



## The Role of Selenium as a Bioactive Antioxidant

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### ARTICLE HISTORY

Received: 3-Jul-2023, Manuscript No. EJMOAMS-23-113856;  
Editor assigned: 5-Jul-2023, PreQC No. EJMOAMS-23-113856 (PQ);  
Reviewed: 19-Jul-2023, QC No. EJMOAMS-23-113856;  
Revised: 26-Jul-2023, Manuscript No. EJMOAMS-23-113856 (R);  
Published: 2-Aug-2023

### Description

Selenium is a trace element that plays a crucial role in maintaining overall health and well-being. Beyond its essential functions in the body, selenium has gained attention for its antioxidant properties. Antioxidants are compounds that help protect cells from oxidative damage caused by free radicals, unstable molecules that can harm DNA, proteins, and lipids, leading to various health issues, including cancer, heart disease, and aging. Selenium, in its role as an antioxidant, assists in neutralizing these harmful free radicals. In this article, we will delve into the scientific mechanisms behind selenium's antioxidant function and explore foods rich in selenium.

#### The mechanism of selenium as an antioxidant

Selenium exerts its antioxidant effects primarily through its incorporation into selenoproteins, a class of specialized proteins that contain selenium in the form of the amino acid selenocysteine. These selenoproteins serve as powerful antioxidants in the body, safeguarding cells against oxidative stress.

**Glutathione peroxidases:** One of the most well-known selenoproteins is glutathione peroxidase. This enzyme plays a pivotal role in the body's defense against oxidative damage. It neutralizes hydrogen peroxide and lipid peroxides, thus preventing cellular damage. Selenium is a crucial component of glutathione peroxidase, allowing it to function effectively.

**Thioredoxin reductases:** Selenium is also a key component of thioredoxin reductases, another group of selenoproteins involved in the reduction of oxidative stress. These enzymes help maintain the balance of redox reactions within cells, mitigating the harmful effects of Reactive Oxygen Species (ROS).

**Selenoprotein P:** Selenoprotein P is a selenium-containing protein that serves as a transporter for selenium in the bloodstream. It helps distribute selenium to various tissues, including those that require it for antioxidant defense. This ensures that selenium is available where it is needed most to combat oxidative stress.

#### Selenium-rich foods

Now that we understand the mechanism behind selenium's antioxidant function, let's explore some foods that are rich in this essential trace element:

**Brazil nuts:** Among all foods, Brazil nuts are renowned for their exceptionally high selenium content. Just a few Brazil nuts can provide your daily recommended intake of selenium. Selenium in Brazil nuts is found in the form of selenomethionine, a highly bioavailable form.

**Fish:** Fish, particularly tuna, salmon, and sardines, are excellent sources of selenium. Selenium in fish is primarily present as selenomethionine, making it easily absorbed by the body.

**Eggs:** Eggs, especially the yolk, contain significant amounts of selenium in the form of selenomethionine. Including eggs in your diet can contribute to your selenium intake.

**Lean meats:** Meats like chicken, turkey, and lean beef are good sources of selenium, as well as high-quality protein. Selenium in meats is found as selenocysteine in various selenoproteins.

**Whole grains:** Whole grains like wheat, barley, and brown rice contain selenium, albeit in smaller quantities compared to other sources. Nevertheless, they contribute to your overall selenium intake, especially if consumed regularly.

**Sunflower seeds:** Sunflower seeds are a nutritious snack that contains selenium. They can be incorporated into salads, yogurt, or enjoyed on their own.

**Spinach and other leafy greens:** Vegetables like spinach, collard greens, and kale contain selenium, albeit in modest amounts. Incorporating a variety of vegetables into your diet can help boost your selenium intake.

Selenium's role as an antioxidant is vital in protecting the body from oxidative stress and the associated health risks. Its incorporation into selenoproteins, such as glu-

tathione peroxidases and thioredoxin reductases, allows it to neutralize harmful free radicals and maintain cellular health. Including selenium-rich foods in your diet, such as Brazil nuts, fish, eggs, lean meats, whole grains, sunflower seeds, and leafy greens, can help ensure that your body receives an adequate supply of this essential trace element to support its antioxidant defenses. However, it's essential to maintain a balanced diet and not rely solely on selenium for antioxidant protection, as other antioxidants and nutrients are also crucial for overall health.