

# SPS® SUSPENSION

## Sodium Polystyrene Sulfonate Suspension, USP

CMP Pharma, Inc.

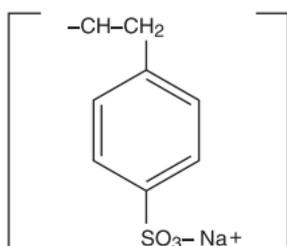
### Cation-Exchange Resin

#### Rx Only

#### DESCRIPTION

Sodium Polystyrene Sulfonate Suspension USP (SPS® Suspension) can be administered orally or in an enema. It is a cherry-flavored suspension containing 15 grams of cation-exchange resin (Sodium Polystyrene Sulfonate USP); **21.5 mL of Sorbitol Solution USP (equivalent to approximately 20 grams of Sorbitol)**; 0.18 mL (0.3%) of Alcohol per 60 mL of suspension. Also contains Purified Water USP; Propylene Glycol USP; Magnesium Aluminum Silicate NF; Sodium Saccharin USP; Methylparaben NF; Propylparaben NF; and flavor.

Sodium polystyrene sulfonate is a benzene, diethenyl-, polymer with ethenylbenzene, sulfonated, sodium salt and has the following structural formula:



The sodium content of the suspension is 1500 mg (65 mEq) per 60 mL. It is a brown, slightly viscous suspension with an *in-vitro* exchange capacity of approximately 3.1 mEq (*in-vivo* approximately 1 mEq) of potassium per 4 mL (1 gram) of suspension. It can be administered orally or in an enema.

#### CLINICAL PHARMACOLOGY

As the resin passes along the intestine or is retained in the colon after administration by enema, the sodium ions are partially released and are replaced by potassium ions. For the most part, this action occurs in the large intestine, which excretes potassium ions to a greater degree than does the small intestine. The efficiency of this process is limited and unpredictably variable. It commonly approximates the order of 33%, but the range is so large that definitive indices of electrolyte balance must be clearly monitored.

Metabolic data are unavailable.

#### INDICATION AND USAGE

SPS® Suspension is indicated for the treatment of hyperkalemia.

#### CONTRAINDICATIONS

SPS® Suspension is contraindicated in the following conditions: patients with hypokalemia, patients with a history of hypersensitivity to polystyrene sulfonate resins, obstructive bowel disease, oral or rectal administration in neonates (see **PRECAUTIONS**).

#### WARNINGS

**Intestinal Necrosis:** Cases of intestinal necrosis, which may be fatal, and other serious gastrointestinal adverse events (bleeding, ischemic colitis, perforation) have been reported in association with sodium polystyrene sulfonate use. The majority of these cases reported the concomitant use of sorbitol. Risk factors for gastrointestinal adverse events were present in many of the cases including prematurity, history of intestinal disease or surgery, hypovolemia, and renal insufficiency and failure. Concomitant administration of additional sorbitol is not recommended (see **PRECAUTIONS, Drug Interactions**).

- Use only in patients who have normal bowel function. Avoid use in patients who have not had a bowel movement post-surgery.
- Avoid use in patients who are at risk for developing constipation or impaction (including those with history of impaction, chronic constipation, inflammatory bowel disease, ischemic colitis, vascular intestinal atherosclerosis, previous bowel resection, or bowel obstruction).
- Discontinue use in patients who develop constipation.

#### Alternative Therapy in Severe Hyperkalemia

Since the effective lowering of serum potassium with sodium polystyrene sulfonate may take hours to days, treatment with this drug alone may be insufficient to rapidly correct severe hyperkalemia associated with states of rapid tissue breakdown (e.g., burns and renal failure) or hyperkalemia so marked as to constitute a medical emergency. Therefore, other definitive measures, including dialysis, should always be considered and may be imperative.

#### Hypokalemia

Serious potassium deficiency can occur from sodium polystyrene sulfonate therapy. The effect must be carefully controlled by frequent serum potassium determinations within each 24 hour period. Since intracellular potassium deficiency is not always reflected by serum potassium levels, the level at which treatment with sodium polystyrene sulfonate should be discontinued must be determined individually for each patient. Important aids in making this determination are the patient's clinical condition and electrocardiogram. Early clinical signs of severe hypokalemia include a pattern of irritable confusion and delayed thought processes.

Electrocardiographically, severe hypokalemia is often associated with a lengthened Q-T interval, widening, flattening, or inversion of the T wave, and prominent U waves. Also, cardiac arrhythmias may occur, such as premature atrial, nodal, and ventricular contractions, and supraventricular and ventricular tachycardias. The toxic effects of digitalis are likely to be exaggerated. Marked hypokalemia can also be manifested by severe muscle weakness, at times extending into frank paralysis.

#### Electrolyte Disturbances

Like all cation-exchange resins, sodium polystyrene sulfonate is not totally selective (for potassium) in its actions, and small amounts of other cations such as magnesium and calcium can also be lost during treatment. Accordingly, patients receiving sodium polystyrene sulfonate should be monitored for all applicable electrolyte disturbances.

#### Systemic Alkalosis

Systemic alkalosis has been reported after cation-exchange resins were administered orally in combination with nonabsorbable cation-donating antacids and laxatives such as magnesium hydroxide and aluminum carbonate. Magnesium hydroxide should not be administered with sodium polystyrene sulfonate. One case of grand mal seizure has been reported in a patient with chronic hypocalcemia of renal failure who was given sodium polystyrene sulfonate with magnesium hydroxide as a laxative (See **PRECAUTIONS, Drug Interactions**).

#### PRECAUTIONS

Caution is advised when sodium polystyrene sulfonate is administered to patients who cannot tolerate even a small increase in sodium loads (i.e., severe congestive heart failure, severe hypertension, or marked edema). In such instances compensatory restriction of sodium intake from other sources may be indicated.

**Precautions should be taken to ensure the use of adequate volumes of sodium-free cleansing enemas after rectal administration.**

In the event of clinically significant constipation, treatment with SPS® Suspension should be discontinued until normal bowel motion is resumed (See **WARNINGS, Intestinal Necrosis**).

#### Drug Interactions

##### Antacids

The simultaneous oral administration of sodium polystyrene sulfonate with nonabsorbable cation-donating antacids and laxatives may reduce the resin's potassium exchange capability.

##### Nonabsorbable cation-donating antacids and laxatives

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Intestinal obstruction due to concretions of aluminum hydroxide when used in combination with sodium polystyrene sulfonate has been reported.

##### Digitalis

The toxic effects of digitalis on the heart, especially various ventricular arrhythmias and A-V nodal dissociation, are likely to be exaggerated by hypokalemia, even in the face of

serum digoxin concentrations in the "normal range" (See **WARNINGS**).

#### **Sorbitol**

Concomitant use of sorbitol with sodium polystyrene sulfonate has been implicated in cases of intestinal necrosis, which may be fatal. (See **WARNINGS**).

#### **Lithium**

SPS® Suspension may decrease absorption of lithium.

#### **Thyroxine**

SPS® Suspension may decrease absorption of thyroxine.

**Carcinogenesis, Mutagenesis, Impairment of Fertility**  
Studies have not been performed.

#### **Pregnancy Category C**

Animal reproduction studies have not been conducted with sodium polystyrene sulfonate. It is also not known whether sodium polystyrene sulfonate can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. Sodium polystyrene sulfonate should be given to a pregnant woman only if clearly needed.

#### **Nursing Mothers**

It is not known whether this drug is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when sodium polystyrene sulfonate is administered to a nursing woman.

#### **Pediatric Use**

The effectiveness of SPS® Suspension in pediatric patients has not been established. **The use of SPS® Suspension is contraindicated in neonates and especially in premature infants.** In children and neonates, particular care should be observed with rectal administration, as excessive dosage could result in impaction of the resin. **Precautions should be taken to ensure the use of adequate volumes of sodium-free cleansing enemas after rectal administration.**

#### **ADVERSE REACTIONS**

SPS® Suspension may cause some degree of gastric irritation. Anorexia, nausea, vomiting, and constipation may occur especially if high doses are given. Also, hypokalemia, hypocalcemia, hypomagnesemia and significant sodium retention, and their related clinical manifestations, may occur (See **WARNINGS**). Occasionally diarrhea develops. Large doses in elderly individuals may cause fecal impaction (See **PRECAUTIONS**). Rare instances of intestinal necrosis have been reported. Intestinal obstruction due to concretions of aluminum hydroxide, when used in combination with sodium polystyrene sulfonate, has been reported.

The following events have been reported from worldwide post marketing experience:

- Fecal impaction following rectal administration, particularly in children;
- Gastrointestinal concretions (bezoars) following oral administration;
- Ischemic colitis, gastrointestinal tract ulceration or necrosis which could lead to intestinal perforation; and
- Rare cases of acute bronchitis and/or bronchopneumonia associated with inhalation of particles of polystyrene sulfonate.

#### **OVERDOSAGE**

Overdosage may result in electrolyte disturbances including hypokalemia, hypocalcemia, and hypomagnesemia. Biochemical disturbances resulting from overdosage may give rise to clinical signs and symptoms of hypokalemia, including: irritability, confusion, delayed thought processes, muscle weakness, hyporeflexia, which may progress to frank paralysis and/or apnea. Tetany may occur. Electrocardiographic changes may be consistent with hypokalemia or hypocalcemia; cardiac arrhythmias may occur. Appropriate measures should be taken to correct serum electrolytes (potassium, calcium, magnesium), and the resin should be removed from the alimentary tract by appropriate use of laxatives or enemas.

#### **DOSAGE AND ADMINISTRATION**

The average daily adult dose is 15 g (60 mL) to 60 g (240 mL) of suspension. This is best provided by administering 15 g (60 mL) of SPS® Suspension one to four times daily. Each 60 mL of SPS® Suspension contains 1500 mg (65 mEq) of sodium. Since the *in-vivo* efficiency of sodium-potassium exchange resins is approximately 33%, about one-third of the resin's actual sodium content is being delivered to the body.

In smaller children and infants, lower doses should be employed by using as a guide a rate of 1 mEq of potassium per gram of resin as the basis for calculation.

SPS® Suspension may be introduced into the stomach through a plastic tube and, if desired, given with a diet appropriate for a patient in renal failure.

SPS® Suspension may also be given, although with less effective results, as an enema consisting (for adults) of 30 g (120 mL) to 50 g (200 mL) every six hours. The enema should be retained as long as possible and followed by a cleansing enema.

After an initial cleansing enema, a soft, large size (French 28) rubber tube is inserted into the rectum for a distance of about 20 cm, with the tip well into the sigmoid colon, and taped into place. The suspension is introduced at body temperature by gravity. The suspension is flushed with 50 or 100 mL of fluid, following which the tube is clamped and left in place. If back leakage occurs, the hips are elevated on pillows or a knee-chest position is taken temporarily. The suspension is kept in the sigmoid colon for several hours, if possible. **Then the colon is irrigated with a sodium-free cleansing enema at body temperature in order to remove the resin. Two quarts of flushing solution may be necessary. The returns are drained constantly through a Y tube connection. Particular attention should be paid to this cleansing enema, because sorbitol is present in the vehicle.**

The intensity and duration of therapy depend upon the severity and resistance of hyperkalemia.

SPS® Suspension should not be heated for to do so may alter the exchange properties of the resin.

#### **HOW SUPPLIED**

SPS® Suspension is a light brown, cherry-flavored suspension supplied in pint (473 mL) bottles (NDC 46287-006-01), 120 mL bottles (NDC 46287-006-04), and 60 mL unit dose bottles, 10 bottles per carton (NDC 46287-006-60).

Dispense in a tight container, as defined in the USP. If repackaging into other containers, store in refrigerator and use within 14 days of packaging.

SHAKE WELL BEFORE USING.

Store at 20°-25°C (68°-77°F); excursions permitted to 15°-30°C (59°-86°F). [See USP Controlled Room Temperature].



**CMP Pharma, Inc.**

P.O. Box 147

Farmville, North Carolina 27828

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