*0.20*		
Sodium	*0.09*	*Dig Methionine*	*0.16*
Chloride	*0.08*	*Dig Meth + Cys*	*0.33*
Potassium	*0.52*	*Dig Lysine*	*0.40*
Selenium (ppm)	*0.50*	*Dig Tryptophan*	*0.17*
Fat	*1.5*	*Dig Threonine*	*0.32*
Linoleic acid	*0.50*	*Dig Arginine*	*0.56*
Crude Fiber	*2.70*		

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Buğday Kullanımında Dikkate Edilecek Noktalar ve Kısıtlamalar

Formulation Constraints:

Bird age	*Min.*	*Max.*	*Comments*
0-4 wk	*15%*	*20 (40)[1]%*	*Minimum constraint used if improved pellet quality desired.*
4-18 wk	*15%*	*25 (50)%*	
Adult layer	*15%*	*25 (60)%*	*Maximum value in parenthesis if a synthetic xylanase used.*

[1] *Higher inclusion level with enzymes.*

QA Schedule:

Moisture	*CP*	*Fat*	*Ca/P*	*AA's*	*Other*
All deliveries	*Wkly*	*6 mos*	*12 mos*	*12 mos*	*Xylan, AME each 12 mos[1]*

[1] *Assay to be conducted within 30 d of yearly harvest.*

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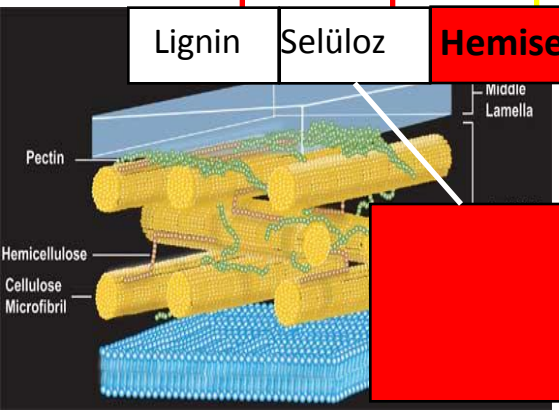
Hayvan Yemlerinde Bulunan Nişasta Olmayan Polisakkaritler (NSP)

Hayvan Yemi

Su | Kül | Yağ | Protein | Karbonhidratlar

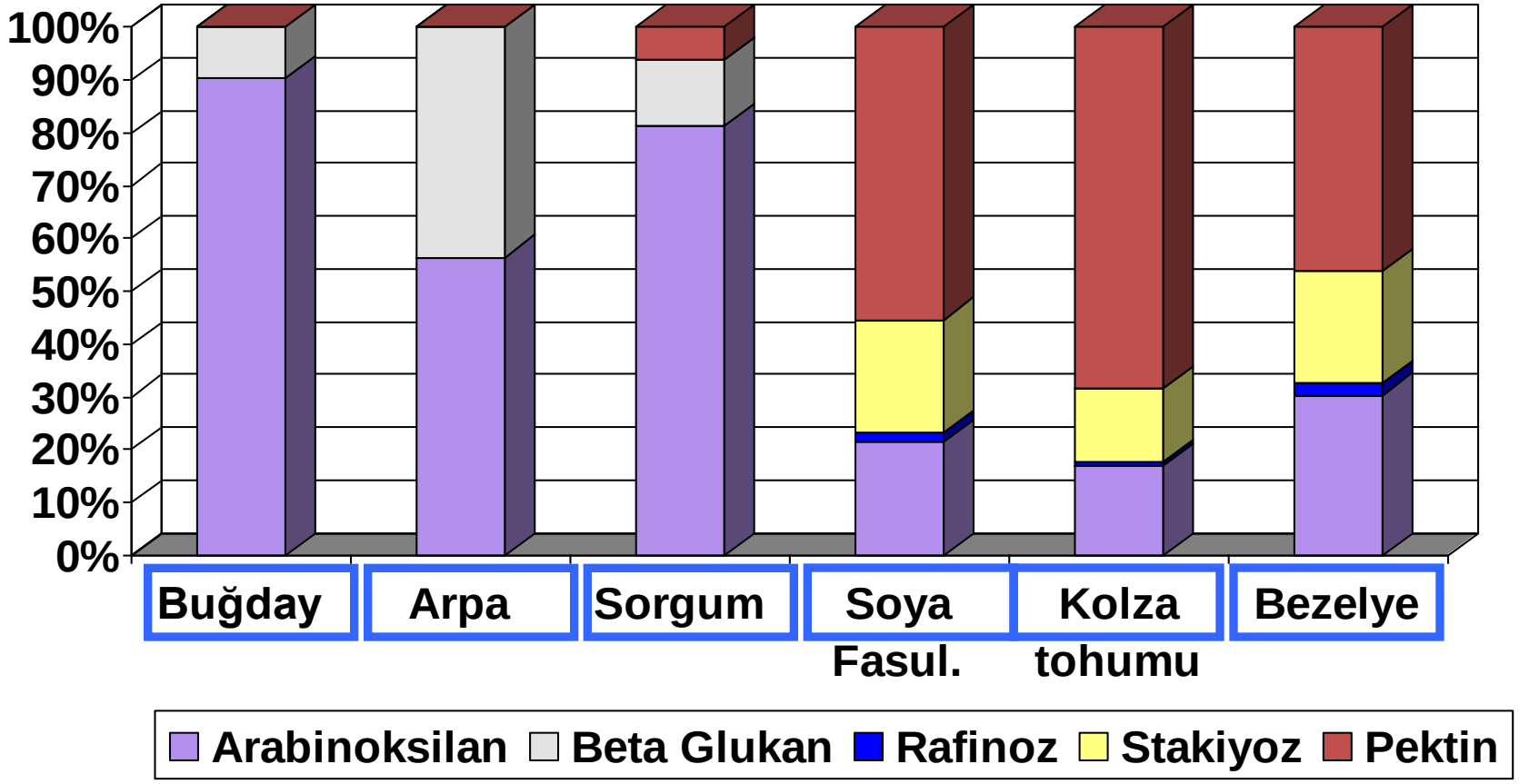
Ham selüloz | Diğer Karbonhidratlar

Lignin | Selüloz | **Hemiselüloz** | β-glukan | Pektin | Oligosakkarit | Nişasta | Monosakaridler



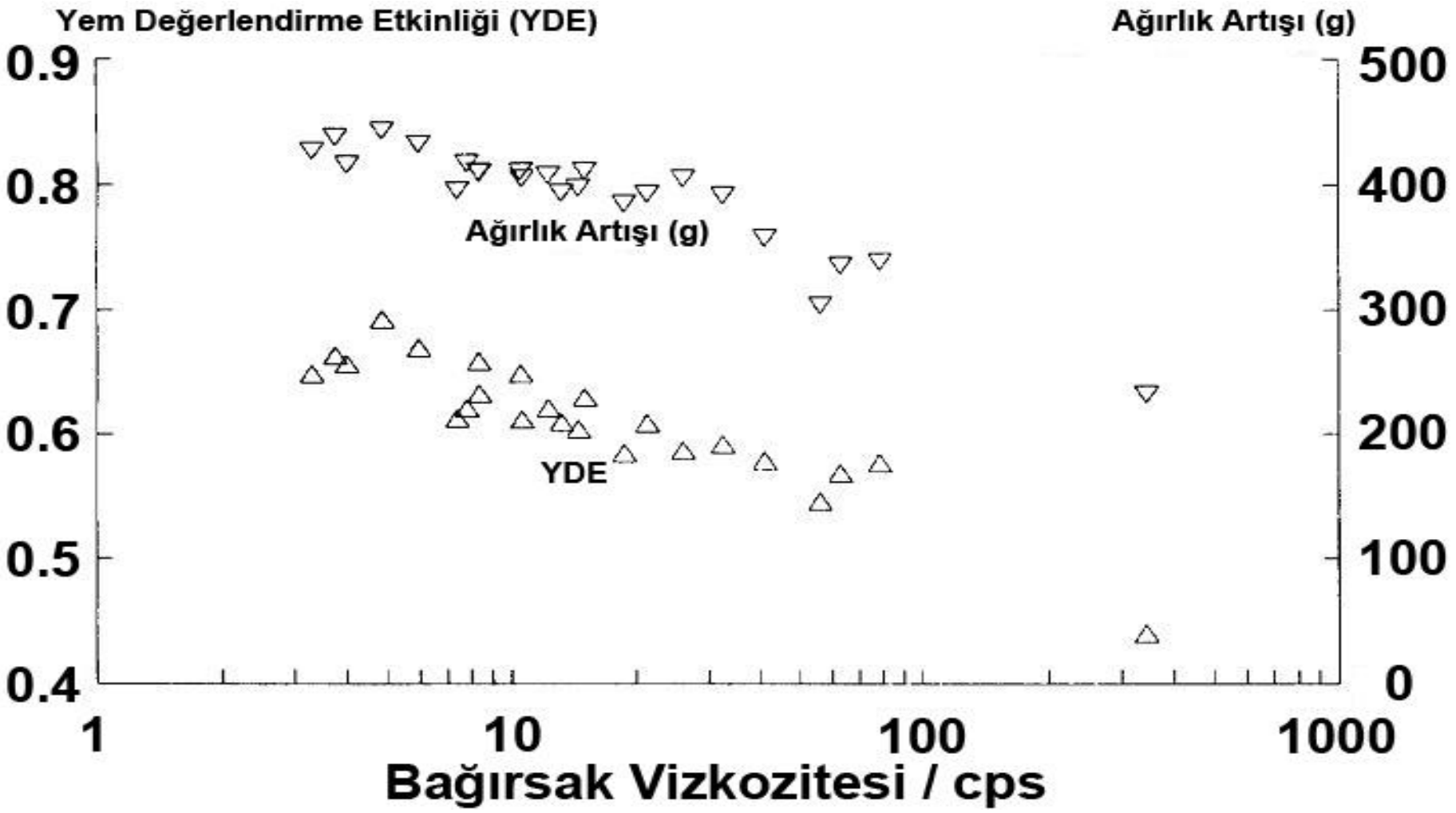
Nişasta Olmayan Polisakkaritler (NSP)

N.S.P.- Fraksiyonu
Tahıllar & Bitkisel Protein Kaynakları



Kaynak: FEFANA Enzim/mikroorganizma hakkında eğitim kitapçığı (1995 yılında Avrupa komisyonuna sunulan)

Vizkozite Artışının Performansa Etkisi



NSP İçeriği ile İlişkili Olarak Tahıllarda Besin Sindirilebilirliği

Tahıl Besin Bileşenlerinin Sindirilebilirlikleri, %

Bileşen	Arpa	Mısır	Yulaf	Buğday
Yağ	9.25±1.2	94.9±0.7	95.0±0.5	92.5±0.8
Protein	83.5±1.3	82.2±2.0	85.0±1.9	84.7±1.5
Organik Madde	77.4±0.2	88.5±0.9	63.8±1.1	83.9±1.0
Toplam Karbonhidrat	73.0	87.2	52.1	81.1
Yararlanılabilir Karbonhidrat	53.7	65.9	36.4	61.2

[A]McNab and Shannon [1]

Çözünebilir ve çözünmeyen NSP lerin sindirim sisteminin ön bölümündeki etkileri

(Choct, 2002)

	Soluble NSP	Insoluble NSP
Water-holding capacity / viscosity	++	+
Gastrointestinal motility	-	+
Digesta transit time	+	-
Nutrient digestion	-	+
Bacterial growth substrate	++	+

+: Artırmaktadır

-: Düşürmektedir