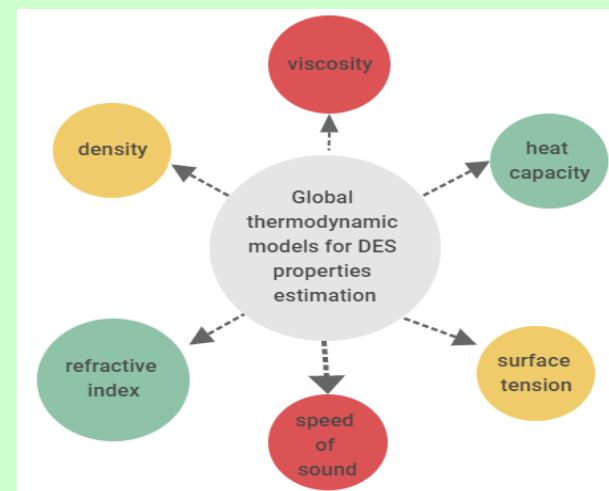



**Ongoing work**
**Estimating DES properties through global thermodynamic modelling**

Considering the time consuming and expensive procedure of experimental investigation for the mentioned properties of DESs, proposing global thermodynamic models that can predict and estimate the thermophysical properties of DESs is vital. DES Solve in collaboration with Shiraz University has proposed 6 global, accurate, simple, and straightforward thermodynamic models for estimation density, viscosity, heat capacity, surface tension, speed of sound, and refractive index of DESs. Those are fundamental properties for any solvent and any given application.


**Abstract presented at the 24th Annual Green Chemistry & Engineering Virtual Conference**

“Natural deep eutectic systems: Green solvents for the extraction and stabilization of phytochemicals from *Beta vulgaris L.* peel”

The goal of this work was to add value to food and agro-industrial waste products, by extracting phenolic compounds and betalains from *Beta vulgaris L.* peel, using NaDES. Betaine-based NaDES were used as extraction media, successfully extracting higher amounts of phenolic acids, flavonoids and betalaines, when compared with extractions done in the same conditions using common organic solvents. The systems Betaine:Sorbitol:Water (Bet:Sor) and Betaine:Lactic acid (Bet:Lac) have shown to be the most promising on the extraction of betalains. These systems increased the half-lives of betanin and vulgaxanthin I, comparing to their half-lives in aqueous media, thus proving the stabilizing effect of NaDES. Thus, this work shows that NaDES are a powerful tool for extracting and stabilizing phenolic compounds from beetroot peel.

**Outreach**

Des.Solve welcomed two high school students from “Colégio Campo de Flores”, who during February and March worked in the Project “Liquid systems for anti-tuberculosis treatment” and experienced the interaction with scientists, gaining transversal skills and combining their favorite disciplines of biology and chemistry.

**Participation in events and conferences**

- Workshop II Simpósio de Investigação em Tuberculose e Micobactérias Não Tuberculosas em Portugal, Lisbon, Portugal (January 2020)
- Conference EIFS 2020 - 1<sup>o</sup> Iberian Meeting on Supercritical Fluids, Santiago de Compostela, Spain (February 2020)
- Workshop Science communication Course - PhD programme, Lisbon, Portugal (February 2020)
- Workshop Design Thinking - PhD programme, Lisbon, Portugal (February 2020)
- 24th Annual Green Chemistry & Engineering (GC&E) Virtual Conference (June 2020)
- Pitch Event - Born from Knowledge RISE Entrepreneurship competition, Portugal (June 2020)

**Publications**

- “Investigating the performance of novel green solvents in absorption refrigeration cycles: Energy and exergy analyses”, International Journal of Refrigeration
- “Design and Processing of Drug Delivery Formulations of Therapeutic Deep Eutectic Systems for Tuberculosis”, The Journal of Supercritical Fluids
- “Estimation of the heat capacities of deep eutectic solvents”, Journal of Molecular Liquids
- “A Global Model for Estimation of Speeds of Sound in Deep Eutectic Solvents”, Molecules
- “Energy conservation in absorption refrigeration cycles using DES as a new generation of green absorbents”, Entropy

**Des.solve group is organizing the 2<sup>nd</sup> International Meeting on Deep Eutectic Systems. Save the date!!!**

**Activities during COVID-19 pandemic**

Despite the quarantine due to COVID-19 pandemic, Des.Solve team continued to work on their activities, mainly on writing, but has also engaged societal projects and contributed with Personal Protective Equipment and disinfectants to Healthcare Professionals. Everything will be alright!