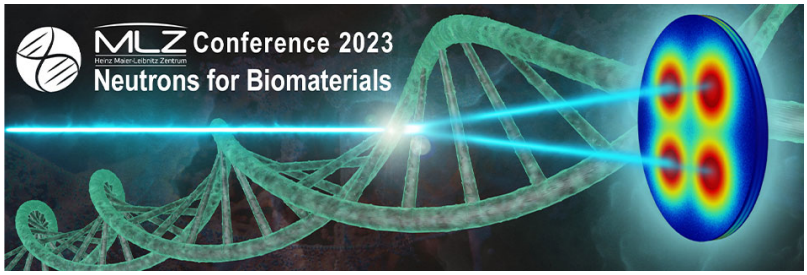

Contribution ID: **21** Type: **Talk**

HETEROPROTEIN COMPLEX FORMATION BASED ON LACTOFERRIN AND β-LACTOGLOBULIN: A SMALL-ANGLE NEUTRON SCATTERING STUDY

Thursday, 25 May 2023 09:30 (20 minutes)

Milk proteins exhibit wide diversity of physicochemical properties which make them attractive for many pharmaceutical and food applications. Major milk proteins are β-lactoglobulin, α-lactalbumin, serum albumin, and lactoferrin. Amongst these proteins, lactoferrin and β-lactoglobulin are considered to be the most versatile in terms of physicochemical properties and mainly due to the possibility of heteroprotein complex formation, which are of great interest in new food products development.
Heteroprotein complex formation between these two proteins can be prompted or reversed as a result of various environmental conditions, including the solution pH, salt addition, temperature, stoichiometry of the individual components, etc. Thus, in this study, the molecular interaction of human lactoferrin and β-lactoglobulin and formation of a high-degree protein complexes at pH 5.9, and the influence of molar ration of individual components, salt and temperature on our model systems were studied using small-angle scattering methods.
The results consistently displayed that the complexation between the LF and BLG occurs at pH 5.9 and the LF-2(BLG) hetero-complexes formation takes place. The solution scattering data treatment revealed that both LF and BLG in individual solutions are present as dimers of a radius of gyration 51Å and 25Å, respectively, whilst their complexes have a radius of gyration of 75Å (1:2.5 molar ratio) and 56Å (1:10 molar ratio). Moreover, when studying the effect of salt on the hetero-complexation it was shown that the interactions of BLG and LF are different in the presence of NaCl, resulting in macromolecular complexes of smaller radius of gyration from 75Å (at 0 mM NaCl) to 45Å (at 200 mM NaCl). The SANS results obtained for LF and BLG mixture at (molar ratio 1:2) investigated for thermal effect has shown that the complexes become unstable at 65°C and complete unfolding and aggregates formation takes place at the temperature of 90°C.
The experiments were performed at KWS-2 small-angle neutron scattering diffractometer operated by JCNS at the Heinz Maier-Leibnitz Zentrum (MLZ), Garching, Germany. L.A. gratefully acknowledges the support from project no.: 20.80009.5007.27. R.V.E. gratefully acknowledges the national research program no: PN 23.21.01.02.

Primary authors: Dr ANGHEL, Lilia (Institute of Chemistry); Dr ERHAN, Raul Victor (Horia Hulubei National Institute for R&D in Physics and Nuclear Engineering IFIN - HH)

Co-author: RADULESCU, Aurel (Forschungszentrum Jülich GmbH, Jülich Centre for Neutron Science at MLZ)

Presenter: Dr ERHAN, Raul Victor (Horia Hulubei National Institute for R&D in Physics and Nuclear Engineering IFIN - HH)

Session Classification: Food

Track Classification: Food