

REF 69.1003

The Extruding-Expelling Process

The two main components of the process are - an Insta-Pro[®] Extruder and a Horizontal Press. The objective of the process is to extract oil from oil bearing seeds such as soybeans, cotton, sunflower seeds, canola or rape seed.

The Insta-Pro extruder generates heat through friction to cook sterilize, stabilize, texturize, and dehydrate products. In processing oilseeds, the anti-nutritional factors in raw oilseeds are deactivated thus making the finished product fit to be used as an ingredient.

Within the extruder barrel, because of the shear, temperature, and pressure, cells are ruptured, including the oil cells, allowing for better and more efficient separation of the oil when a screw press is used.

The extrusion temperature of the oilseeds as they exit the extruder varies as shown in the table below, the pressure is estimated at 400 P.S.I. The dwell time is less than 30 seconds. The extruded oilseeds are augered to the press and enter at 160-180° F and approximately one half of their raw moisture content. The exit temperature of the expelled meal or cake is about 180-200° F.

The amount of oil expelled depends on factors such as the oil and moisture content of the raw oilseeds and the set-up of the press and controlling temperature and moisture of the product to be expelled.

| Oilseed* | Raw Oil Content % | Raw Protein Content % | Oil Removal Efficiency % | Extruding Temperature °F | Expelled Meal Oil Content % | Expelled Meal Protein Content % |
|-----------|-------------------|-----------------------|--------------------------|--------------------------|-----------------------------|---------------------------------|
| Soybean | 18-22 | 36-40 | 65-67 | 300-320 | 6-9 | 42-46 |
| Cotton | 20-22 | 20-22 | 65-70 | 230-250 | 6-8 | 26-30 |
| Canola | 35-40 | 22-26 | 72-75 | 250-260 | 8-11 | 32-37 |
| Sunflower | 35-45 | 16-22 | 72-75 | 240-260 | 10-13 | 22-27 |

** All values used for oil protein content are expressed in average ranges. Actual content varies due to varietal differences and growing conditions. Operator management also influences the quality of the end product.*

The Insta-Pro Extrusion process produces a high quality protein product which has an excellent shelf life. The stability of the product is enhanced because many oilseeds contain natural tocopherols which act as antioxidants. The tocopherols are released when the oil cells are ruptured.