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# The use of olive oil oleogels to improve the nutritional characteristics of burgers. †

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Due to low price and convenience, beef burgers are consumed worldwide. However, because of their excessive content in saturated fatty acids, they have been related to an increased incidence of cardiovascular diseases [1]. To produce healthier burgers, it is necessary to reduce their fat content and modify their fatty acid profile. However, reducing and replacing saturated fats by unsaturated ones may decrease the oxidative stability and the sensory quality of the product. Thus, the challenge of the meat industry is to find viable alternative to decrease the fat level and provide a healthier lipid profile in their products without damage their oxidative stability, and their technological and sensory quality.

The effect of bovine backfat replacement by oleogels containing pork skin and olive oil on the oxidative stability, physicochemical, technological, nutritional, and sensory parameters of burgers was evaluated. Four different hamburger (H) batches were manufactured: with 90% of lean beef and 10% of bovine backfat (control, HC) and with the 10% of bovine backfat replaced by pork skin/water/virgin olive oil (HVOO), stripped olive oil added of an olive leaf extract (HSOOE) or stripped olive oil (HSOO) oleogels, at 20 : 60 : 20 ratio.

A protein increase of 15%, a fat reduction of 80% and an improvement of the fatty acid profile were achieved in the reformulated burgers. Although some differences regarding appearance, colour and fat perception among raw burgers were observed, after processing at 180 ºC, the overall acceptability were high and comparable to control. The 4 different batches were oxidative stable during 7 days at 4 ºC. After 90 days of storage at -20 ºC under vacuum, only HSOO showed some level of oxidation. Apparently, the antioxidant content in the virgin olive oil or in the olive leaf phenolic extract used in the manufacture of oleogels was able to prevent oxidation in HVOO and HSOOE samples.

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[1] E. J. Simpson, Marie Clark, A. A. Razak, and Andrew Salter, The impact of reduced red and processed meat consumption on cardiovascular risk factors; an intervention trial in healthy volunteers, *Food Funct.*., 2019, 10, 6690–6698.

## Appendix A

The appendix is an optional section that can contain details and data supplemental to the main text—for example, explanations of experimental details that would disrupt the flow of the main text but nonetheless remain crucial to understanding and reproducing the research shown; figures of replicates for experiments of which representative data is shown in the main text can be added here if brief, or as Supplementary data. Mathematical proofs of results not central to the paper can be added as an appendix.

## Appendix B

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## References

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