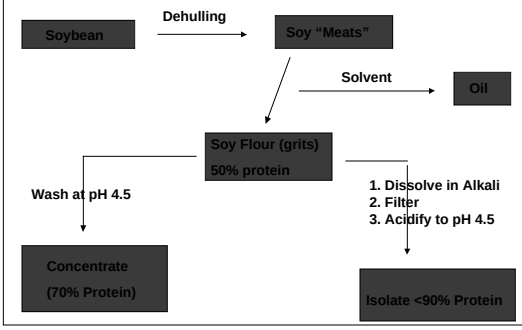
Oil Seed Proteins

Legume	Protein	Fat	Ash	Fiber	CHO
Chick Pea	20.6	5.4	2.8	10.3	61
Lentil	29.6	3.1	2.4	3.2	62
Pea	27.9	3.2	2.8	5.9	60
Bread Bean	31.8	0.9	3.6	8.5	55
Peanut	30.0	50.0	3.1	3.0	14
Soybean	43.9	21.0	4.9	-	30

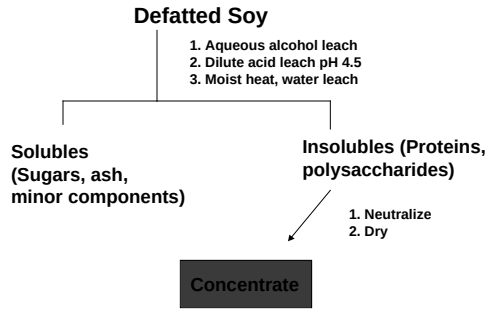
Soy Products

	Full Fat	Defat Flour	Conc	Isolate
Moisture	3.4	6.5	8.0	4.8
Protein	41.0	53.0	65.3	92.0
Fat	22.5	1.0	0.3	-
Fiber	1.7	3.0	2.9	0.25
CHO	27	28	19	-
Ash	5.1	6.0	4.7	4.0
PER	2.1	2.3	2.3	1.1-2.6

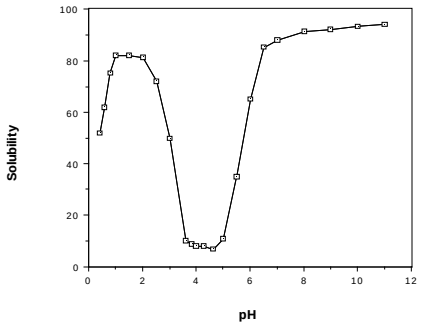
Soy Processing



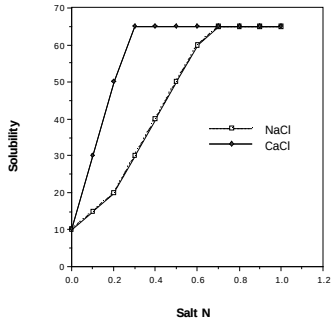
Soy Concentrates



Effect of pH on Solubility



Salt Solubility



Protein Nomenclature

Traditionally based on ultracentrifugation

Four main classes

- 2S
- 7S (Conglycinin)
- 11S (Glycinin)
- 15S

Protein bodies contain storage protein. Mostly 7 and 11S with some 2S

2S Fraction

Comprises from 8 to 22% of total protein

Contains large number of enzymes

Trypsin Inhibitors

- Bowman-Birk
- Kunitz

Inhibitors must be inactivated prior to feeding

Bowman-Birk Inhibitor

Molecular weight = 7,681

- 71 amino acids
- 7 disulfides

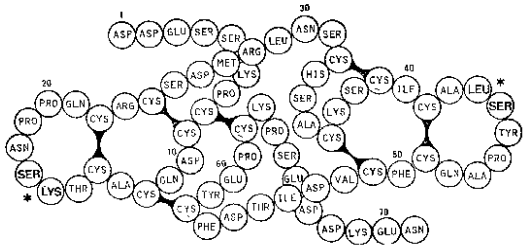
Inhibitory sequence is Lys 16 and Ser 17

Leu 43 and Ser 44 inhibits chymotrypsin

Bond resists hydrolysis

Bowman Birk Inhibitor

Bowman-Birk Inhibitor



Kunitz Inhibitor

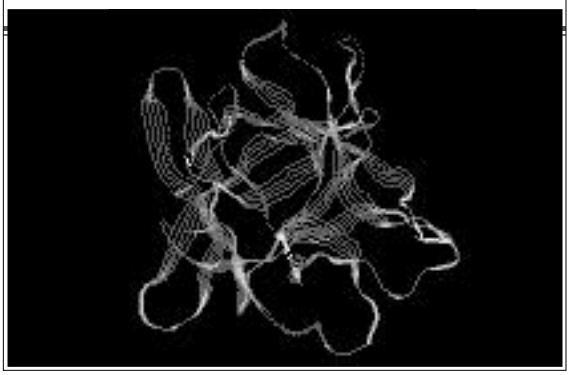
Molecular weight = 21,500

- 181 amino acids
- 2 disulfides

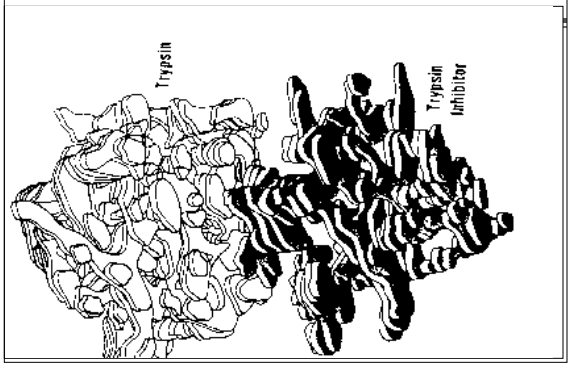
Inhibits at Arg 63 and Ilu 64

Bond is cleaved, but enzyme can not release

Kunitz Inhibitor



Kunitz Inhibitor



7S Proteins

- Approximately 35% of total
- Enzymes including lipoxygenase - 105,000
- Hemagglutinins - 4 x 30,000 + CHO
- Conglycinin - 85% of total 7S
- Molecular weight - 140,000 - 170,000

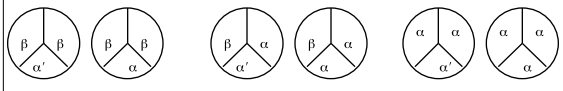
Conglycinin

- Sub unit structure
  - α, α^1 (57,000)
  - β (42,000)
- Normally found as trimers
  - $\alpha\alpha\alpha$ $\alpha\alpha\alpha^1$ $\alpha\alpha\beta$
  - $\alpha\alpha^1\beta$ $\alpha\beta\beta$ $\alpha^1\beta\beta$
- Very heat stable - can form soluble aggregates

Conglycinin

Group A Group B Group C

B1 B2 B3 B4 B5 B6



11S Proteins

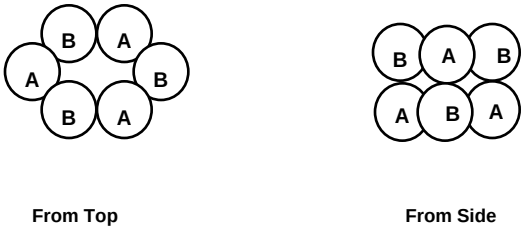
- Approximately 30 to 50% of total
- Glycinin makes up 85% of total
- Molecular weight - 320,000 - 360,000
- Precipitates in the cold
- Sub unit structure

11S Proteins

Three acidic units
- pI = 4.75, 5.15 and 5.4p
- Molecular weight = 34,800
- Heat stable

Three basic units
- pI = 8.0, 8.25 and 8.5
- Molecular weight = 19,600
- Precipitate at 80° C

11S Protein



From Top

From Side

15S Proteins

Poorly defined

Makes up approximately 5% of total

probably polymers of other fractions

Functionality

Spun fibers

Extruded

Bleaching agent

Water holding

Heat stability

Other functionalities often require modification - usually enzymatic