

Ovine and Caprine Lipids Promoting Cardiovascular Health in Milk and Its Derivatives

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Abstract

The purpose of this commentary is to highlight the anti-inflammatory properties of polar lipids present in ovine and caprine milk and its derivatives (i.e. dairy products such as yogurt and cheese). These lipids inhibit the onset of atherosclerosis and thus promote cardiovascular health. We suggest that further research could focus on the elucidation and bioavailability of these lipids.

Keywords: Ovine; Caprine lipids; Cardiovascular; Milk

Introduction

Over the last decade, scientific interest in fermented milk products has raised due to their potential health benefits. These products are yogurt, cheese and artisan fermented milk products such as kefir milk and leben. Liquid milk consumption has increased in developing countries, but it has fallen in the developed world [1]. This reduction of dairy consumption has been attributed to the high content of saturated fatty acids and cholesterol, combined with a high calorific value of milk products. High consumption of these dietary components is often incorrectly linked to a number of metabolic diseases including cardiovascular diseases (CVDs) [2].

Milk as a whole is a highly nutritious food, while fermented dairy products such as yogurts, tend to have even greater health implications due to the use of probiotic bacteria. These probiotic cultures enter the gut alive generally via dairy consumption and carry out a number of beneficial effects on immune function, gut function, and cardiovascular health [3,4]. Yogurts are a diverse and complex, nutrient dense food matrix whose consumption has been linked to numerous health benefits against cancer, CVDs, diabetes, obesity, and metabolic syndrome [2-6].

Humans have consumed yogurts and fermented milk products for thousands of years, now millions of people consume them daily, but there is a distinct gap in the literature relating to the complete nutritional value of fermented milk products. There is even greater discrepancy in relation to the consumption of these products that have been produced using alternatives to bovine milk, such as caprine and ovine milk.

Ovine and Caprine Fermented Milk Products

The majority of dairy products that are consumed worldwide originate from bovine milk, which accounts for 85% of global milk production, followed by buffalo (11%), goat (2.3%) sheep (1.4%) and camel milk (0.2%) [7]. The production of ovine and caprine dairy products is prominent in the Mediterranean basin and the Middle East. Outside of these distinct regions, sheep and goat milk products

are considered a delicacy and their consumption is not common [7], particularly in countries like Ireland and the U.K. where consumption of these products is rare. Limited studies exist on the health effects of ovine and caprine yogurts and milk, as most of the research focuses on the consumption of bovine milk products due to its global dominance in the dairy market. Ovine milk has a higher protein, lipid, mineral and vitamin content than bovine or caprine milks. The negatively perceived lipid fraction of dairy products has been shown to affect CVD risk either neutrally or positively due to the presence of a number of bioactive lipids [2]. Balthazar and colleagues have shown that the most predominant fatty acids in ovine milk yogurt are oleic acid (C18:1), followed by palmitic acid (C16:0) and myristic acid (C14:0) [8]. They also concluded that ovine yogurt has a low atherogenic and thrombogenic risk due to its healthy lipid profile. High consumption of oleic acid has been shown to reduce LDL cholesterol, while leaving the HDL cholesterol levels unaltered in human studies, indicating that oleic acid in sheep milk products may possess antiatherogenic properties [9]. Goat milk may also contain an antiatherogenic lipid profile that is attributed to the high levels of monounsaturated fatty acids, polyunsaturated fatty acids and medium chain fatty acids that are known to be beneficial to cardiovascular health [10].

Our group focuses on the lipid fractions of bovine, caprine and ovine yogurts; they have been associated with the inhibition of platelet-activating factor (PAF). PAF is a potent pro-inflammatory phospholipid mediator that is implicated in the onset and progression of atherosclerosis. Ovine and caprine yogurts possess highly bioactive polar lipid fractions, which exhibit potent anti-thrombotic activities in-vitro against PAF induced platelet aggregation in washed rabbit platelets. In particular, Greek style yogurts produced with caprine and ovine milk have demonstrated greater PAF inhibitory properties in comparison to bovine yogurts. Research in relation to the anti-PAF activities of dairy products has demonstrated that the fermentation of milk to yogurt and then to cheese induces greater anti-thrombotic activity against PAF [11,12]. We focus on the effect of lipolysis and on the role of starter cultures such as *Streptococcus thermophilus* and *Lactobacillus delbrueckii* subsp. *bulgaricus* on the bioactivity of the polar lipid fractions in fermented milk products [12]. We suggest that the polar lipids in these yoghurts have strong anti-inflammatory

activities and hence further research should focus on these lipids and their bioavailability [2,12].

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