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High Phytosterol Levels in Corn Cob Point to their Sustainable use as a Source of these Nutritional Compounds

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[Introduction]

Phytosterols are important structural components of plant cells that affect membrane fluidity, permeability, and membrane-related metabolic regulation. These compounds, which are beneficial for human health, are abundant in vegetable oils, such as corn oil extracted from seeds. Cultivation of corn (*Zea mays*) produces huge amounts of cobs as a by-product, but efforts to utilize cobs are limited. Here, we investigated phytosterol, crude oil, and fatty acid contents in the kernels and cobs of four major Korean corn cultivars and explored the potential use of cobs as a source of phytosterols.

[Materials and Methods]

Four corn (*Zea mays*) cultivars, Sinhwangok, Kwangpyeongok, Hwangdaok, and Jangdaok, were used in this study. The crude oil content was quantified using a Soxtherm Automatic System. The fatty acid composition and phytosterol contents of corn cobs and kernels were quantified by Shimadzu GC-2010 plus.

[Results and Discussion]

The crude oil contents of cobs were 127.8–1331.1 mg 100 g⁻¹ DW, and those of kernels were 3735.6–6372.2 mg 100 g⁻¹ DW. The crude oil content was lowest in Hwangdaok cob 30 DAP (127.78 mg 100 g⁻¹ DW) and highest in Kwangpyeongok kernel 60 DAP (6372.22 mg 100 g⁻¹ DW). The proportions of palmitic (C16:0) and linolenic (C18:3) acids were markedly higher in cobs than in kernels. The palmitic acid contents ranged from 23.4%–37.7% (average 30.9%) in cobs and 12.7%–20.5% (average 15.4%) in kernels, and the linolenic acid contents were 1.5%–7.6% (average 5.1%) in cobs but only 0.6–2.6% (average 1.1%) in kernels. The cobs contained higher levels of phytosterols than kernels in all four cultivars analyzed, which ranged from 86.5 to 217.1 (average 131.4) mg 100 g⁻¹ DW in cobs and 43.8 to 89.5 (average 61.2) mg 100 g⁻¹ DW in kernels. Identifying optimal cultivars and maturation periods should enhance the utilization of corn cobs as a sustainable source of phytosterols.

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