

## WHERE DO I FIND IT

**NON NATURAL** (inorganic) phosphorus: These are **food additives** found in ultraprocessed foods (look the table with the food additives with phosphorus).

**NATURAL** (organic) phosphorus: naturally present in **protein-rich foods**.

### IMPORTANT!

MOST of the Non-Natural Phosphorus that is ingested will be absorbed by the gut (100%). But the Natural Phosphorus will be much less absorbed (animal source = 60-70%; vegetal source 30-40%).

**NON-NATURAL Phosphorus increase phosphorus blood levels more than NATURAL phosphorus.**

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## If I have CKD, and BLOOD PHOSPHATE IS NORMAL,

### WHAT SHOULD I DO?

1

The fact that your phosphate blood levels are normal does not mean that you should not worry with the phosphorus content of your diet. If the **AMOUNT OF PHOSPHOROUS** that you eat in your diet is **HIGH**, some body adaptative mechanisms may allow normal level of phosphates in the blood but this **IS HARMFUL FOR SUBJECTS WITH CKD**.

2

**REDUCE THE AMOUNT OF ANIMAL PROTEIN** (red meat, poultry, fish, egg, dairy), and **PREFER VEGETABLE PROTEIN** (legumes and beans).

3

The most important foods to **AVOID** are the **ULTRAPROCESSED FOODS**, that is, those that contain phosphate additives.

**Reduce the phosphorus content of foods by boiling them in abundant water until cooked and discarding the cooking water.**

Name of additives	Acronym	We can find them in ...
Orthophosphoric acid	E 338	Carbonated soft drinks, particularly those based on cola
Sodium orthophosphate	E 339	
Potassium orthophosphate	E 340	
Calcium orthophosphate	E 341	
Magnesium phosphate	E 343	
Polyphosphates	E 450	Powdered milk, concentrated milk, potato flour, puddings, processed cheeses, canned meat, cooked sausages, cooked ham, cooked shoulder, prepared turkey meats, breaded products, confectionery products
Calcium diphosphate	E 540	
Sodium aluminum phosphate	E 541	
Calcium polyphosphates	E 544	
Ammonium polyphosphates	E 545	



# PHOSPHORUS



A collaboration between ERN and the ERA Cookbook



# WHAT IS PHOSPHORUS?

Phosphorus is a mineral that, along with calcium and other nutrients, is responsible for building strong bones and teeth.

## Why limit phosphorus intake in CKD/ESKD?

- With the loss of renal function, phosphorus excretion decreases and it accumulates in the blood.
- The excess of phosphorus in the blood - if maintained for long time and not treated - can increase the parathyroid hormone and, combined with high calcium levels, can turn some veins and arteries hard and similar to bones. In addition, other bone diseases can appear and cause pain.



## HOW TO LIMIT PHOSPHORUS INTAKE?

- **ASK THE DIETITIAN** how much food containing Phosphorus you can eat. This will vary depending on the plasma phosphorus levels and of the stage of chronic kidney disease.
- **AVOID ULTRAPROCESSED FOODS AND DRINKS** because they contain additives with phosphorus which are more harmful than the natural phosphorus present in foods.
- **AVOID USING TOO MUCH DAIRY** in the diet. Ask the dietitian how much you can eat per day. If you use vegetable milk, check the ingredient list for additives containing phosphorus. Avoid aged cheeses as they have more phosphorus and sodium than fresh cheese.
- Whole **GRAIN CEREALS** (like oats, whole wheat flour, whole rice) **ARE PREFERABLE** to the refined versions (like white rice and white bread), despite they have more phosphorus. The whole grain cereals have more fiber and the amount of phosphorus absorbed by the body is smaller. Limit their intake to once or twice a day, and do not exclude them as they are rich in fiber.
- Look at the red-light figure, and **PREFERE EATING THE FOODS ON THE YELLOW AND GREEN SIGNS**. Those in yellow have a phosphorus to protein ratio lower than 12 mg P/g of protein.
- **AVOID NUTS**, or limit them to 1-2 nuts/day, based on your phosphorus and potassium levels.
- If possible, prefer **BUYING WILD CAUGHT FISH** instead of farmed fish. The farmed fish usually have higher phosphate content.

### Foods and drinks containing additives (E338-343, E450-458, E540-545)

Carbonated soft drinks, particularly those based on cola, processed cheese, ultra processed meat (ie. Chicken Nuggets), desserts, powdered milk, enriched food, concentrated milk, potato flour, canned meat, cooked sausages and ham, breaded products

### Other sources containing an even higher phosphorus to protein ration (> 16)

Aged cheese: parmesan, pecorino, cheddar, emmenthal, stracchino, blue cheese, taleggio, caciotta.  
Nuts, seeds and dried fruit, chocolate, egg yolk.

### Animal protein sources containing a phosphorus to protein ration > 12:

Meat: entrails, sausages, mortadella, ham, salami.  
Poultry: turkey, pheasant.  
Fish: tuna, trout, shrimp, squid, salmon, clams, prawns, mussels, mackerel, sea bass, lobster.  
Dairy: cottage cheese, other fresh cheese.

### Animal protein sources containing a phosphorus to protein ration < 12:

Meat: rabbit, lamb, cooked ham without additives, pork, veal, duck, sheep.  
Poultry: chicken, guinea fowl.  
Fish: cod, hake, anchovy, cuttlefish.  
Dairy: scamorza, mozzarella, ricotta.  
Dairy: Milk, yogurt (1 portion/day).

Cereals: bread, pasta, rice, couscous, corn flour, cornflakes, toasted bread, buckwheat, corn, whole grain rice or pasta, oat flakes.

Legumes: beans, peas, chickpeas, lentils etc.

Egg white, fruits and vegetables.

Olive oil and other plant-based fats (ie. margarine, corn oil, peanut oil), Butter, Sugar.

Low protein foods (used in patients with CKD not on dialysis).