# Determination of iodine concentrations in organs, eggs and feed of laying hens by different sample preparations followed by PIXE

Eri Tsuchihashi[1)], Norihiko Oyama[1)], Masahiro Natsuhori[1)], Koichiro Sera[3)]
Satoru Hatakeyama[2)], Jun Ito [2)], Jiro Yokoyama[4)], Takahiko Morozumi[5)]
Tadashi Sano[1)], Shoji Futatsukawa[6)] and Nobuhiko Ito[1)]

[1)] Kitasato University, School of Veterinary Medicine and Animal Sciences
Higashi 23-35-1, Towada, Aomori 034-8628, Japan

[2)] Nishina Memorial Cyclotron Center, Japan Radioisotope Association
Tomegamori 348-58, Takizawa, Iwate 020-0173, Japan

[3)] Cyclotron Research Center, Iwate Medical University
Tomegamori 348-58, Takizawa, Iwate 020-0173, Japan

[4)] Nosan Corporation
Minatomirai Landmark Tower 46F, Nishi-ku, Yokohama, Kanagawa 220-8146, Japan

[5)] ALVIS Inc.
Higashi-Ikebukuro 2-32-22 Toshima-ku, Tokyo 170-0013, Japan

[6)]Radioisotope section, Japan Radioisotope Association
2-28-45 Honkomagome, Bunkyo, Tokyo 113-8941, Japan

## Abstract

In this study, iodine (I) concentrations from biological samples including iodine enriched eggs, normal eggs, organs and feed of laying hens were determined to evaluate the different methods for sample preparation followed by PIXE. Application of internal standards (In, Pd, Fe) and recoveries of iodine from iodine spiked samples were also considered.

As an internal standard, addition of In underestimated I concentration due to the similarity of characteristic peaks of x-ray between I and In. Therefore Pd or intrinsic Fe was considered to be the better internal standard. For the sample preparation, 1) nitrate ashing (NA), 2) homogenizing (HO), 3) water processing, 4) powdered internal standerd (PI), 5) NaOH processing (NaOH), and 6) KOH processing were chosen to evaluate. NA showed much lower concentration due to acid expel of iodine and other halogens. PI had the largest standard deviation in the determined values due to non-homogeneity in the micro environment of the powdered sample which was most affected by the higher viscosity, especially in fat-rich samples. On the other hands, HO and DW had relatively higher accuracy. The NaOH processing appeared to overestimate due to overlapping of the PIXE signal by significant amount of Na in samples. However considering overall results obtained, KOH processing had the best accuracy and recovery from the samples applied. The quantification limit of I in the samples are appeared to be less than 50 ppm. Therefore, further studies are needed to improve the condition of the sample preparation for the better determination of I by usng PIXE.