

PROTEIN FUNCTION



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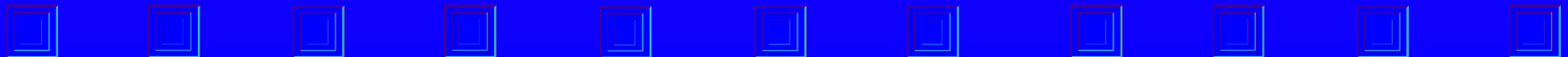
Protein Functionality

- Nutrition
 - Metabolic functionality
- Foods
 - Processing
 - Consumption



Protein Intake Requirements

- Adult males 56 grams/day
- Adult females 46 grams/day
- Pregnant women 52 grams/day
- Infants 14 grams/day
- Young children 15 grams/day



Protein Quality

- PDCAAS

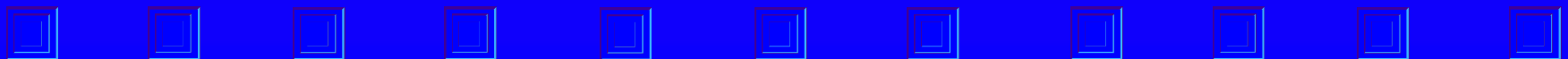
- PDC - Protein Digestibility Corrected

- AAS - Amino Acid Score



PDCAAS of Some Proteins

■ Egg White	1	
■ Milk		1
■ Beef		0.92
■ Soy		0.91
■ Beans	0.68	
■ Whole wheat	0.54	
■ Lentils	0.52	
■ Gluten	0.25	



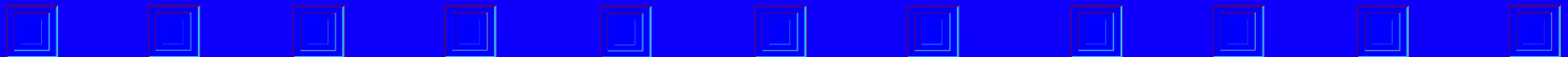
Essential Amino Acids

- Phenylalanine + Tyrosine
- Leucine
- Isoleucine
- Valine
- Methionine + Cysteine
- Lysine
- Threonine
- Tryptophan

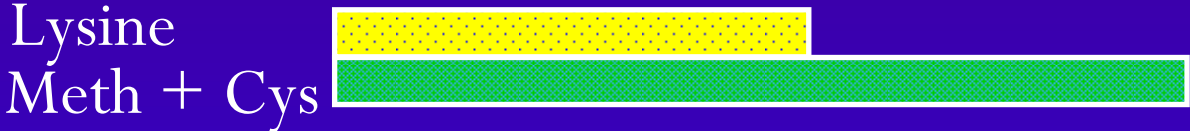


Limiting Amino Acids

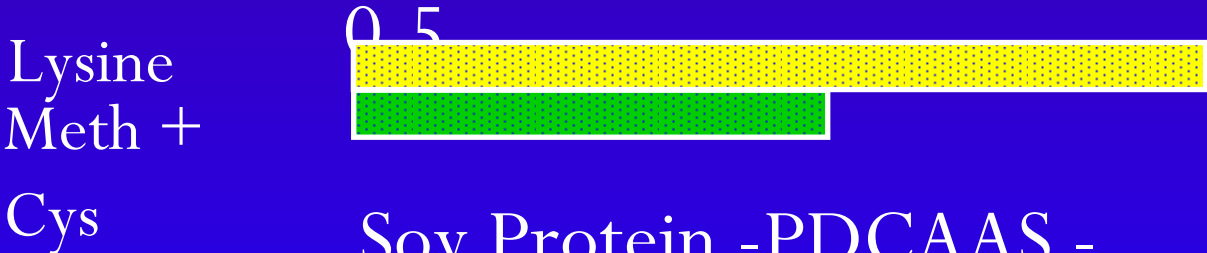
- Wheat, rice, maize Lysine
- Pulses (e.g. soy) Methionine
 (cysteine)
- Beef
 Phenylalanine (tyrosine)
- Milk
 Methionine (cysteine)



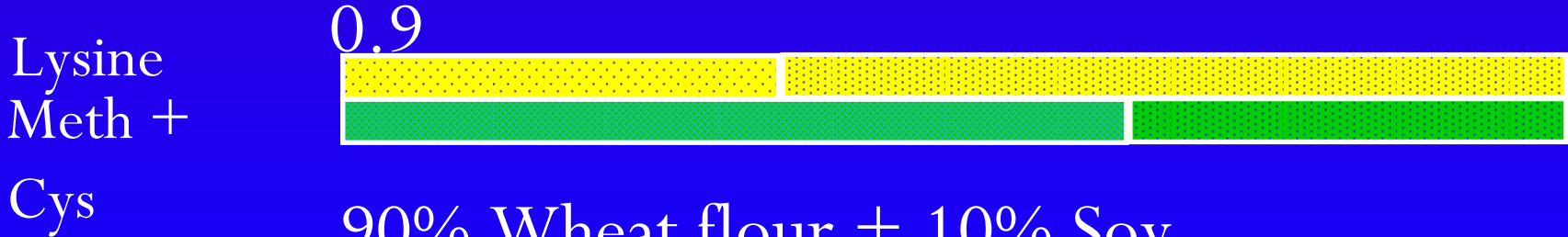
Complementary EAAs



Whole Wheat - PDCAAS



Soy Protein - PDCAAS -

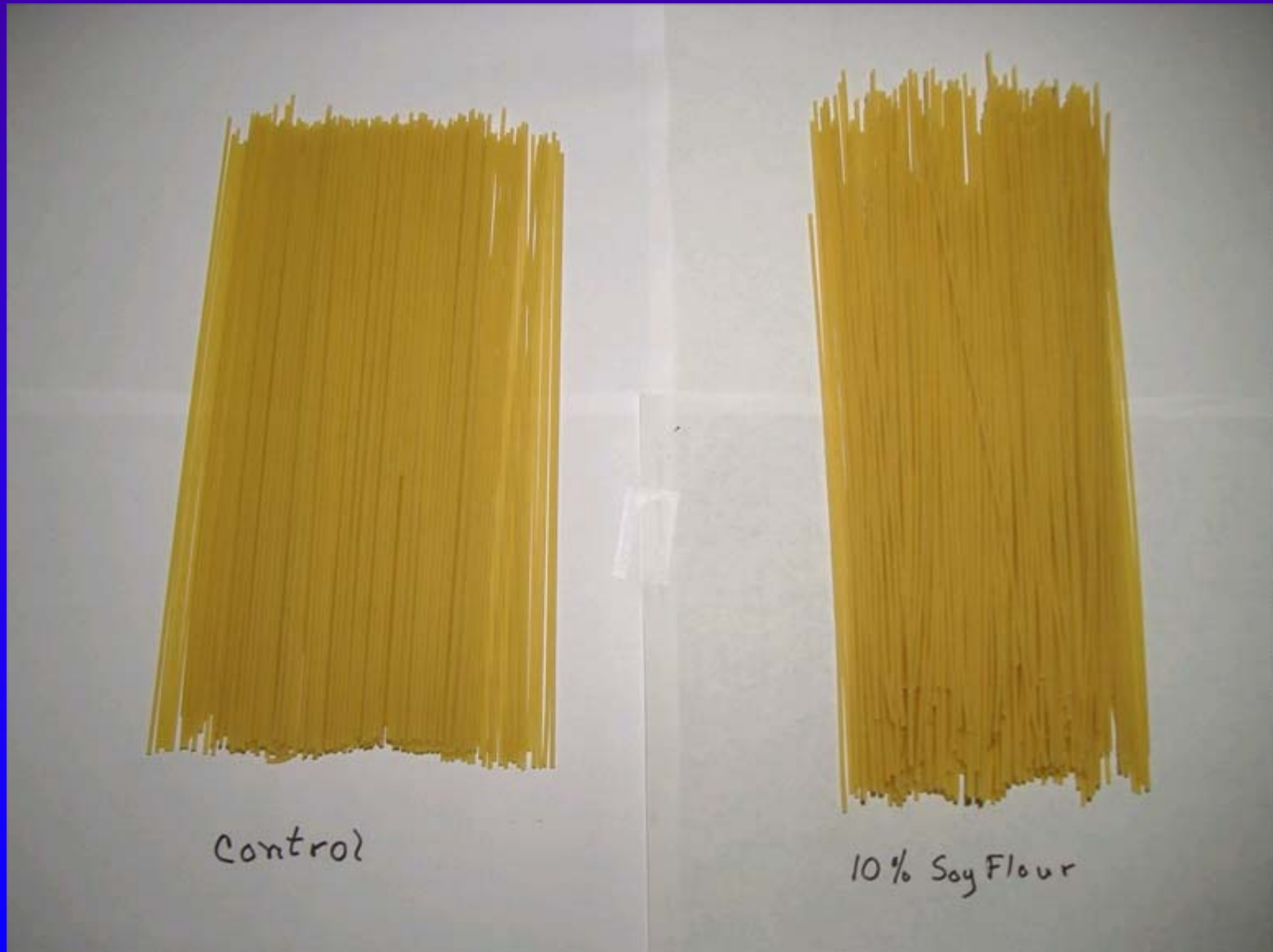


90% Wheat flour + 10% Soy flour

Pan Bread With Soy Flour



Pasta Goods With Soy Flour



Protein Quantity Increase

- White bread - 8.0% protein
 - Add 3% defatted soy flour - 8.5% protein
- Durum pasta - 14% protein
 - Replace 10% of semolina with defatted soy flour - 17.6% protein



Structural Component of Foods

- Air incorporation
- Leavening gas retention
- Solid matrix formation
- Appealing mouth feel



Air Incorporation

- Foaming Agent
 - Sponge cake batters
 - Meringues
 - Cappuccino froth



Protein as Foaming Agent



Leavening Gas Retention

- Yeast leavened bread products
- Chemically leavened products
 - Cakes
 - Cookies
 - Pancakes

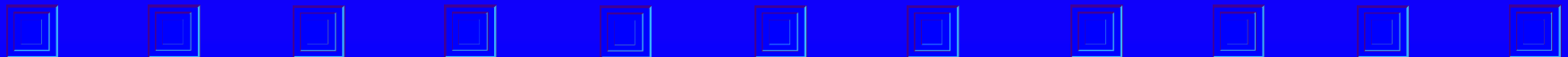


Protein and Leavening



Solid Matrix Formation

- Denaturation
 - Converts soluble protein to insoluble material
 - f* Generally by heating
- Gluten denaturation sets final structure of bread
- Hard boiled egg - liquid to solid
 - The solid white is 88% water



Heat-denatured Protein Structure



Contribution to Mouthfeel

- Desirable level of "chewiness"
 - Too much - "tough" steak
 - Too little - "flavorless", "slimey"
- Interaction with other components of the dish
 - Chewing gives an overall pleasing impression
 - f* Includes flavor release, retention on the tongue



Texturized Protein

