

, , ()

.

.

1.

2. (Biomarker)

3.

.

국문 요약

TLC GC-MS

가

서 언

, 가 .
가 , 21

가‘

가

가

DNA

가 가



가

가

본론

1.

가

(Biomarker)

1978 Lin

Nevada Lovelock

2000

Coprostanol

가

1983 Knights

Bearsdens

Antonine Wall

([2], [3]

). 2003

1)

([1]).



coprostanol bile acids

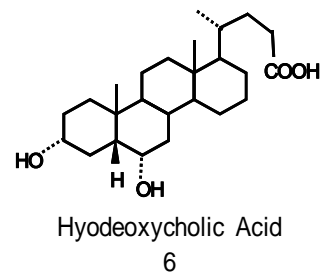
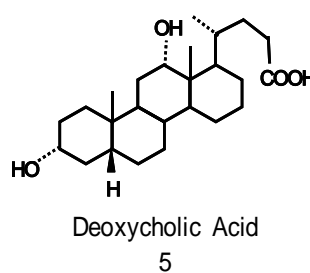
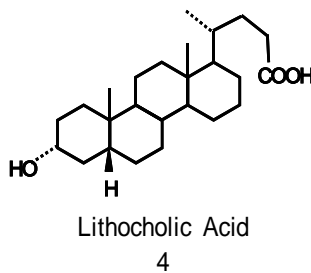
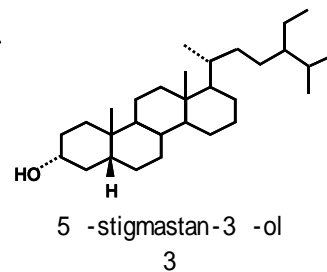
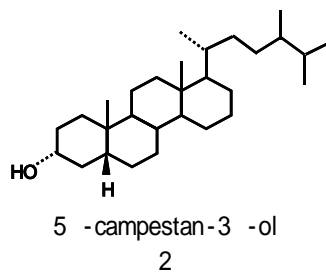
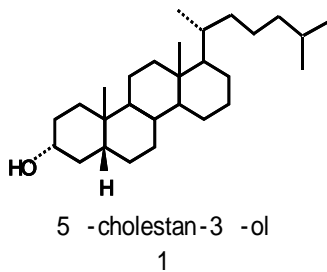
(1) Coprostanol/Bile acids

Coprostanol

5 -stanols sterol 5 가
 5 -stanol coprostanol(5 -cholestan-3 -ol)
 (Eubacterium) cholesterol 5
 가 가 5 -campestanol, 5 -stigmastanol
 campesterol, stigmasterol (1)([9]
). sterol 5 -H
 5 -stanols 5 -stanols , 5 -stanols
 5 -stanols coprostanol 3 -OH
 epicoprostanol(epimer-5 -cholestan-3 -ol)

coprostanol

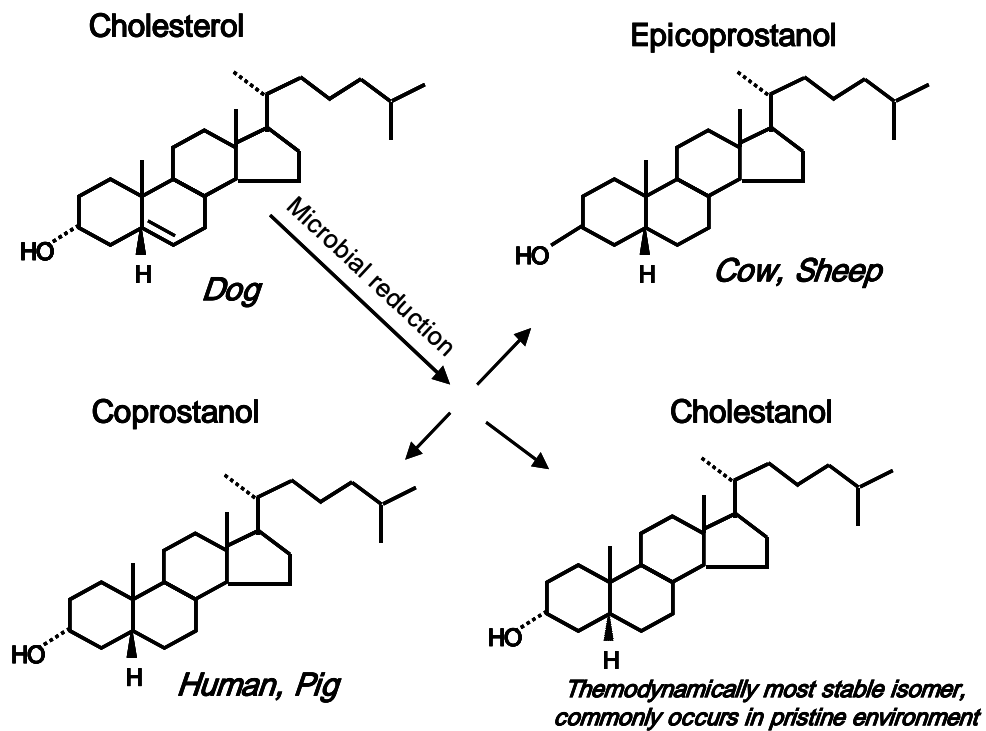
(2)([10]).



< 1> Stanols 2 Bile acids

cholesterol
 5 -stanols coprostanol
 가 5 -campestanol, 5 -sitostanol, 5 -stigmasterol
 campesterol sitosterol, stigmasterol 5
 -stanol (3) ([8]).
 coprostanol 60%
 5 -stanol
 1,200 2~3% cholesterol coprostanol
 , 가 .

가 ([10]).



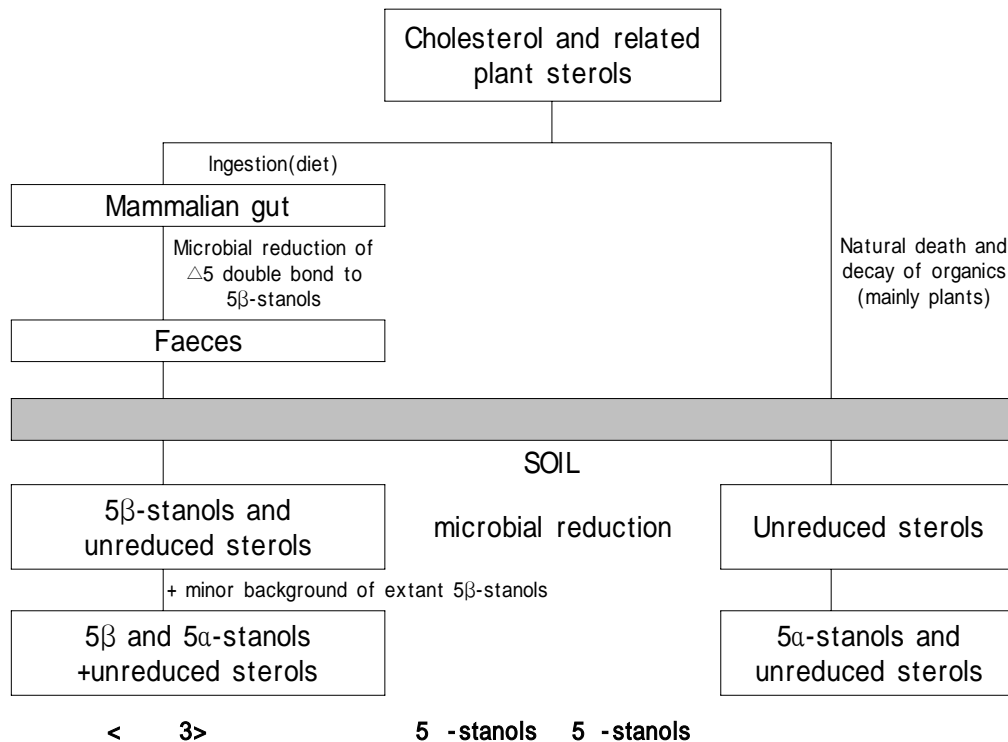
< 2> Sterol ; sterol

5 β -stanol

가 가

Bile acids

Bile acids C₂₄, C₂₇, C₂₈
 , 0.5g 가 . Cholesterol
 C₂₄ -COOH 가 . cholesterol
 bile acid -OH keto moiety 1 bile acids
 chenodeoxycholic acid, hyocholic acid, cholic acid . 1 bile acids
 acids 2 bile acids .
 2 bile acids lithocholic acid, deoxycholic acid, hyodecholic acid (.
 1). 1 , 2 bile acids 1 bile acids가 2 bile acids
 . cholesterol



bile acids

가

bile acids

coprostanol

가

가

coprostanol

(2)

가

(Gas Chromatography-Mass Spectrometry; GC-MS)

coprostanol bile acids

(Ultrasonication extraction)²⁾

(Thin Layer Chromatography ; TLC)³⁾

GC-MS(Gas Chromatography

- Mass Spectrometry)

(Chromatography)

가

(Gas Chromatography) 1950

(Mass Spectrometry)

[11]).

GC-MS

coprostanol bile

2)

()

가

1000 10,000

가

3)

5 40µm

TLC

(0.1 0.3mm)

(展開槽)

RF(RF) (

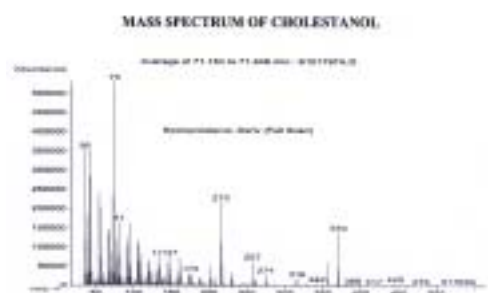
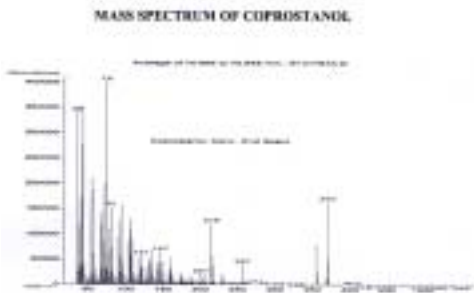
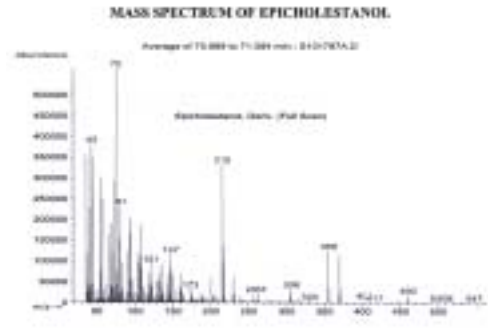
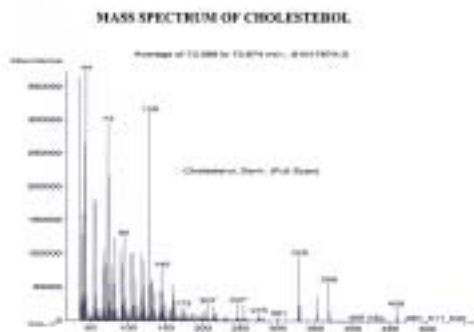
)

(定性) 가

가

(疎水性)

5µm



< 4> GC-MS

acids

, , , (4).

Coprostanol / Bile acids

Coprostanol bile acids

1 5 -stanols coprostanol 5 -stanols 가

Grimalt(1990) (5 -stanol):(5 -stanol+5 -stanol)[e.g(coprostanol):(coprostanol+5 -cholestaol)] 0.7 , Simpson(1998)

Bull(1999) coprostanol epicoprostanol
 coprostanol 가 [(coprostanol + epico-prostanol) : (coprostanol + epicoprostanol
 +5 -cholestanol)]

([12], [8], [13]).
 2

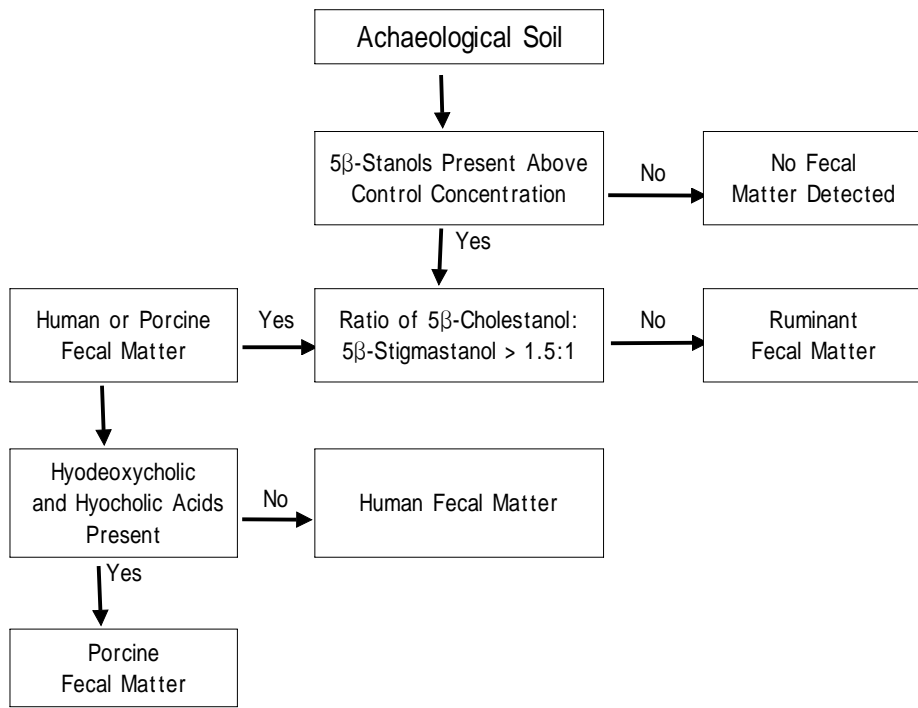
가 5 -stanols coprostanol 5 -stigmastanol
 가 가 가 . Evershed Bethell
 (1996) coprostanol : 5 -stigmastanol 1.5 가
 5.5 0.25 ([9]
). Leeming(1997) [coprostanol : (coprostanol+5 -stigmastanol)] × 100 73%
 38% ([14]).
 3

bile acids ,
 . 2 bile acids lithocholic acid, deoxycholic acid, hyodecholic
 acid ,
 , deoxycholic acid
 , , lithocholic acid
 , deoxycholic acid .

hyodeoxycholic acid hyocholic acid
 . 5 -stanols
 가 (5)([5],[9]).

coprostanol:cholesterol 4.3 , 2.81
 가

, 가



< 5>

5 -stanols bile acids

3.

,
 가 ,
 가 ,
 ,
 가 .
 ,
 가 ,
 , 10 .
 가 ,
 가



< 6 > (500)

가 .
(*Trichocephalus trichiurus*) (6).

(1)

(Formalin-ether sedimentation technique)

가 가 , 가

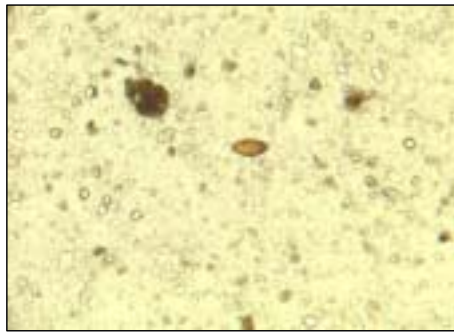
, 가 가 ,

가

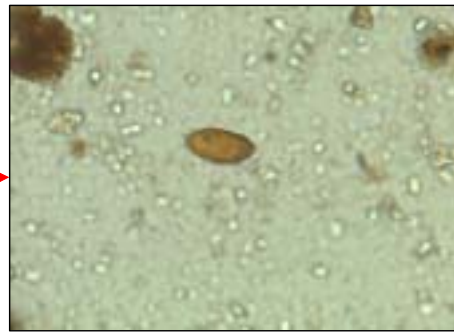
(Brine floatation technique)

(Formalin-ether sedimentation technique)

, , , , , , ,



(A)



(B)



< 7 >

(A) : 200

, (B) : 400

, , , 10%

가

가

가

가

. 3 1,500rpm

10

10%

. 10

5ml

30

1,500rpm

(7)([15]).

(2)

가

가

가

가

(Pollen analysis)

4 (Quaternary)

가

([16]).

가

4

KOH-Acetolysis
(glycerol jelly)

ZnCl₂
(

[17]).

맺음말

가

가

, 가

가
가

가 가

가

참고문헌

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Consideration on the Scientific Analysis of Ancient Soil

Seo, Min-Seok . Kim, Min-Hee . Chung, Yong-Jae

There are some methods such as fatty acid analysis and microscope analysis of parasite egg and pollen and genetic analysis of ancient bacteria from ancient soil.

The fatty acid analysis can examine whether some materials is human feces or animals. This is important thing to reconstruct ancient toilet culture pattern. The methods using TLC and GC-MS as organic chemistry is able to confirm ancient diet life style and nutritive conditions. The microscope analysis of ancient soil is able to confirm ancient parasite egg and pollen. It is possible to analogize ancient human diseases from this analysis. Also, genetic analysis is able to confirm genetic diversity and variation pattern of ancient organisms in archeological soil. Most of all, it is convinced of carrying through genetic preservation of exterminated ancient organisms.

If archeological soils should be analysed through the natural scientific methods such as organic chemistry, soil science, microbiology, molecular biology, and genetics, this is helpful for us to understand and interpretation past historic event. And it is expected to perform an major role for understanding origin of ancient human and life style.

Keyword : ancient soil, fatty acid, parasite, pollen, ancient toilet