Proceedings of the Nutrition Society (2008), **67 (OCE)**, E38 doi:10.1017/S0029665108006472

1st International Immunonutrition Workshop, Valencia, 3–5 October 2007, Valencia, Spain

Effect of long-chain fatty alcohols from orujo olive oil on nitric oxide and eicosanoid generation

M. A. Fernández Arche[1], R. de la Puerta Vázquez[1], A. Márquez Martín[1] and V. Ruiz-Gutierrez[2]
[1]*Department of Pharmacology, School of Pharmacy, University of Seville, C/ Profesor García Gonzalez No. 2 and* [2]*Instituto de la Grasa (CSIC), Av. Padre García Tejero No. 4, 41012 Seville, Spain*

Olive pomace oil ('orujo' oil) is an olive oil product suitable for human consumption that is traditionally produced in Spain[(1)]. The non-acylglycerol component of this oil is a good source of interesting minor components, e.g. triterpenes[(2)], or fatty alcohols, derived from waxy materials. Tetracosanol ($C_{24}OH$; 30%), hexacosanol ($C_{26}OH$; 37%) and octacosanol ($C_{28}OH$; 15%) are the major constituents of the long-chain fatty alcohol (LCFA) fraction isolated from orujo olive oil[(3)]. A similar mixture of long-chain alcohols, termed 'policosanol' and purified from waxy materials of different sources such as sugar cane, bees wax, rice bran or spinach, have shown many beneficial physiological activities[(4,5)]. The present study focused on the effect of LCFA isolated from orujo olive oil on NO, PGE_2 and TNFα release by a lipopolysaccharide (LPS)-stimulated murine macrophage cell line (RAW-264.7) as well as the effect on thromboxane B_2 (TXB_2) generation by A-23187-stimulated rat peritoneal neutrophils (PMN). Nitrite (as an index of NO generation) levels were determined by a fluorometric method. PGE_2, TNFα and TXB_2 production were quantified by sandwich immunoassay.

LCFA significantly and dose-dependently decreased the NO production in LPS-stimulated RAW-264.7 cell line macrophages (Fig. 1). Western-blot analysis for inducible NO synthase (iNOS) showed that NO reduction was a consequence of the 100% inhibition of iNOS expression at a dose of 100 μg/ml (Fig. 2). By contrast, LCFA scarcely affected PGE_2 levels (Fig. 1). TNFα production was also significantly decreased by LCFA at the highest dose assayed (100 μg/ml; Fig. 1). LCFA significantly reduced TXA_2 production in rat PMN stimulated with A-23187 (Fig. 3).

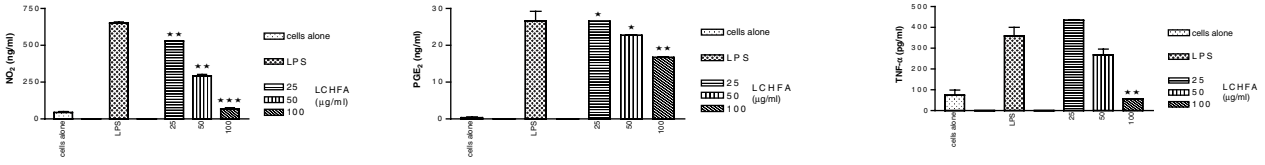

Fig. 1. Effect of LCFA on NO, PGE_2 and TNFα produced by LPS (10 μg/ml)-stimulated RAW-264.7 murine macrophages (1×10^6 cells/ml). Mean values were significantly different from those for LPS control group: $^{**}P<0.01$, $^{***}P<0.001$.

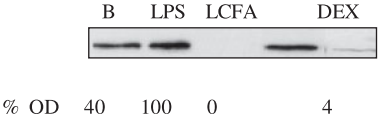

Fig. 2. Effect of LCFA subfraction on iNOS expression and densitometric analysis in *RAW* 264.7 cells. DEX, dexamethasone; OD, optical density.

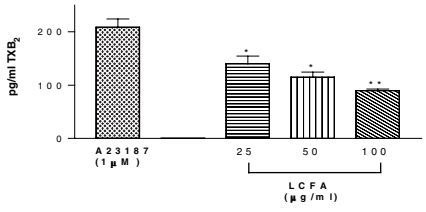

Fig. 3. Effect of LCFA on TXB_2 produced by A-23187-stimulated rat PMN. Mean values were significantly different from the control value: $^{*}P<0.05$, $^{***}P<0.001$.

These results showed that LCFA isolated from 'orujo' oil has a protective effect on some mediators implicated in the development of inflammatory damage in these experimental models and suggest its potential value as a functional component of the olive pomace oil.

This study is part of the project AGL2005–00572/ALI, financially supported by the Comision Interministerial de Ciencia y Tecnologia (CICYT).

1. Perona JS, Aracemis C, Ruiz-Gutierrez V & Catalá A (2005) *J Agric Food Chem* **53**, 730–735.
2. Perez Camino MC & Cert A (1999) *J Agric Food Chem* **47**, 1558–1562.
3. Marquez A (2007) Doctoral Thesis, Universidad de Sevilla.
4. Taylor JC, Rapport L & Lockwood GB (2003) *Nutrition* **19**, 192–195.
5. Singh DK, Li L & Porter TD (2006) *J Pharmacol Exp Ther* **318**, 1020–1026.