

# Amino Acids

## SOURCES

*National Research Council (U.S.). Subcommittee on Underutilized Resources as Animal Feedstuffs. Underutilized Resources as Animal Feedstuffs. National Academy Press, Washington, D.C. 1983.*

*National Research Council (U.S.). Subcommittee on Feed Composition. United States - Canadian Tables of Feed Composition, Third revision. National Academy Press, Washington, D.C. 1982.*



**Agricultural Utilization Research Institute**

1501 State Street  
Marshall, MN 56258

Ph: 507.537.7440

Fax: 507.537.7441

[www.auri.org](http://www.auri.org)



## Introduction

With the fluctuating cost of soybean meal and synthetic lysine, many producers are faced with looking for cost effective alternatives for this limiting amino acid in livestock diets. This brochure provides an easily accessible comparison list for lysine and methionine levels found in various Minnesota agricultural products and co-products that potentially could be used as a feed supplement. Dry matter results are listed in the tables because this is one of the factors that regulate the total feed intake. The feedstocks are separated into three categories: Industrial Food Processing Waste, Non-Food Industrial Waste, and Crop Residues. For each feedstock, values are listed for crude protein, lysine, methionine, crude fiber, acid detergent fiber, and neutral detergent fiber.

It is important to note that although the information may offer options to consider while formulating livestock rations, feedstuffs vary in their composition. Actual analysis should be conducted on the feed material prior to introduction to livestock feeds. Therefore, it is strongly recommended to work with a nutritionist to finalize the balance of any livestock ration.

## Limiting Amino Acids

Limiting amino acids are the essential amino acids found in the smallest quantity in the feeding material. With regard to livestock diets, methionine and lysine are frequently the first or second limiting amino acids. Shortage of these could lead to reduced feed efficiency, slowed animal growth, and/or poor animal health. Mixing feedstuffs that have different weaknesses in their essential amino acids composition can lead to more successful livestock production.



## INDUSTRIAL FOOD PROCESSING WASTES

Feedstock	Crude Protein	Lysine	Methionine	Crude Fiber(%)	ADF(%)	NDFck
Navy Beans	25.3	1.44	0.28	5	—	—
Carrots	9.9	1.27	0.59	—	—	—
Sweet Corn (Cannery Waste)	7.7	0.19	0.12	52	34	55
Pea Waste	13.1	—	—	29.8	49	59
Potato Waste	8.9	0.45	0.11	7.3	—	—
Grape Pomace	13	0.55	0.2	31.9	54	55
Dairy Whey	14.2	1	0.2	0.2	—	—
Casein	92.7	7.88	3.1	0.2	—	—
Bakery Waste	10.7	0.34	0.91	1.3	13	187

## NON-FOOD INDUSTRIAL WASTE

Feedstock	Crude Protein	Lysine	Methionine	Crude Fiber	ADF	NDF
Canola Meal (40% Sol.)	44	2.25	0.82	10.1	18	36
Corn Distillers Grains	29.8	0.84	0.43	12.1	17	43
Corn DDGS w/Solubles	29.5	0.91	0.56	9.9	18	44
Corn Gluten Feed	25.6	0.25	0.17	9.7	12	45
Corn Gluten Meal	67.2	0.64	0.37	2.2	5	14
Corn Silage	8.3	0.43	0.44	23.7	28	51
Soybean Hulls	12.1	0.7	0.13	40.1	50	47
Soybean Meal (44%)	49.9	2.99	0.58	7	10	23
Wheat Middlings (mill run <9% fiber)	17.2	0.64	0.37	8.2	10	37
Sugar Beet Pulp w/Molasses	10.1	0.65	0.01	19.8	33	54
Blood Meal (Flash)	93.3	8.21	1.03	1.1	—	—
Meat with Bone Meal	54.1	3.11	0.7	2.4	—	—
Feather Meal	91.3	2.49	0.59			
Oat Hulls	3.9	0.19	0.09	33.4	42	78

## CROP RESIDUES

Feedstock	Crude Protein	Lysine	Methionine	Crude Fiber	ADF	NDF
Corn Stover	5.9	0.12	0.17	34.3	39	67
Soybean Straw	5.6			44.3	56.8	77.9