

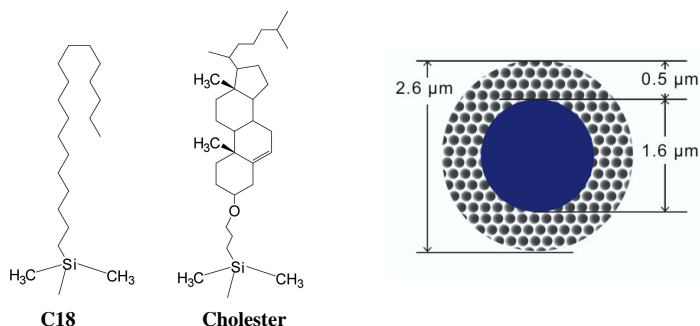
Ken Tseng<sup>1</sup>, Toshi Ono<sup>1</sup>, Tsunehisa Hirose<sup>2</sup>, Kazuhiro Kimata<sup>2</sup>  
<sup>1</sup>Nacalai USA, Inc., San Diego, United States, <sup>2</sup>Nacalai Tesque, Inc., Kyoto, Japan

## Introduction

We investigated the performance of a cholesterol-bonded stationary phase in core-shell vs. fully porous particles. The core-shell column maintained good baseline separation under 3 minutes compare with 20 minutes in a 5 $\mu$ m column for a catechin mixture. Antioxidants such as catechins found in green tea are associated with numerous health benefits. Epigallocatechin gallate (EGCG) is the most abundant, but other catechins may also play important roles. Cholesterol has similar hydrophobicity and better shape selectivity compare with C18. This alternate selectivity allows Cholesterol to purify structural isomers or compounds with closely related structures under typical reversed-phase conditions. The characteristics and advantages of the Cholesterol stationary phase especially when combined with the advantages of core-shell are shown as a good alternative to C18.

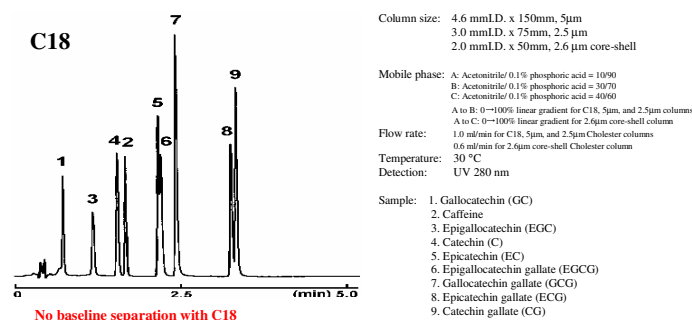
## COSMOCORE and COSMOSIL Cholesterol Material Characteristics

	Core-Shell	Fully Porous		
<b>Name:</b>	Cosmocore Cholesterol	Cosmosil Cholesterol		
<b>Silica Gel</b>	High Purity Spherical Silica	High Purity Spherical Silica		
<b>Stationary Phase</b>	Cholesteryl group	Cholesteryl group		
<b>Average Particle Size</b>	2.6 $\mu$ m ; core 1.6 $\mu$ m	2.5 $\mu$ m	5.0 $\mu$ m	15 $\mu$ m
<b>Average Pore Size</b>	90 Å	130 Å	120 Å	120 Å
<b>Surface Area</b>	150 m <sup>2</sup> /g	330 m <sup>2</sup> /g	300 m <sup>2</sup> /g	300 m <sup>2</sup> /g
<b>Carbon content</b>	N/A	approx. 21%	approx. 20%	approx. 20%

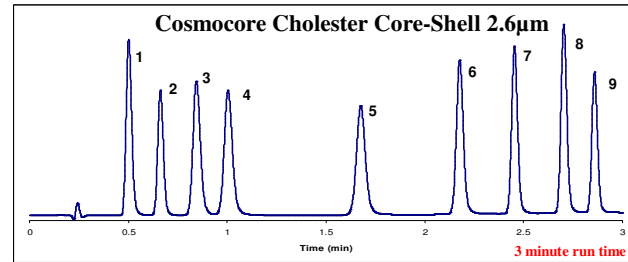
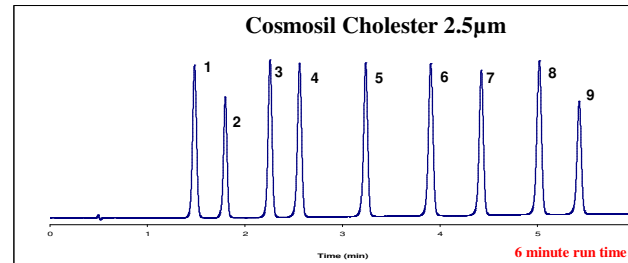
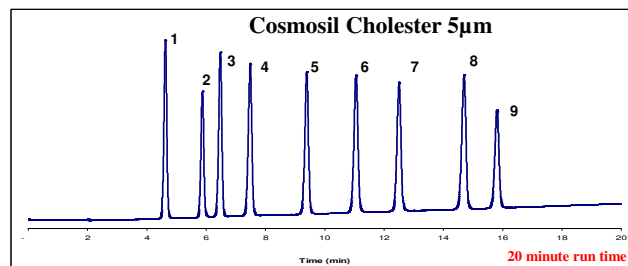


## Catechin Mixture Separation

**Figure 3:** Baseline separation of catechins with Cholesterol, but not with C18. Cholesterol core-shell performed better than the fully porous columns.

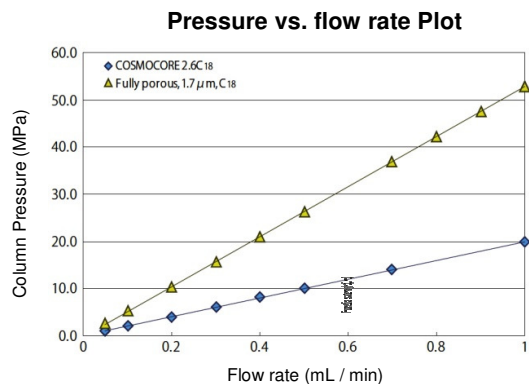


## Catechin Mixture Separation Comparison

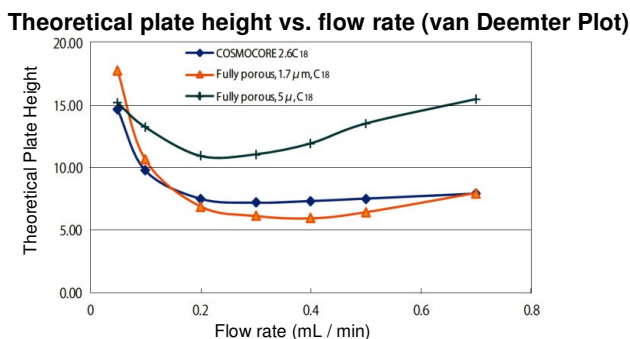


## Core-Shell has Reduced Back Pressure and Similar Plate Height

**Figure 1:** 2.6  $\mu$ m core-shell has lower back pressure compare with 1.7  $\mu$ m fully porous particle



**Figure 2:** 2.6  $\mu$ m core-shell has similar plate height as the 1.7  $\mu$ m fully porous particle



Column size: 2.1 mm I.D. x 50 mm, Mobile phase: Acetonitrile : Water = 70 : 30,  
 Temperature: 40 °C, Sample: Amylbenzene

## Conclusions

- Cosmocore Cholesterol achieved baseline separation of the catechin mixture in under 3 minutes
- Because of the rigid structure of cholesteryl group, COSMOSIL Cholesterol shows greater planarity selectivity and better resolution for geometric isomers.
- Catechin mixture was baseline separated by Cholesterol HPLC column under a typical reversed-phase condition