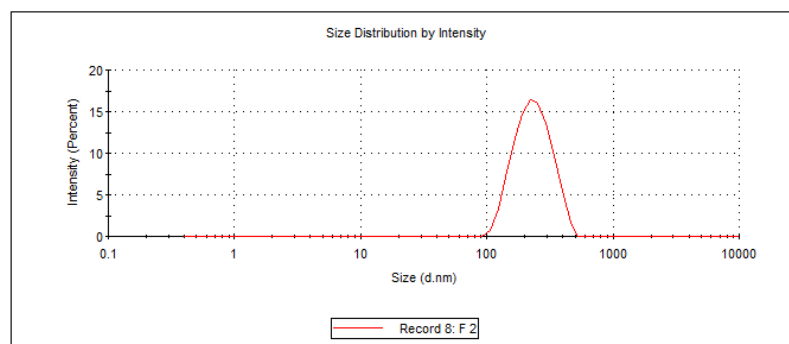


## X-4

**DEVELOPMENT OF FUCOIDAN-CHITOSAN NANOPARTICLES AS AN EFFECTIVE CARRIER FOR THE DELIVERY OF BIOACTIVE COMPOUNDS****Mensah Emmanuel Ofofu<sup>1</sup>, M. A. Mironov,<sup>1</sup> T. E. Bulya,<sup>1</sup> R. S. Alqubelat<sup>1</sup>**<sup>1</sup>*Institute of Chemical Engineering, Ural Federal University*

E-mail: emmanuelofosu63@gmail.com

**Abstract.** Fucoidan is an anionic polysaccharide endowed with a lot of biological activities that are mainly obtained from brown seaweed. Besides their biological activities, their anionic nature makes them ideal for the development of nanoparticles with cationic polymers [1]. Fucoidan-based nanoparticles have recently received much attention especially in the pharmaceutical, food, and cosmetics industry due to the benefits they produce. These nanoparticles have however been faced by problems such as agglomeration, aggregation, and deprotonation which tend to destabilize them [2]. The aim of the study was to prepare a fucoidan-chitosan nanoparticle with different concentrations of fucoidan-chitosan composition in ratio (3/1, and 5/1) with modification to prevent these disparities. Fabrication of nanoparticles were mainly done by polyelectrolyte assembly with addition of glucose, sucrose, inulin, and polyethylene glycol as stabilizers. The nanoparticles were characterized using H<sup>1</sup> NMR (proton nuclear magnetic resonance), Infrared spectroscopy (IR), and dynamic light scattering (DLS). Results obtained from H<sup>1</sup> NMR indicates a good formation of fucoidan-chitosan nanoparticles. Also particle size of these nanoparticles were obtained around 200-300 nm with a very good zeta potential of (− 19mV) to (− 8mV). The nanoparticles were also found to be poly dispersed and much more stable at acidic pH. Also, results showed stable nanoparticles after one month of storage on the bench with no precipitates. This is a good nanoparticle and a Ave for delivery of drug and bioactive compounds since they are stable and free from aggregation. Future work is devoted to the incorporation of bioactive compound into this nanoparticle for effective delivery in vitro, chemical analysis, and its biological activities.



**Figure 5** Particle size distribution between fucoidan and chitosan by DLS.

**References**

1. Zayed, A., El-Aasr, M., Ibrahim, A.S., Ulber, R. Fucoidan Characterization: Determination of Purity and Physicochemical and Chemical Properties (2020). *Marine Drugs*. 19;18(11):571. doi: 10.3390/md18110571.
2. Zhang, X., Wei, Z., & Xue, C. (2021). Physicochemical properties of fucoidan and its applications as building blocks of nutraceutical delivery systems. *Critical Reviews in Food Science and Nutrition*. <https://doi.org/10.1080/10408398.2021.1937042>.