



## **Lipids and proteins bioaccessibility in DHA-enriched fortified infant flours and formulas using a static in vitro 6-month-old infant digestion model**

Mathilde Cancalon, Marine Tournaux, Youna Hemery, Pauline Pinel, Mélina Robert, Valérie Micard, Erwann Durand, Bruno Baréa, Nathalie Barouh, Pierre Villeneuve, et al.

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Lipids and proteins bioaccessibility in DHA-enriched fortified infant flours and formulas using a static *in vitro* 6-month-old infant digestion model

P262

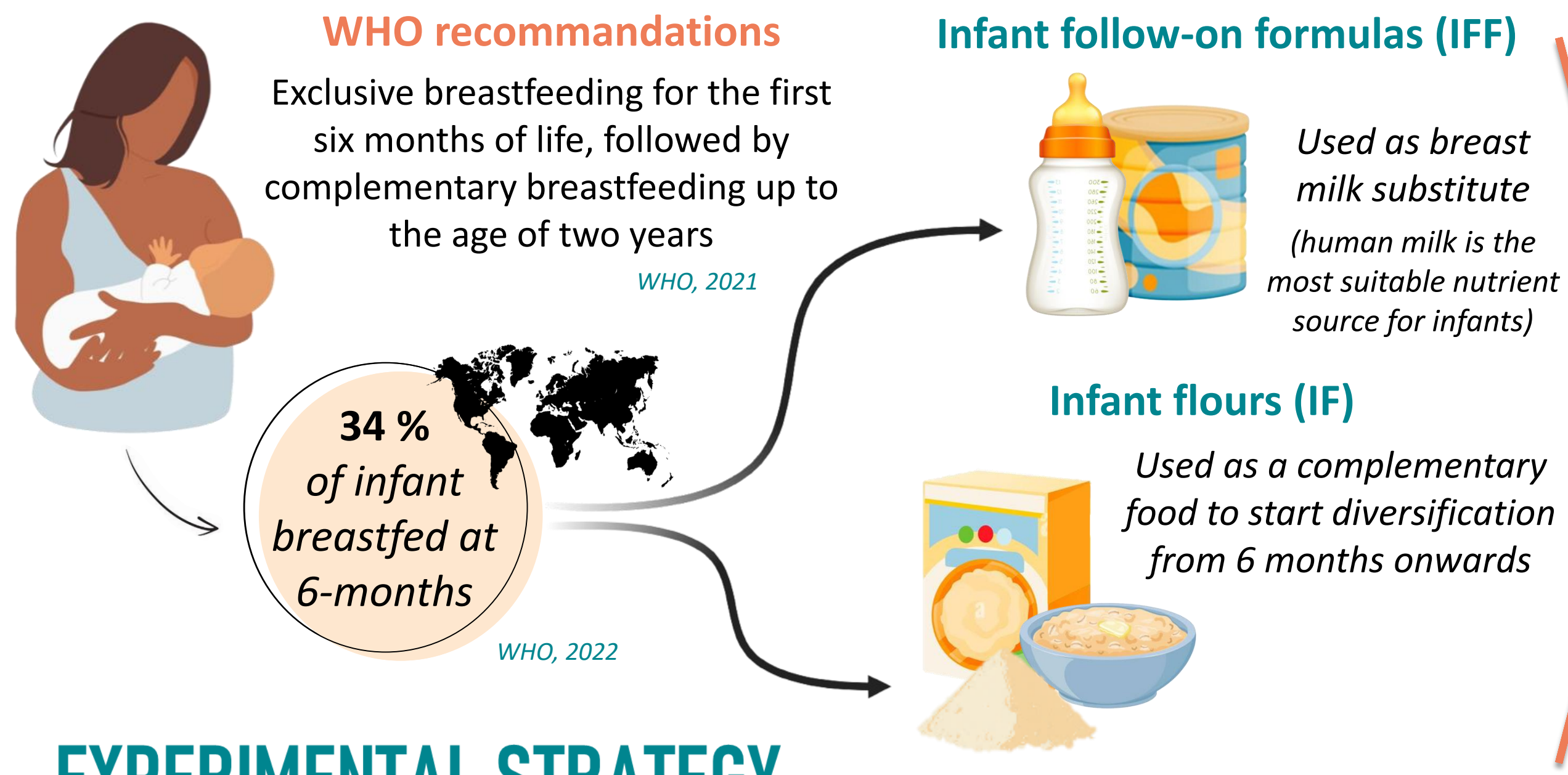


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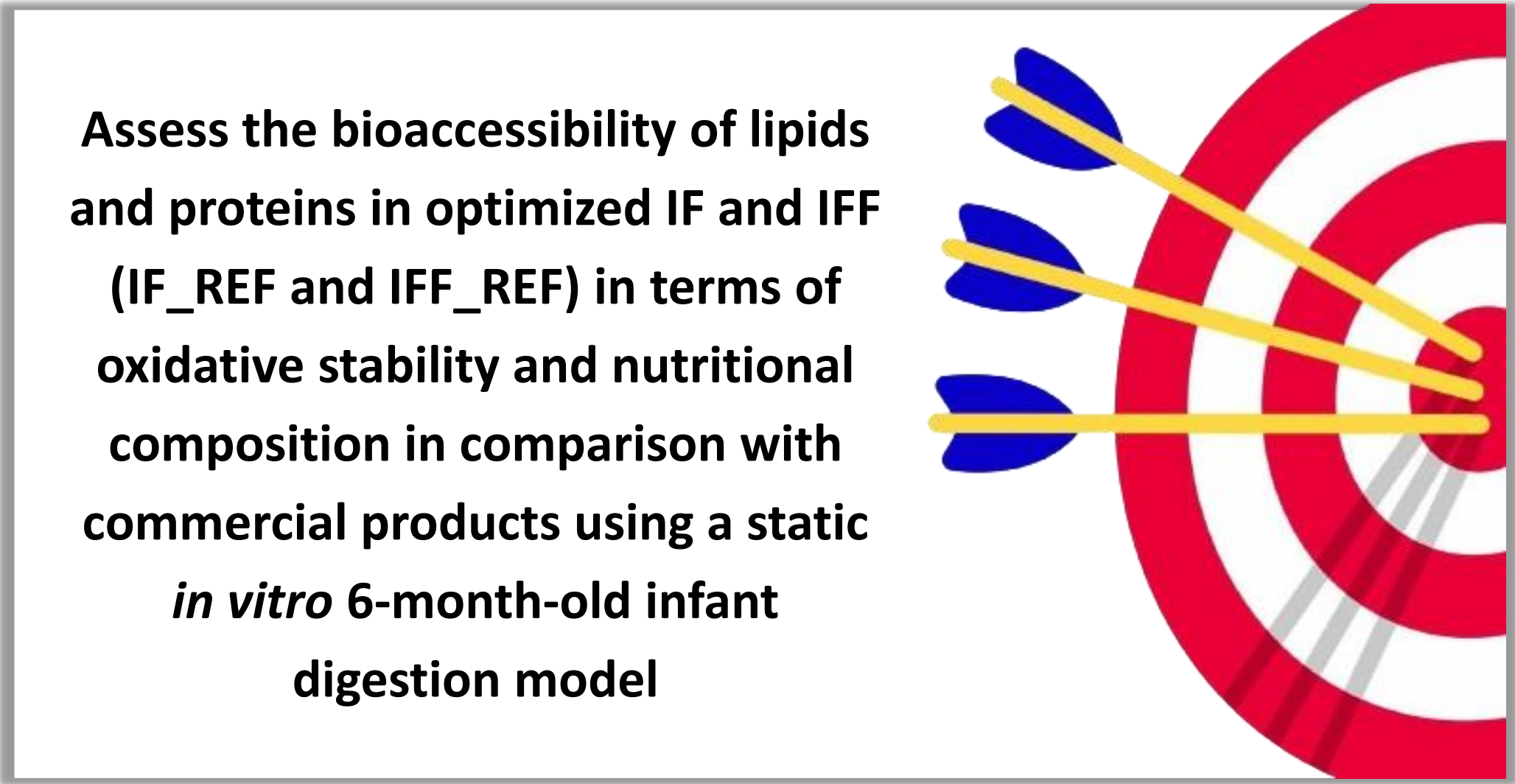
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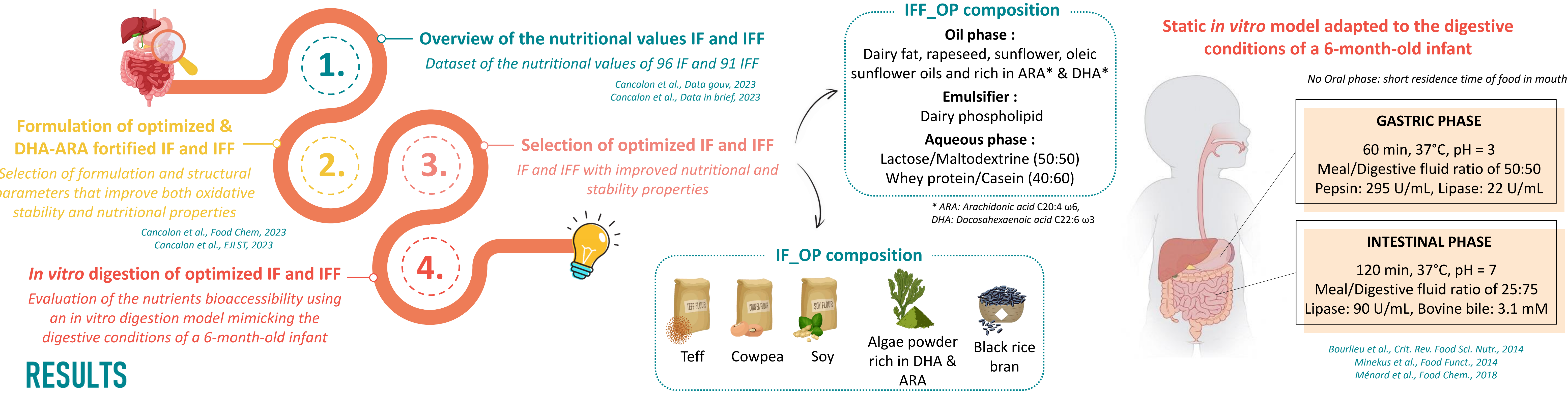
CONTEXT



AIM OF THE STUDY



EXPERIMENTAL STRATEGY



RESULTS

	IF_REF	IF_OP	IFF_REF	IFF_OP
<b>Fatty acid profile (g/100 mL of IFF or IF)</b>				
Total lipids	1.0	0.4	3.1	3.4
SFA	0.40 ± 0.05	0.13 ± 0.00	0.98 ± 0.05	0.92 ± 0.05
MUFA	0.23 ± 0.01	0.07 ± 0.00	1.24 ± 0.07	1.32 ± 0.07
PUFA	0.32 ± 0.01	0.18 ± 0.01	0.56 ± 0.03	0.58 ± 0.03
LA C18:2 ω6	0.30 ± 0.01	0.11 ± 0.00	0.46 ± 0.03	0.49 ± 0.03
ALA C18:3 ω3	0.03 ± 0.00	0.02 ± 0.00	0.06 ± 0.00	0.05 ± 0.00
ARA C20:4 ω6	-	0.02 ± 0.00	0.01 ± 0.00	0.02 ± 0.00
DHA C22:6 ω3	-	0.03 ± 0.00	0.02 ± 0.00	0.02 ± 0.00
ω6/ω3 ratio	10.9	2.5	5.7	8.1
Total tocopherols (ppm)	1105.8 ± 13.9	1033.6 ± 17.2	595.5 ± 18.8	366.3 ± 10.8
Droplet mode (μm)	-	-	0.47 ± 0.00	0.86 ± 0.08
Viscosity (mm/30 s)	112.7 ± 5.0	93.7 ± 10.0	-	-



Trypsin inhibitory activity in infant flours (mg/g of IF dry base)

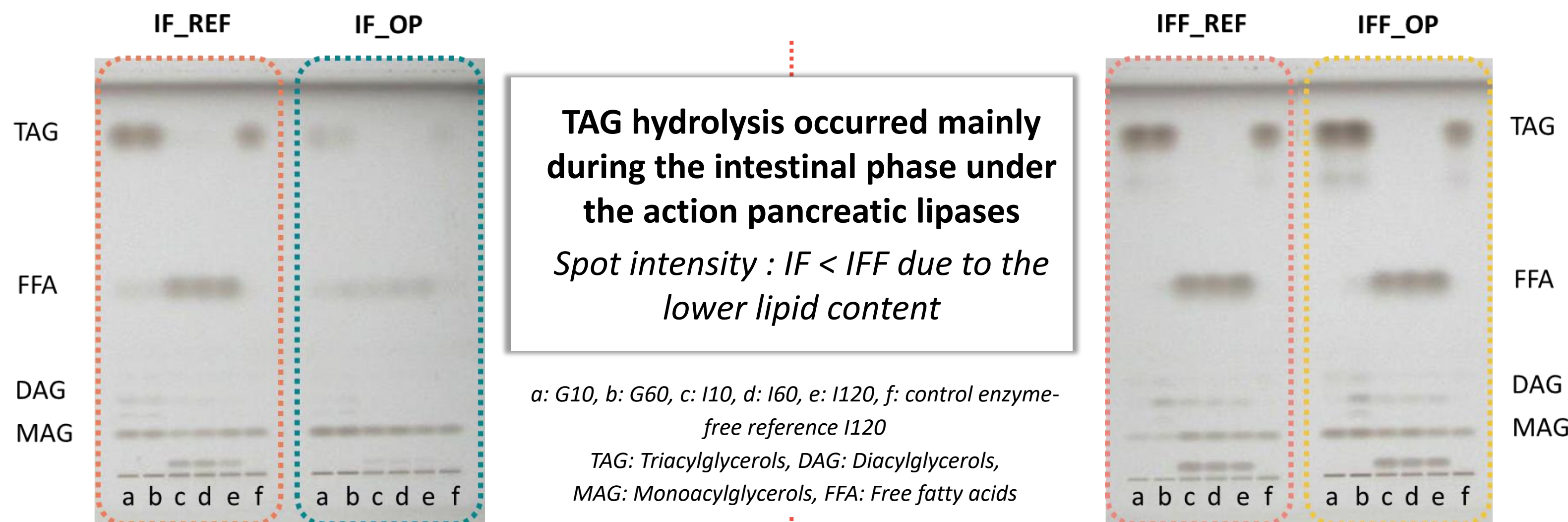
	Before cooking	After cooking
IF_REF	9.0 ± 0.1	N.D.*
IF_OP	55.2 ± 1.2	N.D.

\*N.D.: not detected

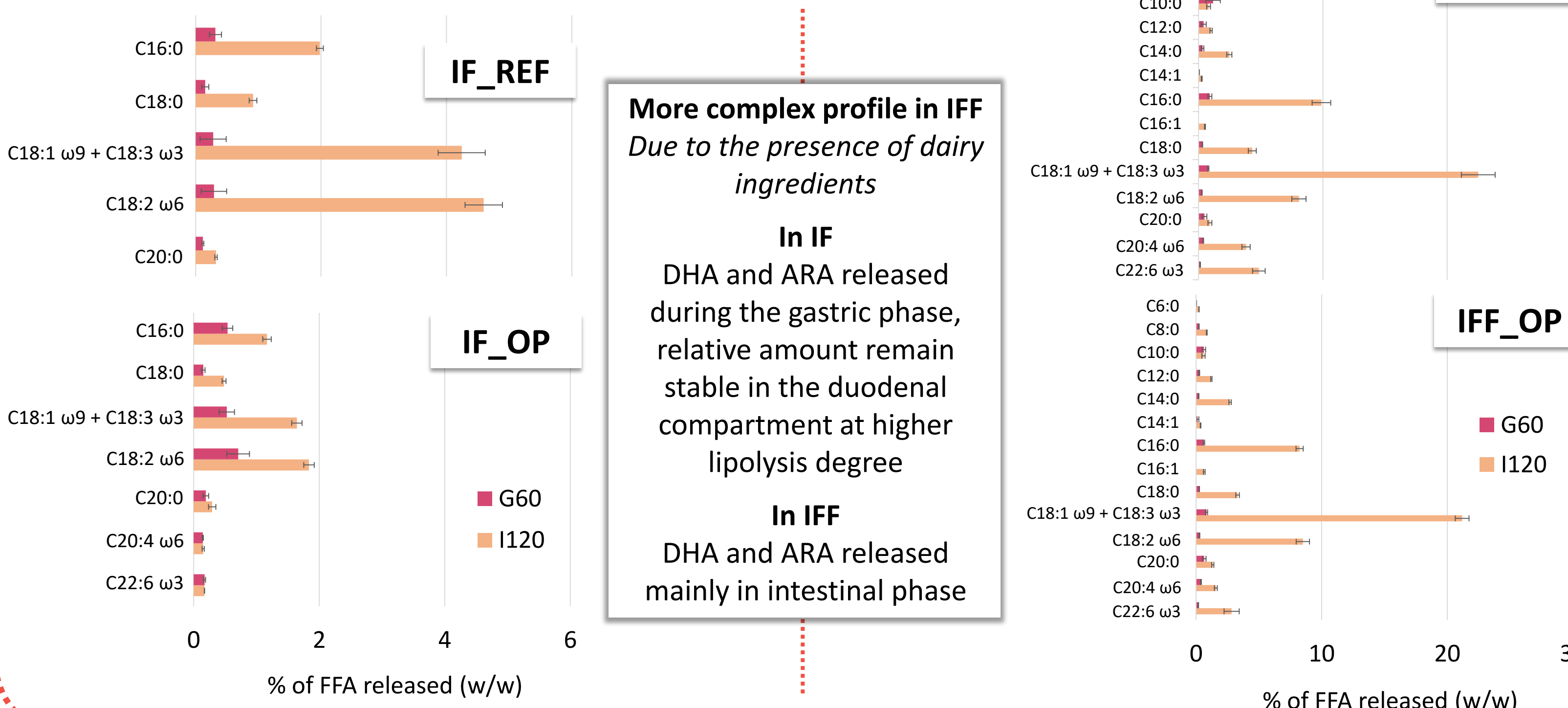
Inhibition of antitrypsin factors during cooking

LIPIDS BIOACCESSIBILITY

Lipids hydrolysis degree evaluated by thin layer chromatography

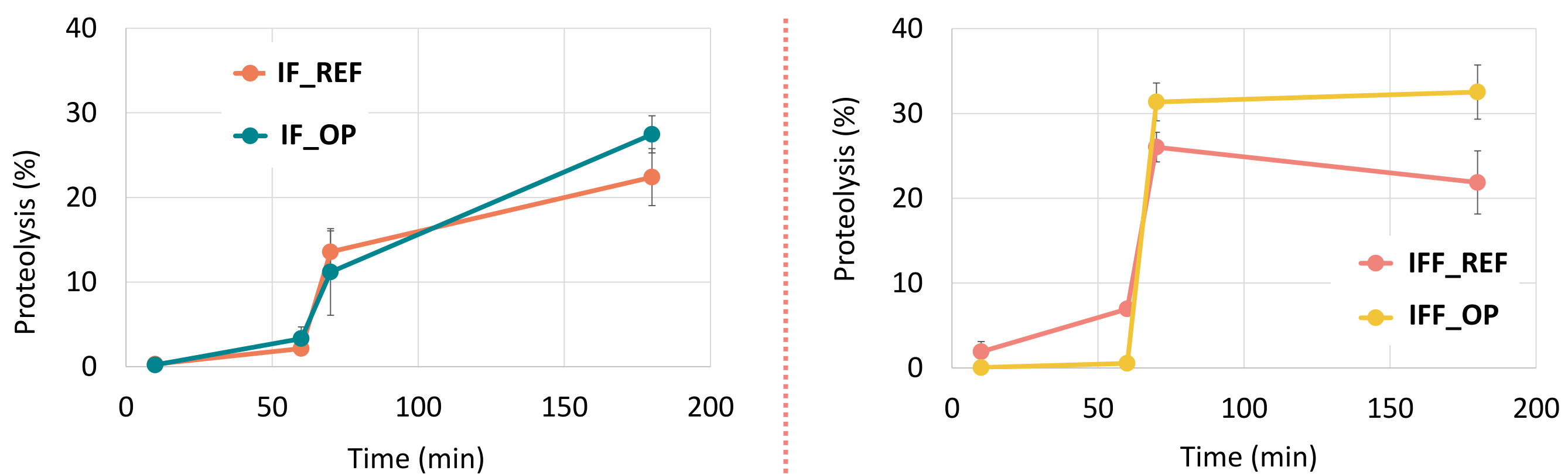


Profile of released fatty acids by gaz chromatography



PROTEINS BIOACCESSIBILITY

Protein hydrolysis degree evaluated by released NH<sub>2</sub> out of total using ninhydrin assay



Moderate levels of intestinal proteolysis (less than 40% released NH<sub>2</sub> out of total)

Influenced by large droplet mode in IFF\_OP and the presence of anti-nutritional factors in IF\_OP

TOCOPHEROLS BIOACCESSIBILITY

Percentage of bioaccessible tocopherols after 120 minutes digestion

IF_OP	IF_OP	Low tocopherols bioaccessibility	IFF_REF	IFF_OP
20.7 ± 0.7	N.D.	Low in comparison with the study of Reboul, Richelle et al. (JAFC, 2006)	15.4 ± 3.6	7.1 ± 3.1

CONCLUSIONS

The optimized IFF and IF subjected to *in vitro* digestion present overall good FA and LC-PUFA (including DHA) bioaccessibility. However a limited proteolysis was observed (NH<sub>2</sub> released < 40% out of total) and 7-20 % tocopherols bioaccessibility. This approach should be investigated further but has to be bear in mind to have global multicriteria optimization approaches when optimizing infant foods.

