Milk is a nutritious food, rich in proteins, minerals, fats, vitamins and enzymes. It is also a functional ingredient found in a variety of food products, ranging from infant formulas to baked goods and confections to salad dressings. Whole milk powder is obtained by removing water from pasteurized, homogenized whole milk. It may also be obtained by blending fluid, condensed or skim milk powder with liquid or dry cream or with fluid, condensed or dry milk, provided the composition of the whole milk powder conforms to U.S. Federal Standards. The following chart provides a typical compositional breakdown of whole milk powder.

**Typical Composition of Whole Milk Powder (%)**

<table>
<thead>
<tr>
<th>Milk Product</th>
<th>Moisture</th>
<th>Fat</th>
<th>Protein</th>
<th>Lactose</th>
<th>Ash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole Milk Powder</td>
<td>2.0-4.5</td>
<td>26.0-28.5</td>
<td>24.5-27.0</td>
<td>36.0-38.5</td>
<td>5.5-6.5</td>
</tr>
</tbody>
</table>

**Beneficial Features**

Dry whole milk powder is an easily reconstituted, economical source of dairy solids, (including milkfat) and a convenient form of nutritious milk. Using dry whole milk powder instead of fluid milk reduces transport and storage costs. Reduced storage space and non-refrigerated shipping and warehousing of dry whole milk powder translates into cost savings. Whole milk powders are available in roller-dried and spray-dried form, the latter being more common. Vitamin and mineral fortification is also an option. In addition, removing moisture from milk inhibits microbial growth.

**Functionality**

Beyond concentrated calcium, protein and other important nutrient values, several desirable properties are achieved through the addition of whole milk powder to food formulations:

**Browning/Color**—Appealing for applications in baked goods or sauces, dairy proteins react with lactose and other reducing sugars during baking or cooking to produce a desirable browning effect.

**Emulsification**—Proteins in dry whole milk act as oil/water interfaces, aiding in the formulation and stabilization of fat emulsions. These properties are particularly useful in soups, baked goods, beverages and salad dressings.

**Flavor**—Dairy proteins have a clean neutral flavor and do not normally contribute off-flavors to formulations. Whole milk powder is often used to enhance the dairy flavor of foods.
**Foaming**—Dry whole milk helps diffuse protein to an air/water interface, reducing surface tension and partially unfolding the protein. Encapsulated air bubbles form a stable and elastic film useful for creating desserts and cakes.

**Water binding**—Dry whole milk entraps water in baked goods. The water holding capacity of whole milk proteins is used to create desired textures in viscous food products like soups and custards. In bread dough, this binding capacity helps prolong shelf life.