

Analysis of glycolipids in vegetable lecithin with HPLC-ELSD

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Abstract

Vegetable lecithins play an important role in the microstructural and macroscopic properties of food and cosmetic products. They are widely used as a natural emulsifier. As lecithin is a by-product of the vegetable oil refining industry, its composition is quite variable and rather complex. Therefore, a more complete view on the chemical composition of lecithin would assist in elucidating its functionality. This study focused on the separation and quantification of several glycolipid classes in lecithin, namely (1) digalactosyldiacylglycerol (DGDG) and monogalactosyldiacylglycerol (MGDG), (2) steryl glucosides, (3) esterified steryl glucosides and (4) cerebrosides, using HPLC-ELSD. MGDG was not detected in soy lecithin.

Keywords: lecithin; glycolipids; HPLC-ELSD

Introduction

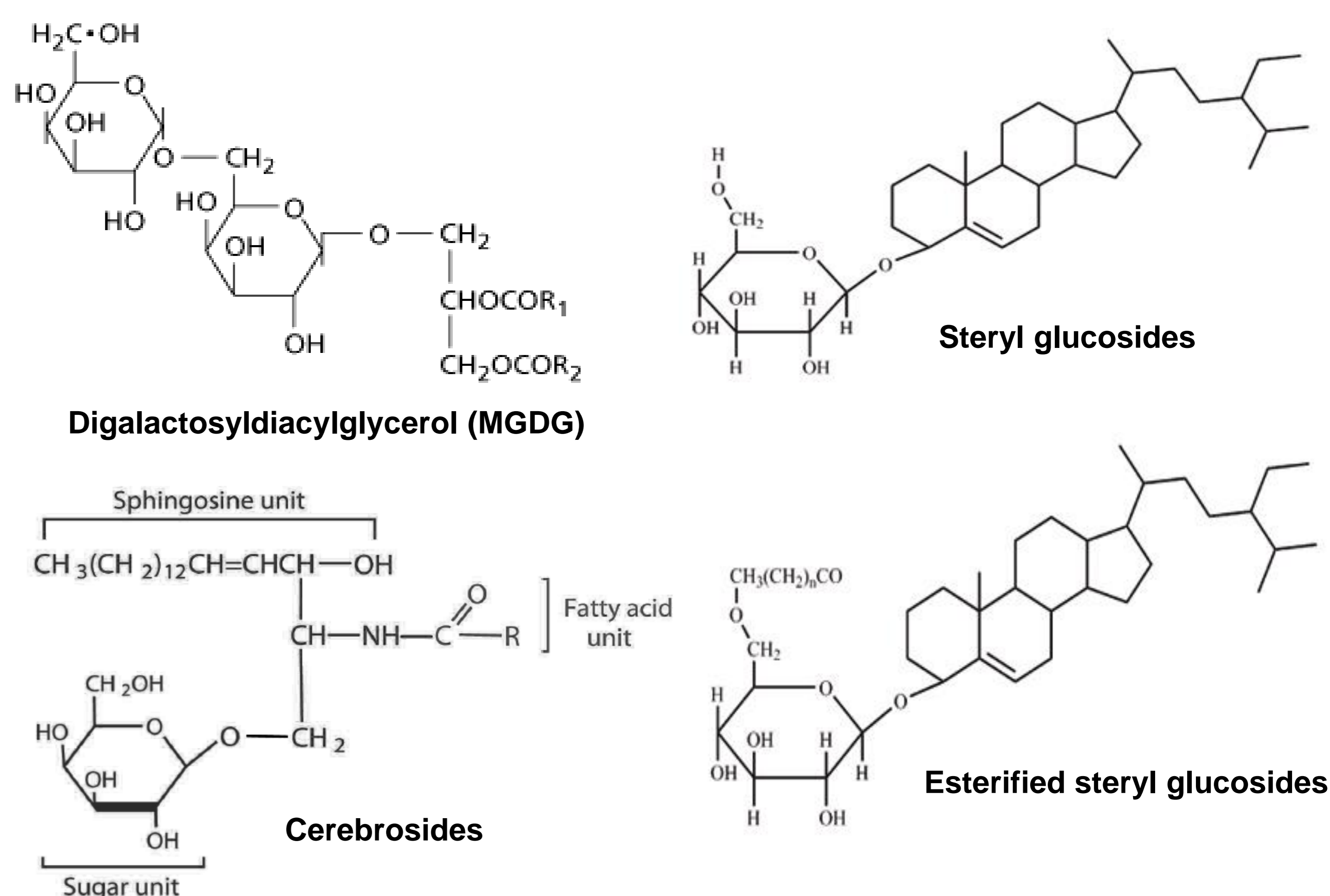
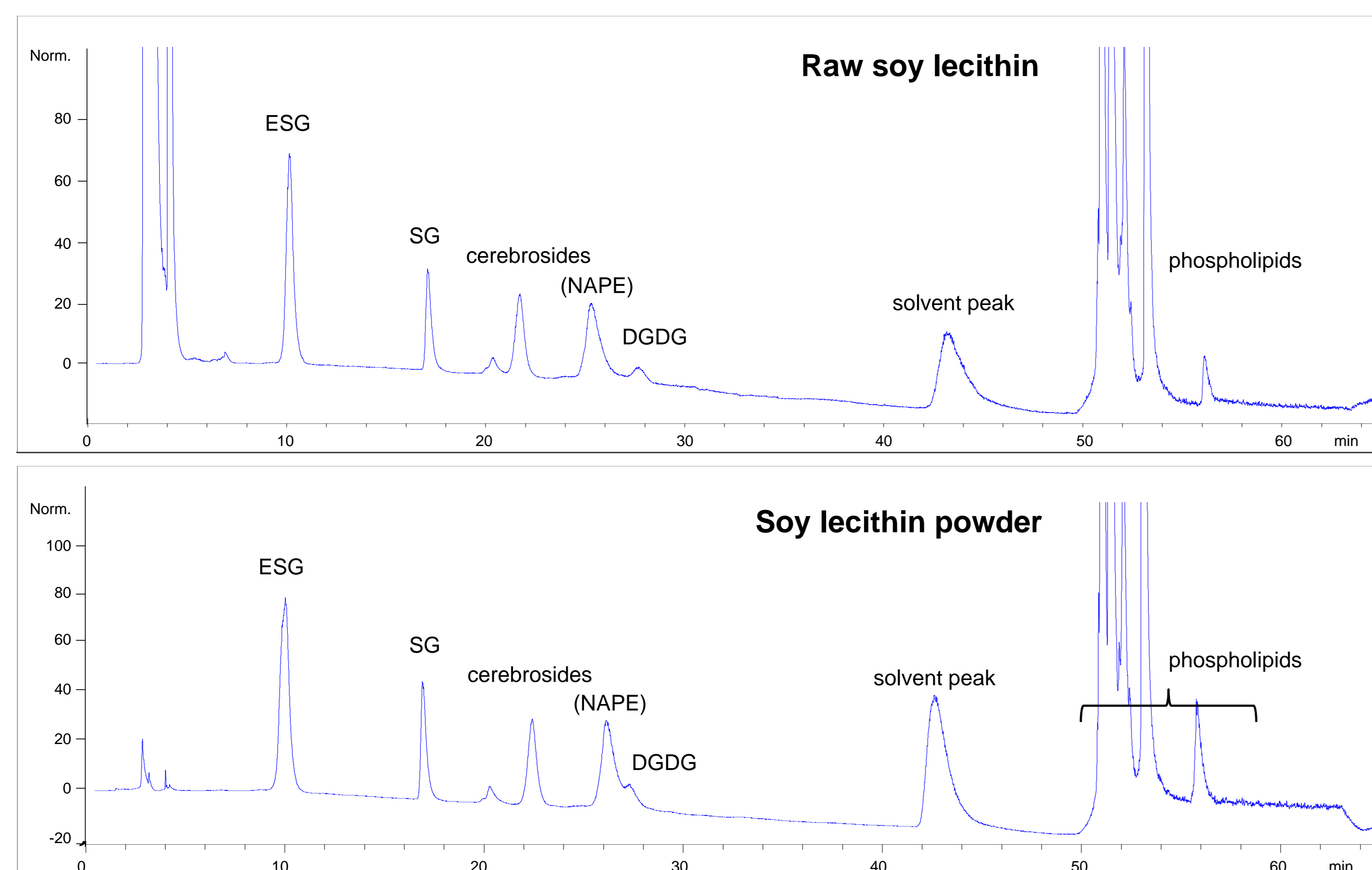
Vegetable lecithin is known for its powerful emulsifying characteristics. This functionality is mainly due to its polar lipid content. Polar lipids comprise of phospholipids and glycolipids. There is a lot of research on phospholipids, however, there is not much data for glycolipids, especially their specific functionality. The molecular structures of the four main glycolipid groups in vegetable lecithins are shown. This study will help to quantify the glycolipid composition in vegetable lecithin, which could help to explain the emulsifying behaviour of lecithin.

Material and Method

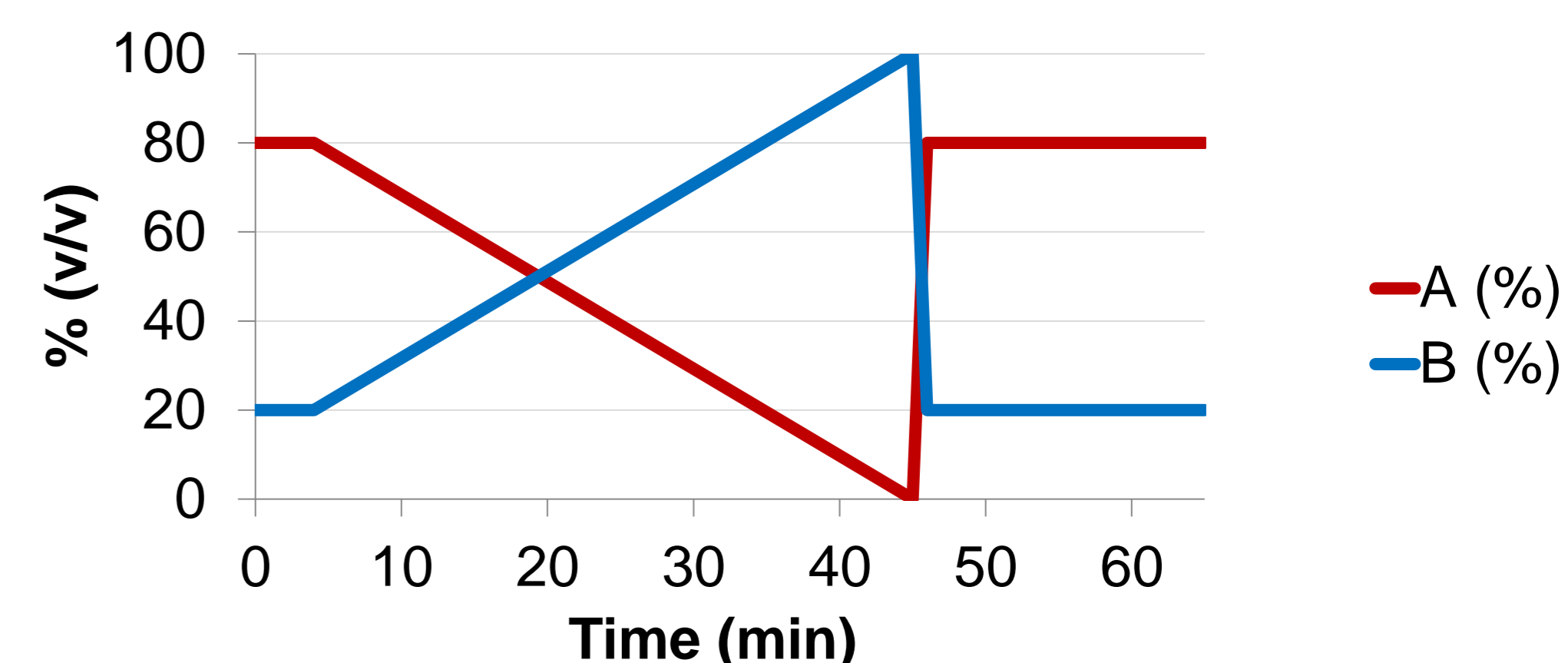


- Lecithin powder was prepared by precipitation of raw lecithin in acetone (2g lecithin/85mL saturated acetone)
- HPLC Waters 2690
- Alltech® 3300 ELSD: 65°C, 1.7L N₂/min
- Column: YMC-Pack Diol Silica column, 250x4.6mm, 5µm, 120Å
- Flow rate: 1ml/min. Injection volume: 25µl
- Gradient elution
 - Solvent A: Hexane + 0.5% acid acetic
 - Solvent B: Dichloromethane/Isopropanol 50/50 + 0.5% acid acetic

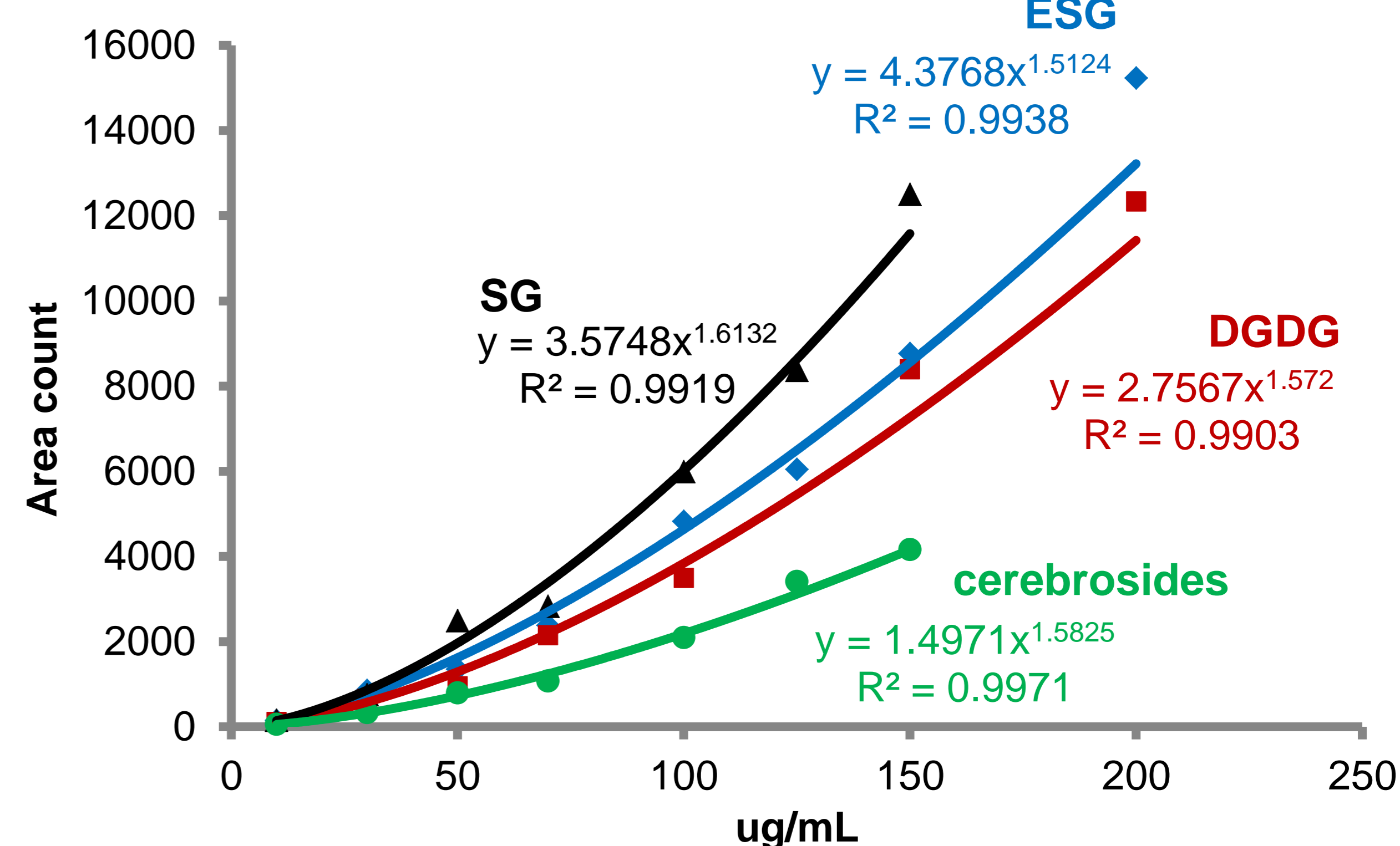
Results



Solvent profile



Calibration curves



Percentage of the glycolipids (% w/w)

GL	Raw soy lecithin	Soy lecithin powder
ESG	2.70	3.37
SG	1.28	1.60
Cerebrosides	2.72	3.31
DGDG	0.73	1.24
Total	7.43	9.53

Conclusion

With this method, it is possible to quantify the four major glycolipids in lecithin both in liquid and deoiled powder form.