Transport of fatty acids within plasma lipoproteins in lactatingand non-lactating cows fed on ■sh oil and hydrogenated palm oil

Vargas Bello Pérez, E., Íñiguez González, G., Garnsworthy, P. C., & Loor, J. J. (2017). Transport of fatty acids within plasma lipoproteins in lactating and non lactating cows fed on fish oil and hydrogenated palm oil. Journal of animal physiology and animal nutrition, 101(2), 369-377. <10.1111/jpn.12545> Accessed 29 Apr 2021.

Abstract

The aim of this study was to elucidate the effect of dietary fish oil (FO) and a blend of FO and hydrogenated palm oil (FOPO) on transport of fatty acids (FA) within plasma lipoproteins in lactating and non■lactating cows. Two trials were conducted (one with lactating and another with non■lactating dairy cows) in two 3 × 3 Latin squares that included three periods of 21 days. Dietary treatments for lactating cows consisted of a basal diet (Control; no fat supplement), and fat∎supplemented diets containing FO (500 g/day/cow) and FOPO (250 FO + 250 g/day/cow hydrogenated palm oil). For non actating cows, dietary treatments consisted of a basal diet (Control; no fat supplement), and fat supplemented diets containing FO (170 g/day/cow) and FOPO (85 FO + 85 hydrogenated palm oil g/day/cow). In lactating cows, compared with control and FOPO, FO increased C16:0, C18:3 cis■9, 12, 15, C18:2 cis■9, trans■11 and total saturated and polyunsaturated FA in plasma and increased C16:0, C18:2 cis■9, trans■11, total polyunsaturated and total polyunsaturated n■6 in high■density lipoprotein (HDL), whereas in non■lactating cows, compared with control and FOPO, FO increased C16:0, C18:1 trans■11, C18:2 trans■9, 12, C18:2 cis■9, trans■11, C20:5 n■3 and total saturated and polyunsaturated FA in plasma; C16:0, C18:1 trans■11, C18:1 cis■9, C18:2 trans ■9, 12, C20:5 n ■3 and total monounsaturated FA in HDL; and C18:1 trans ■6 ■8, C18:1 trans

9, C18:1 trans

10, C18:1 trans

11, C18:3 cis

9, 12, 15 and C20:5 n

3 in low■density lipoprotein (LDL). FO increased C20:5 n■3 in plasma and lipoproteins in non■lactating cows and increased C18:3 cis■9, 12, 15 in plasma (in lactating cows) and LDL (in non-lactating cows). We concluded from results of this study that in bovine plasma, the LDL fraction appears to be the main lipoprotein transporting C18:1 trans isomers and is more responsive than other lipoprotein fractions to variation in supply of dietary lipids.

Keywords

cow, fatty acids, lactation stage, lipids, lipoproteins.