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AQ13 Characterization of differential scanning calorimetry (DSC) polymeric nanoparticles ethanol fraction of green tea leaves (*C. sinensis*).

AQ11 X-ray diffraction (XRD) characterization on polymeric nanoparticles ethanol fraction of green tea leaves.

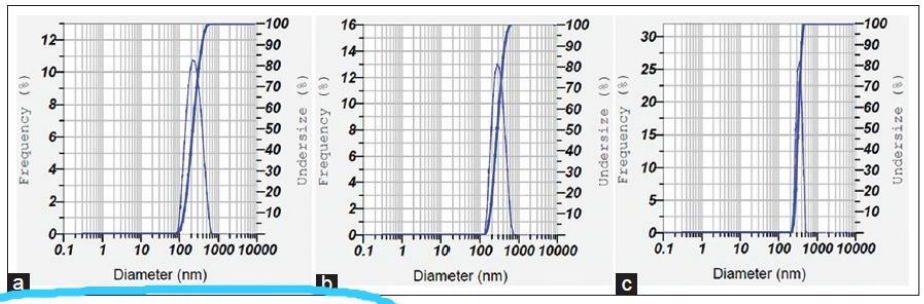


**Figure 2:** Particle size distribution in the three formulations

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The diffractogram pattern shows the results of 2Θ angle and intensity values. It depends on the strength of the intermolecular electron bonds in the molecule. It is shown in Figure 3.

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In the DSC curve, sodium tripolyphosphate shows the peak of the endothermic phase at a temperature of 120.06°C, which is indicated as the material's melting point. This pattern also illustrates that sodium tripolyphosphate is in a crystalline form. Meanwhile, chitosan and carrageenan polymers demonstrated a glass-transition pattern, which indicated an amorphous form.

# Cytotoxicity and antiproliferative activity of ethanol and ethyl acetate fractions from polymeric nanoparticles of green tea leaves (*Camellia sinensis*) in breast cancer cell line MDA-MB-132

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## Abstract

Green tea (*Camellia sinensis*) has benefits. Its main potential content is epigallocatechin gallate, which has many bioactivity and pharmacological properties. However, herbal medicines have limitations on low solubility and stability. A nanoparticle delivery system is a perfect form of active ingredient development, because it can mediate the increase in solubility, dissolution rate, and strength of a targeted delivery system. This study aimed to make and test the formulation of the ethanol and ethyl acetate fraction from green tea leaves in the form of a nanoparticle delivery system using chitosan biopolymer as the primary carrier polymer combined with sodium tripolyphosphate as a crosslinker and then carried out the tests on the MDA-MB-231 breast cancer cell line. The results showed that the particle size value was 199.7 nm, the zeta potential was-56.7 mV, and the polydispersity index was 0.337. X-ray diffraction and differential scanning calorimetry test results showed that the *C. sinensis* fraction was perfectly dispersed molecularly in the nanoparticle system. The results of the cytotoxic test on the MDA-MB-231 breast cancer cell line obtained IC50 values for both fractions, namely 10.70 µg/mL (nano ethanol fraction) and 12.72 µg/mL (nano ethyl acetate fraction). This result showed a significant increase in anticancer activity in both fractions compared to those not formulated ($P < 0.05$). These results also show that the *C. sinensis* tea fraction formulated in a nanoparticle delivery system has a great potential as a new therapeutic agent for breast cancer.

**Key words:** Cytotoxicity test, drug delivery system, ethanol, ethyl acetate fraction of *Camellia sinensis* green tea leaves, MDA-MB-231 breast cancer cells, nanoparticle technology