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Addition of vitamin E in pigs feed: could prevent cured-meat promotion of colon carcinogenesis in rats

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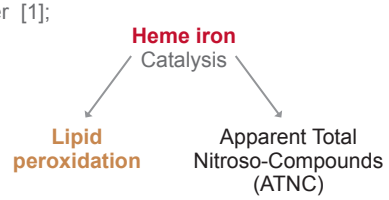
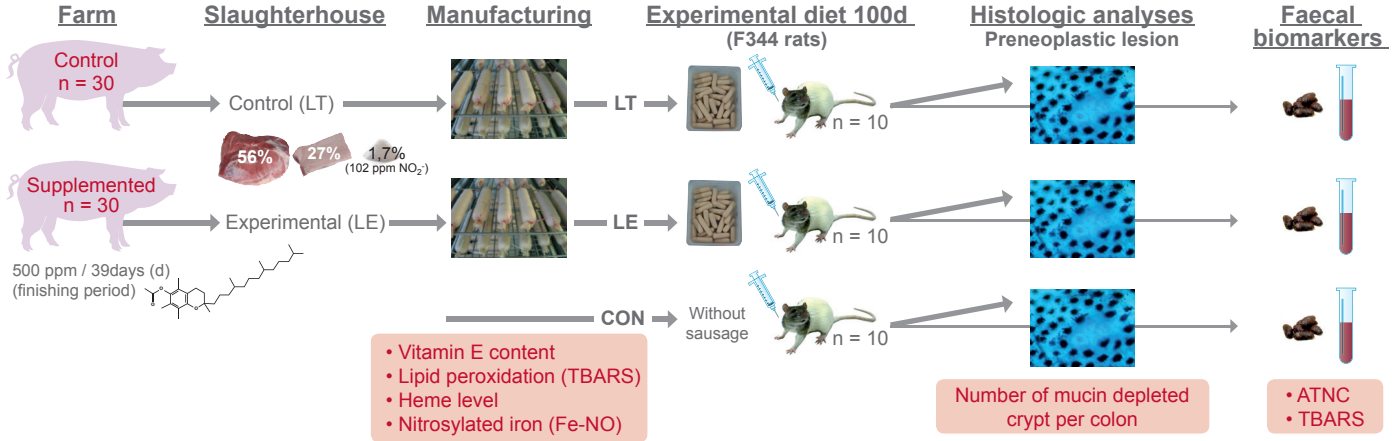
Background & Aim

- Excessive consumption of cured meat induces a slight increase in the risk of developing colorectal cancer [1];
- A central role of heme iron on the formation of genotoxic and cytotoxic products;
- Vitamin E in cured meat could reduce this promotor effect [2];
- Vitamin E in pig diet would also appear interesting to protect cured meat [3];
- **We assess the effect of vitamin E in pig feed on preventing the promotion of colorectal carcinogenesis in rats fed a sausage-based diet from supplemented animals compared to sausage-based diet from control animals.**



Experimental design



Colour and composition of sausages

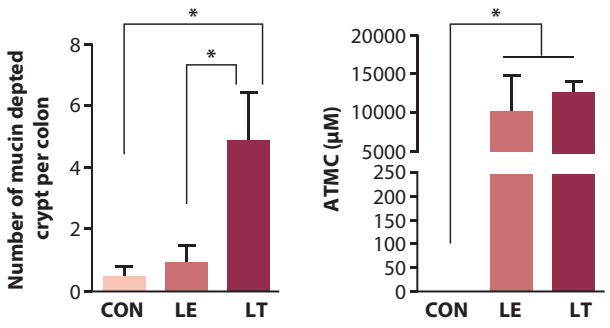
	Colour			Composition				
	L*	a*	b*	Heme mg/kg	Fe-NO mg/kg	% converted	Vit. E mg/kg	TBARS mg MDA/kg
LT	$73,9_a$	$7,83_a$	$10,57_a$	55,3	$21,3_a$	38	$5,1_a$	0,17
LE	$72,4_b$	$8,46_b$	$11,04_b$	63,0	$36,7_b$	58	$12,6_b$	0,20

x2.5

Colour of the LE sausages were different compared to the control ; but this effect was probably not noticeable to the naked eye.

Supplementation increases the vitamin E content.

Preneoplastic lesions and faecal ATNC



- Sausage diet increases number of preneoplastic lesions per colon and level of nitroso-compounds (ATNC).
- Crypts number per colon is reduced by vitamin E addition with a normalization of preneoplastic lesions.
- No significant effect of vitamin E on nitroso-compounds (ATNC) and lipid oxidation (TBARS results not shown).

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Conclusion

Vitamin E addition in pig feed limits colon cancer promotion associated with excessive cured meat consumption. This protection does not seem to be explained by a limitation of the formation of toxic compounds (TBARS and ATNC). We explore currently detoxification enzymes level in mucosa of rats to verify if this effect is explained by a stimulation of the mucosal cytoprotection.

[1] Bouvard, V., Loomis, D., Guyton, K.Z., Grosse, Y., Ghissassi, F.E., Benbrahim-Tallaa, L., Guha, N., Mattock, H., Straif, K. (2015). Carcinogenicity of consumption of red and processed meat. Lancet Oncol. (16): 1599–1600.

[2] Pierre F.H., Martin O.C., Santarelli R.L., Taché S., Naud N., Guéraud F., Audebert M., Dupuy J., Meunier N., Attaix D., Vendeuvre J.-L., Mirvish S.S., Kuhnle G.C., Cano N., Corpet D.E. (2013). Calcium and α-tocopherol suppress cured-meat promotion of chemically induced colon carcinogenesis in rats and reduce associated biomarkers in human volunteers. Am. J. Clin. Nutr. (98): 1255-1262.

[3] Meineri, G., Claudio M., Valeria G., Sonja V., P.G. Peiretti. (2013). Effect of dietary supplementation of vitamin E in pigs to prevent the formation of carcinogenic substances in meat products. JFCA 30 (2): 67–72.