Sveučilište u Zagrebu
Prirodoslovno-matematički fakultet
Kemijski odsjek

KOLOKVIJ

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održat će u srijedu 20. prosinca u predavaonici P1 (prizemlje zgrade Kemije, Horvatovac 102a) s početkom u 11:00 sati kolokvij pod naslovom:

Separation by Polyelectrolyte Complexation

Cellular processes are extremely efficient and the most complex reactions occur in the blink of an eye. This efficiency can be only be achieved by good spatiotemporal organisation, that can be obtained by compartmentalisation of the right components in structures called organelles. In the traditional view these organelles are surrounded by a phospholipid membrane. However, it appears that the cellular fluids are highly organized. They consist of dynamic droplet-like condensates, referred to as membraneless organelles. A hypothesis is that these droplet-like structures ensure spatiotemporal control of components. Our work is inspired by this spatiotemporal organisation of components, if we can mimic this in the lab we can use to develop aqueous extraction media.
Many cellular condensates consist of cationic intrinsically disordered proteins and RNA and strongly resemble polyelectrolyte complexes. In our group we therefore use polyelectrolyte complexes as model systems for the cellular condensates and study the partitioning of molecules and proteins between the dilute aqueous phase and the dense condensate.
Previous research has demonstrated that protein uptake strongly depends on the polyelectrolyte complex composition. This suggests that polyelectrolyte complexes can be used to selectively extract proteins from a multi-protein mixture. With this in mind, we studied the uptake and release of the protein lysozyme using different polyelectrolyte complexes and release procedures. Complexes of poly(allylamine hydrochloride) and poly(acrylic acid) had the best uptake and release properties. These were used for selective extraction of lysozyme from a hen-egg white protein matrix. The (back)-extracted lysozyme retained its enzymatic activity, showing the capability of polyelectrolyte complexes to function as extraction media for proteins.

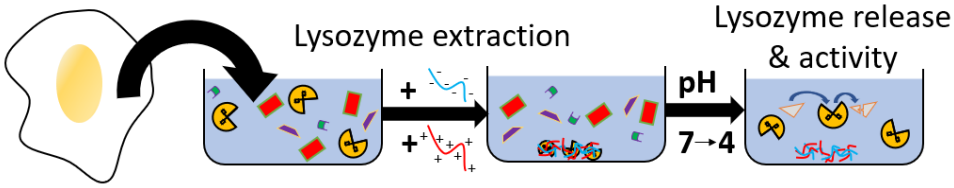

Figure 1. Lysozyme from egg-white, extracted by polyelectrolyte complexation remains catalytically active