In the baking process, leavening takes place when the gluten is relaxed and its disulfide bonds are broken. The sulfhydryl groups generated from this process must then be re-oxidized at the end of the proofing (fermentation) process and during baking in order to generate a good product. This produces disulfide bonds between the different protein molecules in gluten.

IXPER® 75C Calcium Peroxide (CaO²) is an oxidizer that is extensively used as dough conditioner in the production of buns. It has also been used to enhance the properties of croutons, French toast sticks, pizza bagels, and other specialty bread products.

Considering IXPER® 75C Calcium Peroxide is a fast oxidizer, it is usually used at the dough stage of a conventional breadmaking process (sponge and dough process), i.e., as follows:

- 50-70% of the required flour, water, salt, yeast, dough conditioner (yeast food and iodate oxidizer) and malt are mixed and allowed to ferment for a few hours. The fermented product is called sponge.

- The sponge is added to the mixer with the remainder of the ingredients including calcium peroxide followed by a short fermentation period.

- Processing is then performed to generate the final product.
In addition to the advantages of the oxidizers mentioned in technical data sheet IXP-03-001, IXPER® 75C Calcium Peroxide has the following benefits in breadmaking:

- **IXPER® 75C Calcium Peroxide allows the surface of dough to be drier. This is quite valuable in the case of the production of buns such as hamburger buns since they are typically made with sticky dough. When IXPER® 75C Calcium Peroxide dries the surface of the dough, the dough becomes less sticky and more machinable with less operational problems. This also reduces crimping, and allows for higher production rates and decreased downtime. This also reduces the amount of dusting flour required to reduce the stickiness of the dough.**

- **IXPER® 75C Calcium Peroxide allows the dough to hold more water. This produces a softer dough that is more machinable. It also results in higher flour yields.**

- **IXPER® 75C Calcium Peroxide is a bleaching agent, and can produce lighter crumb color.** IXPER® 75C Calcium Peroxide is best used in combination with other dough conditioners such as other oxidizers (ascorbic acid, calcium iodate…), emulsifiers or enzymes.

Use levels for calcium peroxide are:

- The Food and Drug Administration allows the use of most oxidizers including calcium peroxide up to a level of 0.0075 parts for each 100 parts by weight of flour (21CFR136.110).

- The Canadian Food and Drug Act and Regulations Division 13, B.13.021 allows the addition of oxidizers including calcium peroxide to bread, at a level of 0.01 part by weight of all oxidizers for each 100 parts of flour used.

- Typical use rates are 0.0025 to 0.005 parts for each 100 parts by weight of flour. There is no residual calcium peroxide at the end of the baking process. After releasing its oxygen the product takes the form of a calcium salt or hydroxide.
Properties of IXPER® 75C Calcium Peroxide

IXPER® 75C Calcium Peroxide has the following properties.

- Fine powder.
  - The mean particle size is smaller than other calcium peroxide products, enhancing mixing with dough.
  - The particles are also smooth and spherical, so they “roll” easily, enhancing mixing.
  - The product is homogeneous.
- Very pale yellow. Color is affected by the presence of impurities. The very light color of IXPER® 75C Calcium Peroxide indicates a high degree of purity.
- Odorless, and tasteless.
- High concentration of calcium peroxide - a minimum of 75%.
- Low moisture content which enhances shelf life.
- Very stable in the dry form.
- Very limited solubility in water.
- Releases its oxygen only when mixed with water, producing calcium oxide, calcium hydroxide, water and oxygen.
IXPER® 75C Calcium Peroxide
Dough Conditioner
Application Data Sheet

IXPER® 75C Calcium Peroxide conforms to the new requirements of the United States Food Chemical codex for calcium peroxide and is certified Kosher. Its properties are as follows.

<table>
<thead>
<tr>
<th>Product Properties</th>
<th>Typical Range</th>
<th>Standard Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>-</td>
<td>Pale yellow amorphous odorless powder</td>
</tr>
<tr>
<td>Calcium Peroxide (%)</td>
<td>78 ± 2</td>
<td>75</td>
</tr>
<tr>
<td>Available Oxygen (%)</td>
<td>17.3 ± 0.44</td>
<td>16.65</td>
</tr>
<tr>
<td>Food Chemicals Codex Specifications (ppm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluoride</td>
<td>-</td>
<td>&lt;50</td>
</tr>
<tr>
<td>Heavy Metals (as Pb)</td>
<td>-</td>
<td>&lt;20</td>
</tr>
<tr>
<td>Lead</td>
<td>-</td>
<td>&lt;4</td>
</tr>
<tr>
<td>Particle Size Distribution (% pass through)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75µ (US Sieve #200)</td>
<td>100 min.</td>
<td>-</td>
</tr>
<tr>
<td>20µ (US Sieve #325)</td>
<td>50 min.</td>
<td>-</td>
</tr>
<tr>
<td>Moisture (%) – moisture balance</td>
<td>&lt;1.0</td>
<td>-</td>
</tr>
<tr>
<td>Bulk Density (g/mL)</td>
<td>0.50 ± 0.075</td>
<td>0.50 ± 0.075</td>
</tr>
<tr>
<td>Solubility in Water (20°C)</td>
<td>&lt;0.01%</td>
<td>-</td>
</tr>
<tr>
<td>pH (1% suspension)</td>
<td>~11.7 - 12</td>
<td>-</td>
</tr>
</tbody>
</table>

* Determined by Light Scattering (CILAS)

Regulatory information
- DOT Proper shipping name: Calcium Peroxide
- DOT Hazard Class: 5.1 (oxidizer)
- UN Number: UN 1457
- RCRA Waste Number: D001, ignitable
- SARA Section 311/312 hazard category: Fire hazard and immediate health hazard.

Storage and handling
- Store in a dry location away from heat and out of direct sunlight in containers fitted with a safety valve or vent. Storage temperature: <104°F (40°C).
- Store in an area away from acids, bases, metals, metal salts, reducing agents, organic materials or flammable substances.
- Never return unused product to the storage container.
- Rotate inventories - first in, first out.
Safety

- Ensure all personnel who may come in contact with this material are aware of the potential hazards, first aid measures and the proper storage and use techniques outlined in the Material Safety Data Sheets (MSDS).
- Storage and use areas should be equipped with a safety shower and eyewash station.
- Use appropriate eye and skin protection.
- Dispose of according to applicable federal, state and local regulations.

Warning: Check MSDSs of all reagents and wear appropriate personal protective equipment.

Danger: OXIDIZER – CALCIUM PEROXIDE CAN CAUSE SEVERE EYE DAMAGE AND SKIN IRRITATION. IN CASE OF REPEATED CONTACT WITH SKIN, PRODUCT MAY CAUSE DERMATITIS. Prevent contact with eyes and avoid skin contact. Wash hands and skin thoroughly after handling. Damp product in contact with combustible materials may cause fires.

Water is the preferred extinguishing medium in case of fire involving this product.

First Aid

**Eye contact:** Flush eyes with running water for 15 minutes, while keeping eyelids wide open. Consult with an ophthalmologist in all cases.

**Skin contact:** Wash the affected skin with soap and water. Call a physician in case of persistent pain or redness.

**Inhalation:** Remove the victim from the dusty environment. Call a physician in case of respiratory symptoms.

**Ingestion:** Consult with a physician in all cases. DO NOT induce vomiting. If victim is conscious, rinse mouth and give large quantities of fresh water. NEVER give anything by mouth to an unconscious person.

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