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An overview of vitamin K in cheese and the potential role on cardiovascular disease

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Dairy fat is relatively high in SFA content (~60%) and has been associated with cardiovascular disease, yet evidence exists for either neutral or beneficial effects from cheese consumption, due to the specific food matrix[(1)(2)]. Vitamin K has been implicated in cardiovascular, bone and metabolic health[(3)]. This vitamin includes two naturally occurring forms; phylloquinone (Vitamin K1) and menaquinones, MK4- M13 (collectively known as Vitamin K2). Leafy vegetables are the main dietary source of K1 whereas K2 is mainly bacterially synthesized, and found in cheese which may also represent a good dietary source of vitamin K, but the levels in cheese are not well characterised.The overall aim of this analysis is to evaluate composition data for vitamin K in different national food databases and in different cheeses from published studies, with respect to recommended population intakes, and to assess the potential contribution of vitamin K in cheeses to cardiovascular disease. A search was conducted on 5 national food databases: USA, UK, Netherland, Japan, and Australia, and a dataset was created containing compositional data for all forms of Vitamin K available for all common cheeses. Separately, a search was conducted in Web of Science, Medline/PubMed and Science Direct to find studies that had specifically measured vitamin K levels, of any form, in cheese, using c*ombinations of the following keywords: "vitamin K," "vitamin K2," "menaquinone," phylloquinone, "dairy products," "cheese"*. The papers identified were used to create a separate database of this information 36 kinds of cheese, including data on cheese type, and content of phylloquinone and menaquinones 4-13, where available. Few national food databases include comprehensive vitamin K composition data, and considerable variation is reported in those, due in part to incomplete menaquinone data. The cheeses examined here included Cheddar, Blue cheese, soft cheese, Raclette and Gouda, etc., and contained mainly forms of Vitamin K2 which are MK-9 (ranging from 0-359.8ug/100g), MK-8 (0-41.2ug/100g) and MK-4 (0-20.8ug/100g).

Considerable variability in values was also reported across cheese types and in different studies. Potential reasons include different starter cultures used, fermentation conditions, the fat content and milk source.

A number of recent clinical studies demonstrated vascular calcification inhibition by MK-7, but knowledge on other forms, including MK-9, MK-8 and MK-4, all of which are rich in cheeses, is still lacking. Vitamin K2 may have a role in dairy matrix effects on CVD due to its health benefits on vascular calcification, and the content ranges found here show promise for potential biological activity. However, considerable variation exists, and studies are now needed to determine the optimal conditions for K2 content and demonstrate effects of vitamin K2 in human intervention studies, to confirm the potential role of vitamin K2 and dairy matrix effect on CVD biomarkers.

References

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