



Importation of Soybean Meal vs Soybeans for crushing: Pros and Cons

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Soybean meal

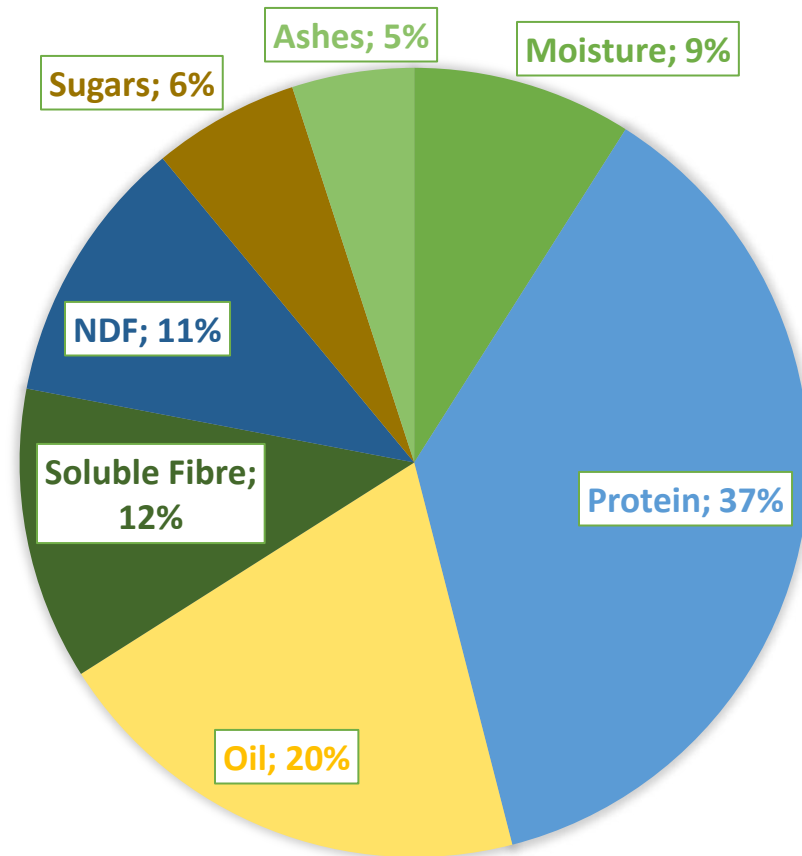
Globally soybean meal is the most widely used protein source in poultry diets.

- Best protein meal available: High quality protein
- High in protein (45-48%)
- High Amino acid digestibility
- **Ideal balance of EAA**
- **Fairly high Energy**
- Low fibre and palatable
- If processed properly no anti-nutritional factors



Options for the
SA Region
Importation of
SBM or
Soybeans for
crushing :
Conundrum

Soybean composition: Key components



Major components

Oil:

- Food for humans, Energy source for Livestock and Poultry
- **Bio diesel:** Produced for diesel engines. produced from Oil

Protein

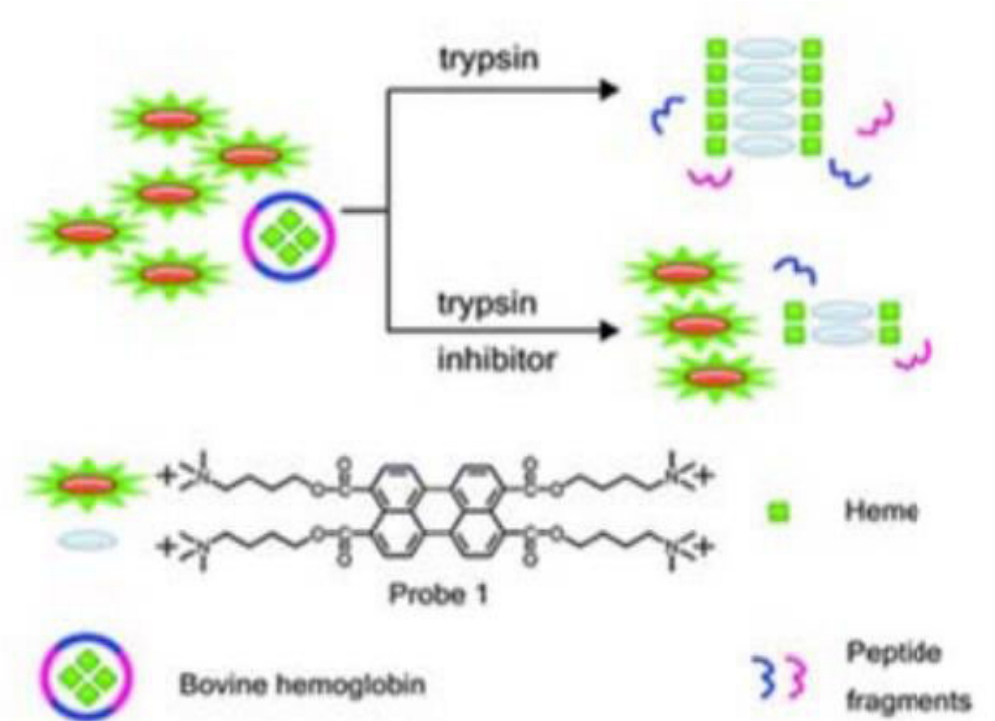
- Food for humans and quality protein source for animals

Hull – 8% of DM

Why do we need to process Soybeans?

Antinutritional factors

- Trypsin and Chymotrypsin inhibitors
- Lectins
- Urease
- Allergenic factors
- Lipase
- Saponins



How to Deactivate those Biologically Active Compounds?

Most ANF are heat labile and can be reduced to safe levels through “proper heat treatment” but many variables have to be considered.

Temperature

Time

Moisture

Particle size

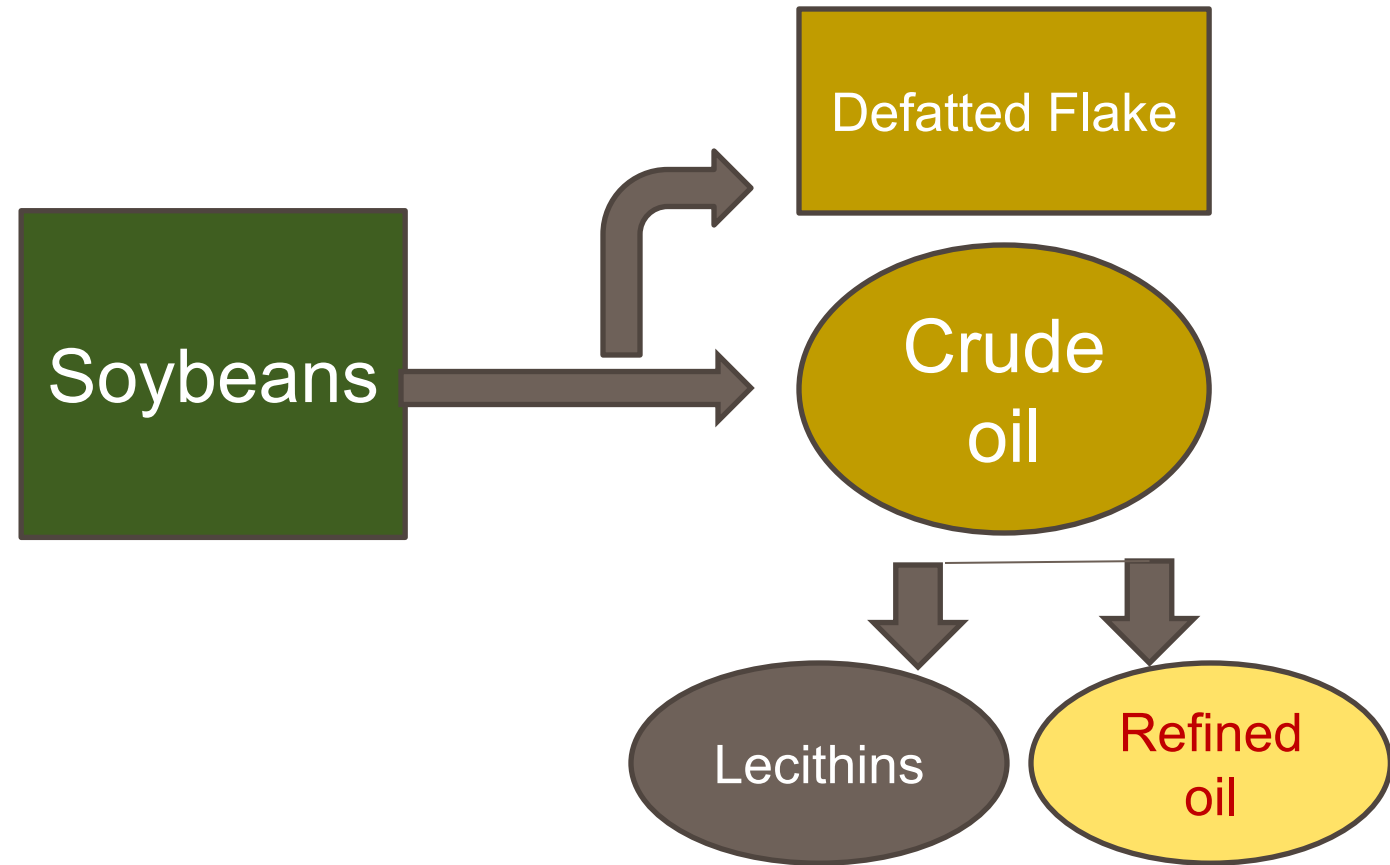
Amount of physical damage imposed during process

Cooling / drying

Knowledge (Operator)

Soybean crushing

1. Solvent extraction: Non-polar solvents (commonly hexane and hexane isomers)
2. Expeller :mechanical extraction of the oil by a screw press



In both processes, Flakes are toasted – Remove ANF

Common Processing methods

Long Term

Cooking / boiling

Autoclaving

Steam roasting

Expansion

Short Term

Extrusion

Dry roasting

Jet-sploding

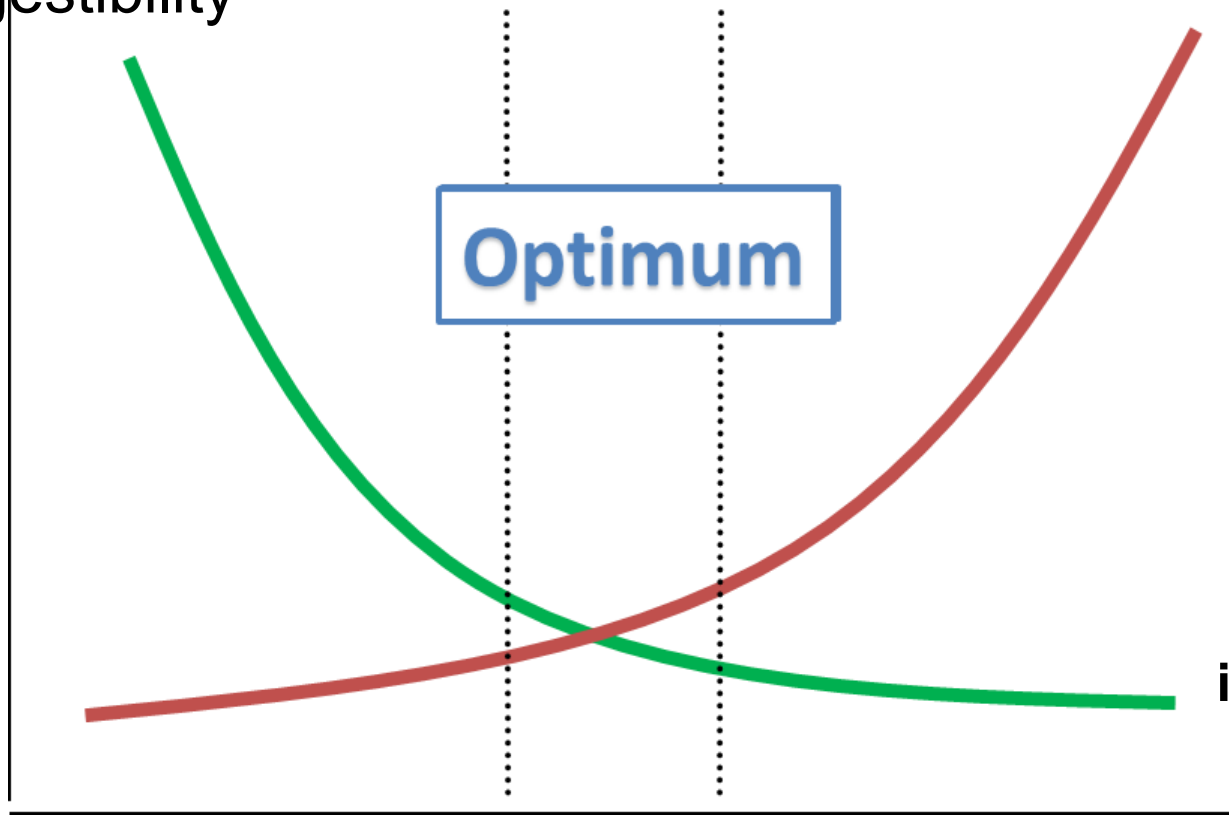
Microionisation

*Complete destruction of ANF is not the ultimate objective.
Different technologies but essentially heating for specific time

Protein quality of SBM



Protein
Digestibility



Maillard
reactions



Trypsin
inhibitors



T °C

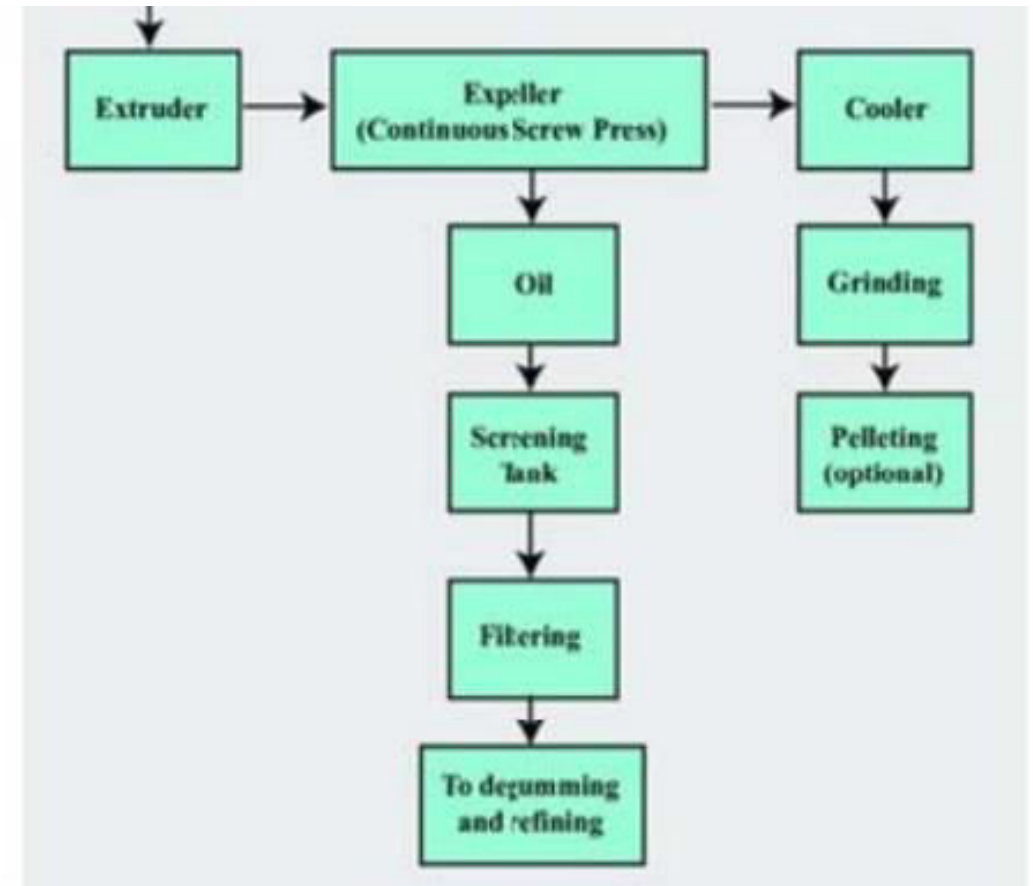
Extrusion

- In this process using a screw with variable configuration whole or ground beans are forced through barrel
- Basic Principle: HTST
- Material subject to, Heat, Pressure and shear
- Friction, shear, and the pressure changes in the extrusion process rupture oil cells
- Making oil more available for digestion



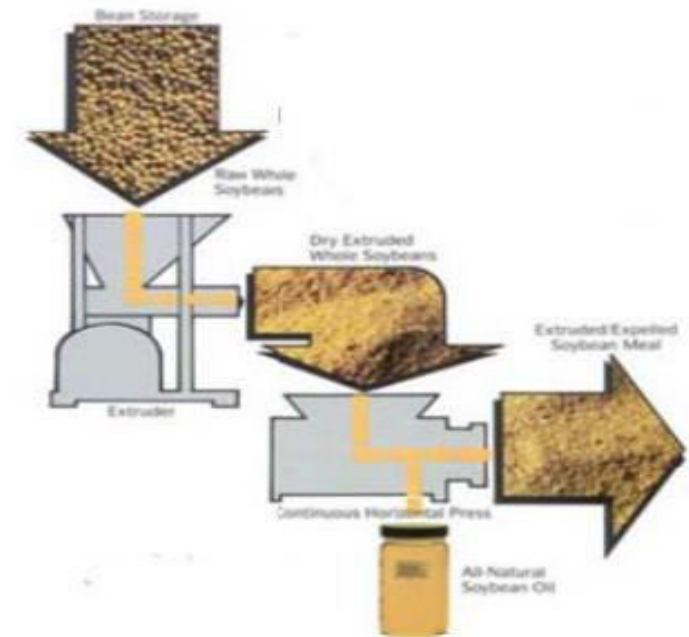
Extrusion: Full-fat SBM and advantages

- Economical when feed grade fat is expensive
- COP is generally lower than Solvent extracted SBM
- The oil is stable
- Easier and cheaper way to add oil uniformly in the feed
- No need for oil tanks, pumps and fat coating equipment



Extrusion and expelling

- Soybean Oil Meal - oil is partially extracted from Soybeans after extrusion
- Full Fat Soya – beans are extruded either whole or cracked
- Excellent source of AA and fat
- Reduces transportation cost
- Highly flexible can be based on market demand
- **Diversify formulation options**



Partially defatted SBM for diversification of formulation option

NAME	Base SBM	NDH SBM	Soy Oil Meal 46.5 6.0	Soy Oil Meal 45.5 8.0	FFS 92% DM Extruded
Dry Matter	89.00	89.00	93.30	93.42	92.00
Crude Protein	45.50	43.68	46.51	45.51	37.53
AMEn Broiler	2108.98	1984.04	2481.60	2621.72	3575.45
Crude Fat	1.66	1.21	6.01	8.02	19.24
Dig LYS	2.42	2.31	2.58	2.53	1.98
Dig MET	0.54	0.45	0.57	0.55	0.47
DIG M&C	0.96	0.80	1.10	1.07	0.84

Factors determining the decision

- **Price of Soybeans vs SBM**
- Investments and scale of the operation
- Taxes
- Soybean oil price: **Biofuel** is a major future determinant
- Transport cost
- Soybean meal quality (Imported vs Locally produced)
- Technology of soybean processing
- Country requirements and demands of the livestock industries
- Other Ingredients choices especially cereals
- Geopolitical realities (supply chain disruptions)



Comparing Imported SBM options

SSOY
Delivers Solutions

USSEC

Standard Ileal Digestible Amino Acids

NAME	Arg	Bra	USA
Dig Lys	2.42	2.44	2.54
Dig Met	0.54	0.54	0.56
Dig M&C	0.96	0.99	1.06
Dig Thr	1.40	1.43	1.46
Dig Trp	0.52	0.53	0.56
Dig Ile	1.74	1.81	1.79
Dig Val	1.82	1.84	1.89
Dig Arg	2.90	3.02	3.04

There are differences in available amino acids

USSBM is rich in almost all essential amino acids

M.A. Ibáñez, C. de Blas, L. Cámara, G.G. Mateos 2020 (courtesy of Mathew Clark, Genesis Feed Technology)

Soybean analysis

Variable	Arg	Bra	USA
Dry Matter	88.00	88.00	88.00
Crude Protein	45.50	47.00	46.40
AMEn Broiler	2,108.98	2,142.70	2,206.38
Crude Fat	1.66	1.78	1.67
Crude Fibre	4.32	5.03	3.88
Ash	6.54	6.29	6.54
Sucrose	10.00	8.00	10.00
Starch	1.00	1.00	1.00

M.A. Ibáñez, C. de Blas, L. Cámara, G.G. Mateos 2020
(courtesy of Mathew Clark, Genesis Feed Technology)

ME Difference: 100Kcal /Kg
= 12.5ml of quality oil / kg

At 25% SBM use, $12.5 * (25/100)$
= 3.125kg of extra oil per ton

= 3.125Kg lesser volume for
balance other nutrients

***At 25% 15-20% energy is
coming from SBM. Extra energy
is highly significant**

Thank you