



manufacturing process of selen nano drink

The manufacturing process of a selenium nano drink involves several key steps to incorporate selenium nanoparticles (SeNPs) safely and effectively into a beverage. The process generally consists of two main parts: the **synthesis of selenium nanoparticles** and the **formulation of these particles into the drink**.

1. Synthesis of Selenium Nanoparticles (SeNPs)

There are three main synthesis methods to create SeNPs used in beverages:

- **Biological (Green) Synthesis:**

Using microbes, plants, or fermentation (e.g., Kombucha fermentation with selenium salt) to biosynthesize SeNPs in situ. This method is eco-friendly and increases bioavailability. For example, Kombucha fermentation with pollen and added sodium selenite can generate SeNPs naturally during fermentation, producing a selenium-enriched drink with antioxidant activity. ^[1]

- **Chemical Synthesis:**

Involves reducing selenium salts (e.g., sodium selenite) with reducing agents such as ascorbic acid in the presence of stabilizers like polysaccharides (chitosan, konjac glucomannan, carboxymethyl cellulose) to produce stable, uniform SeNPs in solution. This is widely used for industrial production. ^[2]

- **Physical Methods:**

Techniques like pulsed laser ablation in liquids, hydrothermal treatment, microwave radiation, and others generate pure SeNPs without chemical contaminants. Such methods yield high-purity nanoparticles but may require specialized equipment. ^[2]

2. Formulation of Selenium Nano Drink

- **Incorporating SeNPs into Beverage Base:**

- SeNP suspensions are purified and stabilized using agents to prevent aggregation.
- The SeNP solution is mixed carefully into beverage bases such as water, tea (e.g., black or kombucha), juice, or herbal infusions under controlled conditions to ensure even distribution.

- **Fermentation (Optional):**

- In green synthesis-based products, fermentation may continue after SeNP formation to improve flavor, probiotic content, and antioxidant capacity, as in kombucha-based drinks fortified with SeNPs.

- **Filtration and Sterilization:**

- The beverage is filtered and sterilized to ensure safety and shelf stability without damaging SeNPs.
- **Bottling and Packaging:**
 - The final drink is bottled under hygienic conditions, maintaining nanoparticle dispersion.

Summary of Manufacturing Flow

Step	Description
Selenium Salt Preparation	Sodium selenite or other salts prepared as precursor
SeNP Synthesis	Chemical, biological, or physical reduction to nanoparticles
Stabilization	Use of polysaccharides/proteins to stabilize nanoparticles
Beverage Base Preparation	Preparing water, tea, juice, or fermented liquids
Mixing SeNPs into Base	Careful incorporation ensuring homogeneity
Filtration and Sterilization	Removing impurities and pathogens
Bottling and Packaging	Hygienic filling and sealing

This process ensures the selenium nano drink is bioavailable, safe, and palatable, while taking advantage of the unique properties of selenium nanoparticles for health benefits.



1. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10525527/>
2. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10227571/>