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## PHISICOCHEMICAL STUDY ON FREEZE-DRIED SACCHARIDE INCLUDING NANOPARTICLES USING POWDER X-RAY DIFFRACTOMETRY AND DIFFERENTIAL SCANNING CALORIMETRY

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**P**owder X-ray diffractometry (PXRD) and differential scanning calorimetry (DSC) are employed to investigate the property of crystalline powders. In the case of PXRD, powders with crystal phase produce diffractive peaks and powders with amorphous phase produce hallow pattern. In the case of DSC, the powders with crystal phase has endothermic peak because they have melting point. Meanwhile, powder with amorphous phase has no endothermic peak because they have melting point. In the present study, we investigated about a relationship between various saccharides and nanoparticles during freeze-drying or normal drying. Because nanoparticles suspension is thermodynamically labile, we focus on freeze-drying and normal-drying method. Trisaccharides, tetrasaccharides, or pentasaccharides were added to the nanoparticle suspensions, followed by rehydration of the samples, which had been either dried normally or freeze-dried. The particle size after rehydration each sample at that time was then measured. The particle size of each freeze-dried saccharide was maintained.

Meanwhile, the particle size of each normal dried saccharide indicated various particle size. We studied the association between the nanoparticles aggregation and the crystal form of saccharides and their mechanisms by using the obtained results of the data of particle size, powder X-ray pattern, and DSC curves. The relationship between degrees of the nanoparticles aggregation and degree of crystallization are gradually figured out. By continuing this research, the saccharide additives map for preservation nanoparticles will be drawn.

### Biography

Seitaro Kamiya has completed his PhD in Pharmaceutical Technology from the University of Shizuoka. He has worked as Senior Assistant Professor of Pharmaceutical Technology at Nagasaki International University. He has published more than 12 papers as a first author in reputed journals. He has succeeded in commercializing vitamin C related products through collaborative research with a health food company.

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