Effect of cinnamon (Cinnamomum burmanii Blume) essential oils on the textural, rheological, thermal properties and antioxidant activity of white chocolate

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Introduction

Chocolate with herbs or spices has become more popular in recent years. This may be due to the unique flavour and potential antioxidant capacity. However, studies on the herbs and spice-enriched chocolate are still limited. Among primary types of chocolate, white chocolate has the lowest level of specific chocolate flavor and antioxidant activity due to the absence of cocoa mass. In this study, the effect of cinnamon essential oils on the textural, rheological, melting profile and antioxidant activity of white chocolates is investigated. The term of essential oils is understood to mean a mixture of biochemical compound obtained from the plant volatile fraction by steam distillation.

Result and Discussion

Chemical properties and antioxidant activity of cinnamon essential oils

Cinnamon essential oils that consist of a number of volatile compounds exhibit antioxidant activity. Cinnamaldehyde and possibly other volatile compounds play a role in the increase of antioxidant activity. Addition of the essential oils into white chocolate (0.1% w/w) slightly improved the FRAP activity and total antioxidant activity of the white chocolate. The DPPH radical scavenging activity was not significantly different between samples. White chocolate enriched with cinnamon essential oils has lower hardness and cassin viscosity. However, it has higher yield stress and thixotropy than the chocolate control. There is no remarkable difference between the samples in terms of melting profile and microstructural properties. Essential oils from various herbs and spices have an good potential to enrich the flavor properties of chocolate, but not antioxidant property. The method for making chocolate in this research can be adopted by the small scale confectionery producer.

Conclusions

Adding cinnamon essential oils is strategically and technologically feasible to enrich flavor properties of white chocolate. The results show some deviating behaviour of the enriched chocolate in rheological and textural properties. However the differences are not insuperable in industrial application. Even though an improvement in antioxidant activity of the chocolate was observed, cinnamon essential oils did not satisfactorily enhance antioxidant activity of the chocolate. Adding whole powder or oleoresins of cinnamon may be more effective to improve antioxidant activity of white chocolate.

Quality attributes of cinnamon essential oils-enriched white chocolate

Table 1. Antioxidant activity of cinnamon essential oils determined by FRAP (Ferric Reducing Antioxidant Power) and phosphomolibdenuum and method.

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