Regiospecific Analysis of Base Oils as New Sources for Infant Nutritional Formulas

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Human milk is a very complex mixture of nutrients and no-nutritional factors which provides the essential nutrients that the neonate needs for a correct development as well as an adequate energy supply, and therefore human milk has been considered the ideal food for full-term infants. Although fat content and fatty acid (FA) profile of human milk is variable and it is influenced by certain factors, several studies reported oleic acid (OA, 18:1*n*-9), palmitic acid (PA, 16:0) and linoleic acid (LA, 18:2*n*-6) as principal components of human milk fat, and they appear mainly in the form of triacylglycerols (TAGs). FAs mentioned above are selectively placed among the three stereospecific numbering (*sn*) positions of TAGs so they are not hydrolyzed in the same way by regiospecific lipases during the digestion process. They are placed so as to provide the ideal mixture of FAs and monoacylglycerides for the neonate. Human milk also contains long chain polyunsaturated fatty acids (LC-PUFAs) as arachidonic acid (AA, 20:4*n*-6) and docosahexaenoic acid (DHA, 22:6*n*-3). An adequate ratio between *n*-6 and *n*-3 FAs is required for a normal infant development.

Infant formulas try to resemble the FA profile of human milk by using vegetable oils and butterfat. While these fats allow infant formulas to show a similar FA profile for OA, PA and LA, percentages of each FA in the *sn*-2 position usually differ from human milk, affecting fat and calcium absorption. Oils from vegetal, marine and single cell origins have been analyzed in order to elucidate the *sn*-2 FA composition using a regiospecific method. The FA bioavailability in these oils and their AA and DHA content have been studied in order to discern their potential as fat source for future infant formulas.