

Sensory Evaluation of Non-Synthetic Conjugated Linoleic Acid (CLA)-Rich and Transvaccenic Acid (TVA)-Rich Cream and Butter

E. Silva-Hernández^a, R. Herrera-Lee^b, M. Jácome-Sosa^a, I. Verdalet-Guzmán^a, W. Wismer^c,
T. Nakano^c and L. Ozimek^c

^aInstituto de Ciencias Básicas, Universidad Veracruzana, Dr. Rafael Sanchez Altamirano s/n.
Carr. Xalapa-Las Trancas, 91192 Xalapa, Veracruz, Mexico.

^bFacultad de Nutrición, Universidad Veracruzana, Médicos y Odontólogos s/n, 91000 Xalapa,
Veracruz, Mexico.

^cAFNS Department, University of Alberta, 410 Agriculture/Forestry Building, T6G 2P5
Edmonton, Alberta, Canada

E-mail: esilva.basicas@gmail.com

ABSTRACT

Several reports indicate that CLA, a fatty acid, has different beneficial biological activities. Milk and dairy products are major sources of CLA in the human diet. TVA is the main precursor of CLA. Synthetic CLA-fortified milk has shown off-flavors. Therefore, this study was undertaken to evaluate sensory properties of cream and butter made of milk from cows fed a control or a sunflower seed (11.2% dry matter basis) diet. Milk from cows fed the control and sunflower diets contained 0.54 and 2 g of CLA; 1.6 and 6.4 g of TVA; 34.5 and 42.7 g of unsaturated fatty acids/100 g of fatty acids, respectively. A sensorial evaluation performed by 66 non-trained panelists evaluated aroma, flavor and overall opinion of both, control and CLA-TVA-rich cream. In addition, aroma, flavor, spreadability and overall opinion were evaluated in both, control and CLA-TVA-rich butter. A nine-point hedonic scale was used for the analysis. The sensory evaluation did not show any significant ($p>0.05$) difference between control and CLA-TVA-rich cream or butter in the acceptability for all evaluated attributes, except for CLA-TVA-rich butter spreadability, which scored almost 8 points ("like very much") on the hedonic scale, 2 points more than the control butter. Most acceptability scores were between 6 ("like slightly") and 7 ("like moderately") on the hedonic scale. There were no significant differences ($p>0.05$) on the general preference between control and CLA-TVA-rich cream and butter. These results indicate that is feasible to make CLA-rich dairy products from manipulation of cow's diets with acceptable sensory characteristics.

Keywords: Conjugated Linoleic Acid, CLA, Transvaccenic Acid, TVA, milk

INTRODUCTION

Conjugated linoleic acid (CLA) is a natural component which has been attributed several health benefits in humans, such as carcinogenesis inhibition, anti-obesity, atherogenesis reduction and control of diabetes (O'Quinn et al., 2000). CLA is found naturally in animal products such as milk and meat and is produced during the rumen biohydrogenation of linoleic acid or from the conversion of transvaccenic acid (TVA) into CLA in adipose tissue of animals and humans. CLA content in milk may be increased through the manipulation of the animal's diet by supplementing with a linoleic acid-rich feed source that makes CLA levels be close to the recommended human CLA daily intake (Bell and Kennelly, 2001). As a result of this diet change, chemical and physical composition as well as sensory properties of dairy products might be affected. Sensory studies with synthetic CLA-fortified milk have shown off-flavors (Campbell et al., 2003), but there is very limited available

information on the sensory analysis of TVA-CLA-rich dairy products. Therefore, this study was conducted to evaluate the sensory properties of TVA-CLA-rich cream and butter.

METHODS

Cream and butter were made from milk produced by cows feeding a control diet (Control products) or supplemented with 11.2% sunflower seed (CLA-rich products). A sensorial evaluation performed by 66 non-trained panelists evaluated aroma, flavor and overall opinion of both, control and CLA-TVA-rich cream. In addition, aroma, flavor, spreadability and overall opinion were evaluated in both, control and CLA-TVA-rich butter. A nine-point hedonic scale was used for the analysis (Lawless and Heymann, 1999). The preference of control or CLA-TVA-rich cream and butter was asked as well. A fatty acids profile was performed in all samples using gas chromatography as well.

RESULTS

TVA-CLA-rich dairy products showed about four times more CLA and TVA values than the control products. In addition, fatty acids profiles of dairy products were unaffected during processing, which demonstrates its stability.

The sensory evaluation did not show any significant ($p > 0.05$) difference between control and CLA-TVA-rich cream or butter in the acceptability for all evaluated attributes, except for CLA-TVA-rich butter spreadability, which scored almost 8 points ("like very much") on the hedonic scale, and 2 points more than the control butter. Most acceptability scores were between 6 ("like slightly") and 7 ("like moderately") on the hedonic scale. There were no significant differences ($p > 0.05$) on the general preference between control and CLA-TVA-rich cream and butter. Figure 1 shows two Chernoff faces comparing the sensory attributes of butter. No clear differences are noticed between the faces. This same trend was observed on the sensory analysis of cream samples.

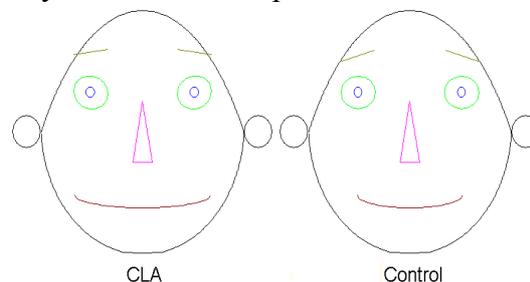


Figure 1. Chernoff faces representing butter's sensory evaluation. Code: flavour, mouth curvature; aroma, eyebrows slope; general opinion, eccentricity of eyes; spreadability, height of eye browns, mouth size and eyes slope.

In conclusion, sunflower seed in dairy cows feed increases the CLA content in milk and modifies the concentration and proportion of other fatty acids decreasing the risk of cardiovascular diseases in humans without affecting the acceptability of dairy products.

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