

## **Seal Oil Company's Manufacturing Process Sheet on Refining Seal Oil for Capsulation**

### **Step 1: Cull**

Each year, the Canadian Federal Government approves the number of Harp seals (*Phoca Groenlandica*) that may be hunted. This cull of mature seals is carried out under the supervision of the Canadian Food Inspection Agency and the Government of the Province of Newfoundland and Labrador. Seals are harvested from the ice flows off the north east coast of Canada.

### **Step 2: Skinning**

After the seals are killed, the pelt with the blubber layer still attached is separated to prevent contamination from the meat, skeleton, and organs.

### **Step 3: Inspection and Rinse**

Upon arrival at the factory, the pelt/blubber are inspected and then separated. The blubber (fat layer) is lightly sprayed with seawater to remove any residue. The extremely low amount of seawater used assures that no organochlorines or other pesticides are transferred to the blubber.

### **Step 4: Mince**

The blubber is minced into small grains with a diameter of 2 to 3 millimeters.

### **Step 5: Rendering**

The grains are steam heated at a low temperature of 50 to 70 degrees Celsius. This rendering process produces the crude seal oil.

### **Step 6: Cooling**

The crude oil is placed in a large container where it is gradually cooled using a cooling coil at about 10 degrees Celsius. The oil remains in a liquid state.

### **Step 7: Centrifuging**

The crude oil is centrifuged to remove water and solid impurities.

### **Step 8: Purity Testing**

The crude oil is tested by independent laboratories for Omega 3 content to ensure that it meets our specifications.

### **Step 9: Bulk Crude Packaging**

The oil is packed into metal, closed top drums. The free space in each drum is purged with nitrogen for 5 minutes and then sealed. The drums are stored in a temperature-controlled warehouse.

### **Step 10: Purity Tests**

Just before refining the crude oil, the following tests are conducted: - peroxide value, p-Anisidine, PCBs, dioxins, furans and heavy metals. This data allows for the customization of our refining and deodorization process that ensures that the unwanted contaminants are removed and that the quality of the oil meets our specifications.

### **Step 11: Bleaching**

The crude oil is bleached and filtered to remove the free fatty acids, phospholipids, peroxides, heavy metals, and undesirable chemicals. The bleaching process involves blending the oil with a mixture of citric acid, then adding carbon and finally adding bleaching clay. This mixture is then heated for 30 minutes at temperatures

between 100-110 degrees Celsius under a vacuum. The oil is then cooled down to 40 – 50 degrees Celsius and filtered under a nitrogen blanket.

#### **Step 12: Purity Testing**

The refined oil is re-tested for peroxide value, p-Anisidine levels and heavy metals to ensure that the refined oil now meets or exceeds the specifications set out by the Council for Responsible Nutrition for Omega-3 marine products.

#### **Step 13: Deodorizing**

The refined oil is then deodorized using a Packed Column Thin Film Deodorizer. The deodorizing process involves heating the bleached oil to temperatures between 240-260 degrees Celsius for a very short period under a high vacuum. Any organochlorine compounds and volatile oxidation products are desorbed in the brief period of exposure.

#### **Step 14: Purity Testing**

The refined oil is re-tested again for PCBs, Dioxins, Furans and free fatty acids to ensure that the end product exceeds the standards for set out by the Council for Responsible Nutrition for Omega-3 marine products.

#### **Step 15: Content Testing**

The refined oil is tested for colour and Omega-3 content.

#### **Step 16: Antioxidant**

An antioxidant of 70% mixed tocopherol is added at a concentration of 1000 ppm to help prevent oxidation of the polyunsaturated Omega-3 fatty acids.

#### **Step 17: Bulk Refined Oil Packaging**

The oil is packed into metal, closed top drums. The free space in each drum is purged with nitrogen for 5 minutes and then sealed. The drums are stored in a temperature-controlled warehouse (between 15 – 30 degrees Celsius).

#### **Step 18: Encapsulation with only one additive Vitamin E**

The refined oil is encapsulated into 500mg clear gelatin capsules to which only 5IU of d-alpha tocopherol (Vitamin E) is added as an anti-oxidant to ensure a 3 year shelf life. The gelatin used for our capsules is NOT a risk material for BSE (Bovine Spongiform Encephalopathy).

#### **Step 19: Bottling**

The capsules are bottled and labeled. A desiccant is added to the bottle as well as a freshness seal to the mouth of the bottle. A security seal is added in the capping process to ensure the safety of the contents.

#### **Step 20: Finished Product Storage**

The bottles are master packed and stored in a temperature-controlled warehouse.

#### *Notes:*

*All steps of our production meet the hygiene standards for manufacturers of marine products as set out by the Canadian Food Inspection Agency that performs regular audits to ensure that these high standards are maintained. The Good Manufacturing Processes (GMPs) as set out in the Natural Health Products Regulations from Health Canada are adhered to fully.*