



Women in Science – 3rd Erlangen Symposium

Sustainability and green concepts in pharmaceutical nanoformulations

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Current trends in pharmacy turned to sustainability and green concepts leading to a re-thinking of the classical drug formulation techniques to avoid hazards for human health and the natural environment. The formulation of active substances by nanoparticle approaches has resulted in a high number of reports with new concepts and trends for the development and optimization of new drug carriers with varying architectures and novel carrier materials, but sustainability concepts are still rare.

The different steps and excipients for the preparation of polymer-based nanoparticles by nanoprecipitation and nanoemulsification as the most commonly used manufacturing techniques will be evaluated regarding sustainability [1]. New green and sustainable solvents are presented as alternatives for organic solvents to dissolve the polymers and the correlation between physicochemical solvent characteristics and the type of the formulation process, the particle characteristics, as well as effects on biological efficacy and toxicity are highlighted [2]. Alternatives for surfactants and emulsifiers will be discussed.

Additionally, the potential of natural polymers that are produced by organisms like bacteria or Archaea, as drug delivery systems will be presented such as bacterial nanocellulose used as wound dressings and lipidic archaeosomes for oral vaccination [3].

Conclusively, new excipients are available that present a significant advancement as green and sustainable alternatives in nanoparticle formulations and provide access to high-quality delivery systems with reproducible quality.

References

- [1] D. Fischer, Handbook Exp. Pharmacol. **2024**, 284, 45.
- [2] C. Grune et al., Int. J. Pharmaceutics. **2021**, 599, 120404.
- [3] Y. Poetzing et al., Ther. Deliv. **2017**, 8, 753