DETERMINATION OF THE PROTEIN NUTRITIONAL VALUE OF MEAT PRODUCTS AND STUDY OF THE EFFECT OF PROTEIN SUPPLEMENTATION

MAGYAR AGRÁR- ÉS ÉLETTUDOMÁNYI EGYETEM

AUTHORS

Vilmos Lehota*,[1], Koppány László Majzinger[1], Gábor Jónás[1], László Friedrich[1], Judit Tormási[2], László Abrankó[2]

[1]Department of Livestock Product and Food Preservation Technology

[2]Department of Food Chemistry and Analysis

Institute of Food Science and Technology, Hungarian University of Agriculture and Life Sciences, H-1118 Budapest, Hungary

*Corresponding author e-mail: Lehota.Vilmos.2@phd.uni-mate.hu

INTRODUCTION

Food adulteration is considered one of the major food safety concerns today, significantly impacting consumer health and the economy. Meat products are particularly susceptible to adulteration, where cheaper protein powders are added to increase protein content, potentially distorting food safety and nutritional parameters.

OBJECTIVE

The aim of this study was to determine the protein nutritional value of manipulated meat products and to examine the effects of various protein supplements.

METHODOLOGY

Four different types of turkey sausage were made and analysed: a control, a mechanically separated meat (MSM)-based product, a collagen- and a soy powder-fortified product. Digestion processes were simulated through in vitro digestion with Infogest method (Figure 1). After digestion amino acid profiles were assessed using chromatographic techniques to determine protein quality and bioaccessibility.

The determined attributes were evaluated using the protein digestibility corrected amino acid score (PDCAAS) and the digestible indispensable amino acid score (DIAAS) indicators.

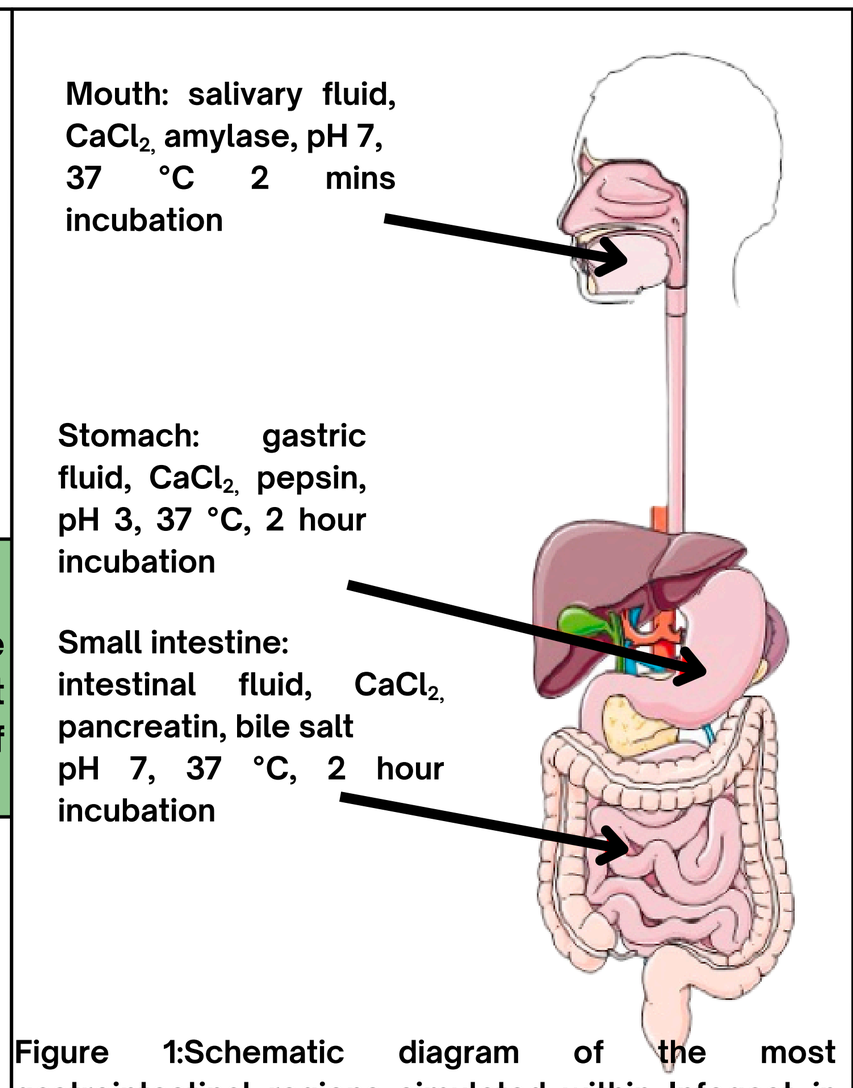

Figure 1:Schematic diagram of the most gastrointestinal regions simulated within Infogest *in vitro* digestion model, as well as the different components and conditions in these regions

	Child (2-5 years)	School-age child (10-12 years)	Adult
Controll	AAA*	histidine	histidine
MSM-based	SAA*	SAA*	SAA*
Collagen fortified	histidine	histidine	histidine
Soy fortified	leucin	histidine	histidine

Limiting amino acids for PDCAAS

*AAA (tyrosine+ phenylalanine), SAA (methionine+ cysteine)

RESULTS

The measured data indicate that enrichment did not work as intended, as the control sample showed the highest crude protein content (Figure 2), likely due to altered water-holding capacity reducing weight loss during heat treatment. The protein supplements influenced protein quality: soy enrichment improved nutritional value. The protein digestibility of the MSM product was found to be lower than expected. Based on DIAAS and PDCAAS values it was demonstrated that adulteration directly affects the nutritional quality of foods (Figure 3).

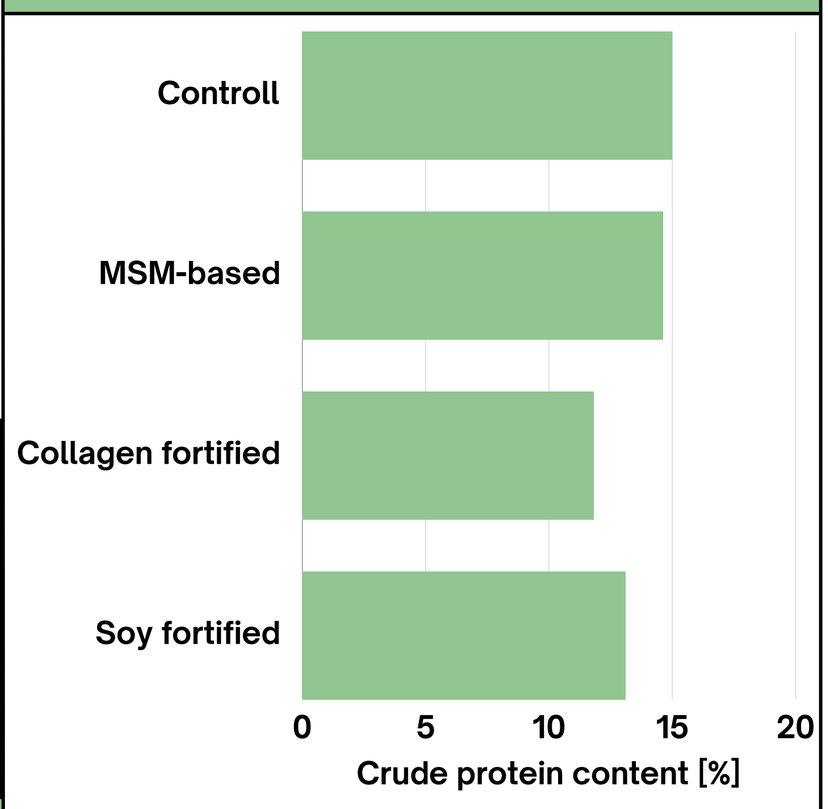

Figure 2: Protein content in % measured with Khjeldal method

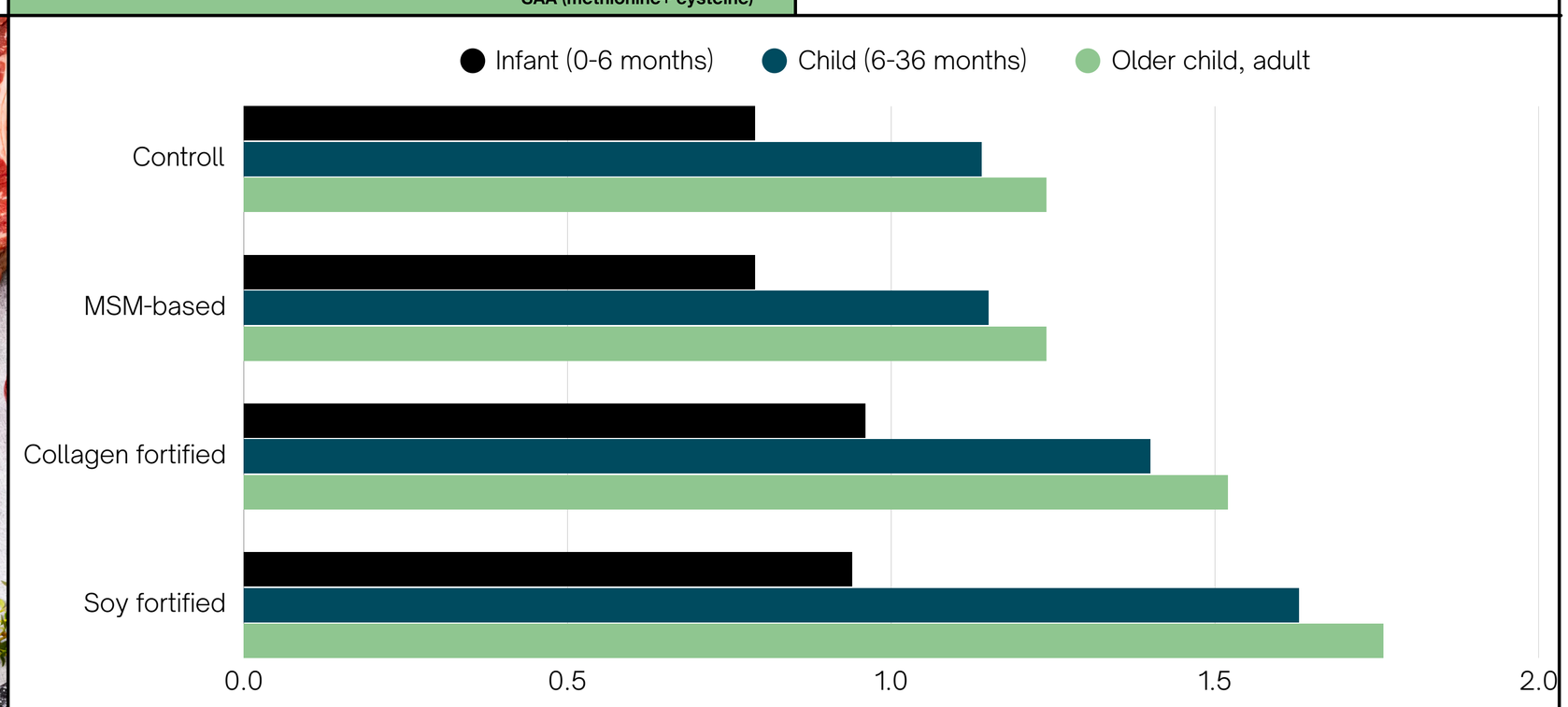

Figure 3:DIAAS values for different products in different age groups

CONCLUSION

The findings indicate that protein supplementation does not always enhance the nutritional value of products and can sometimes deteriorate it. The protein quality indicators of fortified and MSM-based products were shown to differ from consumer expectations. The results of this study could contribute to improving food industry regulations and monitoring mechanisms to mitigate food fraud.

ACKNOWLEDGEMENT: The Project was supported by the Doctoral School of Food Sience MATE