Phosphates
for meat and poultry products

Carfosel™ blends interact in a unique way to bind water with proteins and increase meat tenderness. Treated products will maintain their juicy appearance as well as their natural nutritional properties, texture and colour.

www.prayon.com
Prayon food phosphates for meat & poultry products

Food-grade phosphates perform a number of functions in processed meat and poultry products. Pyrophosphates (TSPP and SAPP) are the most rapidly acting phosphates on myofibrillar proteins, the water binding proteins of meat and poultry. Pyrophosphates are not highly soluble in water so they are usually blended with more soluble long-chain phosphates, such as sodium tripolyphosphate (STPP), which is then hydrolysed by alkaline phosphatases in the meat to the active pyrophosphate form.

For broader spectrum activity, SHMP (sodium polyphosphates glassy), a strong sequestant of metal ions, may be blended with STPP. SHMP will bind calcium and magnesium, the minerals that harden water, and so soften the water. By binding iron, which may accelerate the oxidation of fatty acids, SHMP helps to prevent the development of off-flavour and protects natural colour.

The pH will also impact phosphate performance and functionality. SAPP is rarely used alone since it is an acidic phosphate and lowers the meat pH closer to its isoelectric point, which leads to protein dehydration and discoloration. STPP (sodium tripolyphosphate) is widely used and will increase the pH. Products with reduced sodium content may contain potassium pyro and/or tripolyphosphate. The high-performance Carfosel™ range has been developed for meat, poultry and seafood products.

Injected and marinated meat and poultry

When the meat cuts are injected and tumbled for uniform brine dispersion, the alkaline phosphates raise the pH and work with salt to increase the ionic strength, which favours protein solubilisation and water absorption. As protein becomes soluble, it develops a natural tackiness that binds the meat pieces. Useful in formed products such as boneless hams, chicken rolls and turkey rolls.

Phosphates have also been shown to increase the temperature for denaturation, thus reducing cook-cool loss and leading to an end product with greater succulence and enhanced yield. In the finished product, phosphates will compensate for the oxidative influence of salt, bind iron to inhibit the development of warmed-over flavour and protect colour.

Frozen meat and poultry products also benefit from the presence of phosphates, which have a cryoprotective effect on the protein and protect against the development of rancid flavours. Additionally, the phosphates assist the protein by binding water and minimising thaw-drip losses.

Emulsified meat and poultry products

In comminuted meat production, phosphates, salt and ice are added to the ground meat and physically mixed for dispersion and protein solubilisation. The hydrated protein wraps around the cold fat droplets to form an emulsion. Cure colour may be accelerated by using a phosphate with a near neutral pH, such as Carfosel™ 700. The presence of phosphate stabilises the emulsion during smoking and results in enhanced yield.
Meat and poultry change after slaughter. The animal cell’s own phosphate compound (ATP - adenosine triphosphate) quickly decomposes. As a result, pH decreases, muscles contract (rigor mortis) and water is expelled. Prayon’s phosphates demonstrate characteristics comparable to the cell’s own phosphate. They act on muscle tissue and restore it to the uncontracted state, thereby enabling constitutive water to be retained.

**Benefits of phosphate salts**

- **RIGOR MORTIS**
- **MOISTURE RETENTION**
- **EMULSION**

**Muscle:** PROTEIN CHAINS

**Buffering power:** pH > pH"
Food phosphates for meat & poultry

STPP Range
Prayon has a wide range of spray-dried STPPs with various particle size distributions, bulk densities and hydration levels. There is always a Prayon STPP to fit your specific processing needs and requirements.

Carfosel™ Blends
Prayon has developed a full range of blended phosphates designed for the meat, fish and seafood industries. Carfosel™ optimises yields, controls texture and enhances cured colour development. Prayon also offers Carfosel™ blends to meet customers’ specific needs.

Carfosel™ Instant
Carfosel™ Instant outperforms equivalent physical blends in terms of solubility and speed of dissolution. These properties are particularly useful under extreme conditions. For example, Carfosel™ Instant salts even dissolve very well in freezing brines with a very high salt concentration. Under standard conditions, Carfosel™ Instant products help to guarantee optimal brine homogeneity and stable processing conditions.

Injected and marinated meat and poultry
(Ham, marinated meat & poultry, frozen chicken and turkey, etc.)
Better moisture retention
• Reduces cook-cool loss;
• Reduces purge during retail and distribution;
• Reduces thaw-drip loss.

Better texture development
• Binds meat pieces, ensures the integrity of restructured products;
• Maintains natural juices and added flavours, protects colour and inhibits onset of rancidity.

In order of increasing functionality:

<table>
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<tr>
<th>CARFOSEL™</th>
<th>E NUMBERS</th>
<th>Properties and Applications</th>
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</thead>
<tbody>
<tr>
<td>CARFOSEL™ 996</td>
<td>E 451</td>
<td>STPP Granular. Excellent rate of dissolution, handling properties, flowability.</td>
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<tr>
<td>CARFOSEL™ 999</td>
<td>E 451</td>
<td>Fine granular, recommended for producers of blends. Keeps its dissolution speed even after blending. Good salt tolerance.</td>
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<tr>
<td>CARFOSEL™ Genius</td>
<td>E 451, E 450</td>
<td>Wet and dry processes. Recommended for producers of blends.</td>
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<tr>
<td>CARFOSEL™ 1000 i</td>
<td>E 451</td>
<td>High moisture retention &amp; texture development.</td>
</tr>
<tr>
<td>CARFOSEL™ B-940</td>
<td>E 451, E 452</td>
<td>Multifunctional. Stabilises brine, preserves appearance and taste of final product.</td>
</tr>
<tr>
<td>CARFOSEL™ 950 i</td>
<td>E 451, E 450</td>
<td>Advantages of Na phosphates with a reduced sodium content in the finished product.</td>
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</table>

Emulsified meat and poultry products
(Luncheon meat, frankfurters, precooked sausages, chicken nuggets, etc.)
Mainly texture development:
• Solubilises the proteins responsible for emulsion development and stabilises the emulsion;
• Adapts the viscosity of raw paste;
• Binds meat pieces in restructured rolls.

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<tr>
<td>CARFOSEL™ 700</td>
<td>E 450</td>
<td>Provides strong firmness in final product and rapid colour development.</td>
</tr>
<tr>
<td>CARFOSEL™ 2</td>
<td>E 450, E 452</td>
<td>Provides high viscosity in raw pastes, good texture development in final product.</td>
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Other Carfosel products are available. For details about our complete range, please contact us at sales2services@prayon.com
About us

Prayon is a leading producer of purified phosphoric acid and food-grade phosphates. Our food applications laboratory enables us to meet market requirements and offer innovative products in line with the latest trends in the food industry.

Food-grade phosphates are produced using high-quality purified phosphoric acid.

The Prayon Group has a global reputation for its phosphoric acid technology. Jointly owned by Office Chérifien des Phosphates (OCP) and Société Régionale d’Investissements de Wallonie (SRIW), the Group consists of more than 20 companies in more than 10 countries. It employs over 1,126* people and generates a turnover of approximately €688,6** million (2018).

With production facilities in Belgium (Engis and Puurs), France (Les Roches de Condrieu) and the USA (Augusta, Georgia), Prayon produces a full range of purified phosphoric acids, sodium, potassium and calcium phosphates and blends mainly used in the meat, poultry, seafood, baking and dairy industries.

Food-grade purified phosphoric acid and phosphates supplied by Prayon:

- are controlled using an HACCP approach on all production lines and are FSSC 22000 certified;
- meet current legal requirements;
- are kosher- and halal-certified.

Phosphates perform a wide range of functions in processed food products. These include protein modification, sequestration of minerals that may catalyse oxidative rancidity and pH adjustment in meat, poultry and seafoods.

Baked goods are leavened with phosphates that contribute to texture, colour, rise and desirable crumb characteristics.

The smooth mouthfeel, even melt and slice-ability of processed cheeses benefit from the buffering capacity and protein dispersion properties provided by phosphates.

A variety of beverages are acidified by purified phosphoric acid.

Phosphates are also widely used to balance the mineral content of foods (Na, K, Ca, etc.).

*Prayon Group jobs (according to equity method)
**According to equity method
We achieve our goals through strong ethics and solid core values

- **Customer-focused:** We listen to your needs and fulfil your requirements. We are competitive and flexible.
- **People-oriented:** We value the experience, creativity and professionalism of our employees. We are a winning team.
- **Technology:** We maintain state-of-the-art facilities through continuous process improvement and innovation.
- **Quality of life:** We practise Responsible Care. We believe in sustainable development. We are committed to enhancing quality of life.

Our food-grade phosphates are allergen-free, GMO-free and BSE-/TSE-free.

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