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## Introduction & Aim

Parenteral nutrition (PN) induces secondary hyperglycaemia. To limit this effect, insulin is administered alongside PN. As subcutaneous administration of insulin increases the risk of hypoglycaemia, adding it directly to the PN mixture could be a safer alternative. A previous study showed a 50% reduction in human insulin concentration within 6 hours of addition to an industrial binary mixture (Olimel®), related to a protein glycation reaction<sup>1</sup>. **The aim of this work is to evaluate the stability of several insulins in an industrial binary mixture of NP on one hand, and to monitor the formation of glycated forms on the other hand.**

## Materials & Method

Vitamins (Cernevit®)

Trace elements (Nutryelt®)

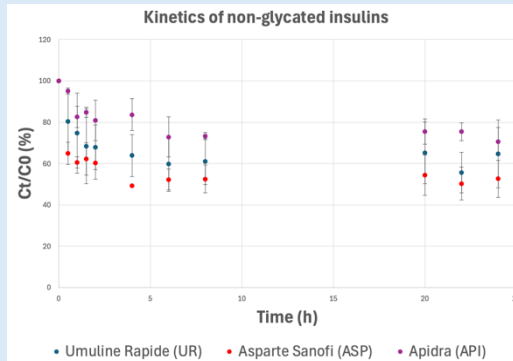
Human insulin (Umluline Rapide® = UR)  
or Aspart insulin (Asparte Sanofi® = ASP)  
or Glutisine insulin (Apidra® = API)

**Storage conditions:** 24 hours at room temperature

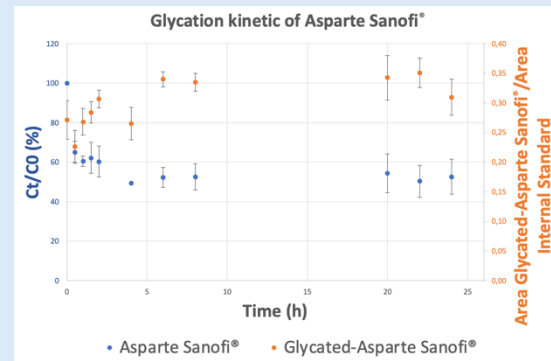
**Sampling times:**  $t_0$ ,  $t_{30min}$ ,  $t_{1h}$ ,  $t_{1h30}$ ,  $t_{2h}$ ,  $t_{4h}$ ,  $t_{6h}$ ,  $t_{8h}$ ,  $t_{20h}$ ,  $t_{22h}$  and  $t_{24h}$

**Analysis:** Dosage of non-glycated insulins with an Internal Standard (Chain B of human insulin) and monitoring of glycated forms by HPLC-MS/MS

## Results



At  $t_{6h}$ : [UR]  $\searrow$  -40 % | [ASP]  $\searrow$  -48 % | [API]  $\searrow$  -29 %



$\searrow$  of native insulin concentration

$\nearrow$   $A_{gly-ins}/A_{IS}$

## Discussion-Conclusion

The decrease in UR concentration in the PN mixture used confirms the results of the previous study. In comparison, it is higher for ASP and much lower for API. The proportion of glycation in insulins appears to differ depending on the speciality (different structure and composition), and the use of API in PN seems preferable. It would be interesting to test the stability of other insulins in PN and to evaluate the bioactivity of glycated vs. non-glycated forms.

## Reference

<sup>1</sup> Henry *et al.* Behavior of Regular Insulin in a Parenteral Nutrition Admixture : Validation of an LC/MS-MS Assay and the In Vitro Evaluation of Insulin Glycation (2022)