If then, explain about detailed information of limitation quantity of this property that can not affect to human health

The detailed information about the safe **limitation quantity** of selenium nanoparticles (SeNPs) that will not adversely affect human health is as follows:

Safe Dosage Limits for Selenium Nanoparticles

- **Maximum safe dose for humans:** Approximately **300 micrograms (µg) per day** or **5 µg per kg of body weight per day** is considered the upper limit for selenium intake to avoid toxicity as per the Scientific Committee on Food (2006).[1]
- This dosage corresponds to typical adult upper intake limits for selenium in any form, including nanoparticles.
- **Lower doses (~50-100 µg/day)** are within the recommended dietary allowance for normal selenium intake.

Findings from Toxicity Studies

- Oral dosing of SeNPs in animal studies at doses of **0.05 to 0.5 mg/kg body weight per day** for 14 days showed **no clinical signs of toxicity** or significant adverse effects compared to controls.[1]
- Both SeNPs and traditional selenium forms caused similar metabolite changes at low to moderate doses, indicating biological effect but no significant toxicity.
- High doses of selenium intake can lead to toxicity symptoms (selenosis) such as gastrointestinal distress, hair loss, fatigue, and, rarely, more severe effects.

Recommended Limits and Guidelines

Parameter	Quantity	Notes
Upper Selenium Intake Limit	300 µg/day	To avoid toxicity in humans
Typical Dietary Requirement	55 µg/day	Average needed for normal physiological function
Safe Selenium Nanoparticle Range	Up to 5 µg/kg body weight/day	Considered safe based on human extrapolation from studies
Toxic Dose (LOAEL)	~300 µg/day (chronic intake)	Lowest observed adverse effect level related to mortality in long term studies

Key Takeaways:

- SeNPs are generally **less toxic** than other selenium forms due to slower release and better biological interactions.
- Consuming SeNPs below the **300 µg/day threshold** is considered safe, with doses adjusted by body weight.
- Excessive chronic consumption above this limit may increase risk of selenium toxicity.
- Regulatory agencies advise care in supplement doses and recommend staying within established limits for selenium intake.

Conclusion

Selenium nanoparticles in beverages or supplements should be formulated to provide selenium doses **below the upper safe limit (~300 µg/day)** to ensure no adverse health effects. Proper dosing adherence and product quality control are critical for safe consumption.

This dosing ensures the micronutrient benefits of selenium, including its antioxidant and immune support roles, without toxic risk.

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1. https://pmc.ncbi.nlm.nih.gov/articles/PMC5075706/