

2P-64 Steroidal Glycosides from Potato and Eggplant

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Introduction

Potato (*Solanum tuberosum* L.) and eggplant (*Solanum melongena* L.) are among the most widely consumed vegetables belonging to family Solanaceae.

Many solanaceous plants are reported to contain steroidal glycoalkaloids.

α -Chaconine (1) and α -solanine (2) and are the main steroidal glycoalkaloids in potato.

Although toxic in nature, these glycoalkaloids are receiving more attention in recent years due to their beneficial effects such as anticancer, anti-inflammatory, anti-allergic, anti-bacterial and anti-fungal activities etc.

Extensive studies on the variation of glycoalkaloids in different plant parts of potato suggested that the highest content is found in flowers followed by leaves, stems and tubers.

However, there has been no report on the isolation of steroidal glycosides from fresh fruits.

Hence, in the present work, we isolated and identified α -chaconine (1), α -solanine (2) and chlorogenic acid (3) from the fresh unripe fruits of potato collected from Hokkaido.



Solanum tuberosum Flowers



Solanum melongena Flowers



Solanum tuberosum fresh fruits
(485 g)

MeOH (2.5 L x 2)

Methanol Extract
(17.0 g)

MCI gel CHP20 column

Fr. 1 (14.8 g) Fr. 2 (123 mg) Fr. 3 (405 mg) Fr. 4 (232 mg) Fr. 5 (185 mg) Fr. 6 (122 mg) Fr. 7 (83 mg) Fr. 8 (358 mg)

Sephadex LH20
(90% MeOH)

Chromatorex NH
(C:M:W = 7:3:0.5)

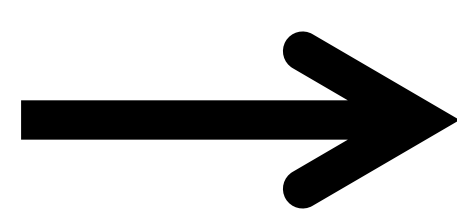
chlorogenic acid (3)
(20 mg)

α -chaconine (1)
(30 mg)

α -solanine (2)
(17 mg)



Solanum tuberosum aerial parts
(1.5 kg)



α -chaconine (1)
(21 mg)

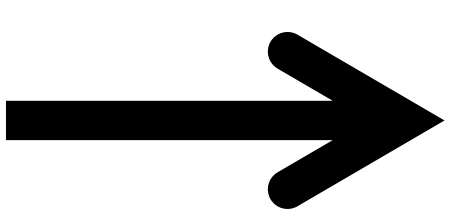
aculeatiside A (4)
(48 mg)

α -solanine (2)
(39 mg)

aculeatiside B (5)
(19 mg)



Solanum tuberosum tubers
(9.8 kg)



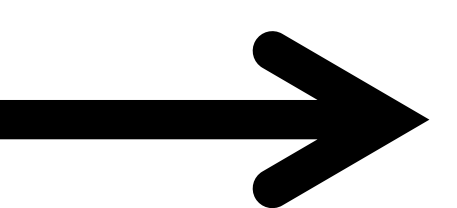
α -chaconine (1)
(122 mg)

protodioscin (6)
(8 mg)

α -solanine (2)
(70 mg)



Solanum melongena fruits
(9.0 kg)



protodioscin (6)
(36 mg)

solasonine (8)
(4 mg)

solamargine (7)
(18 mg)

dioscin (9)
(3 mg)

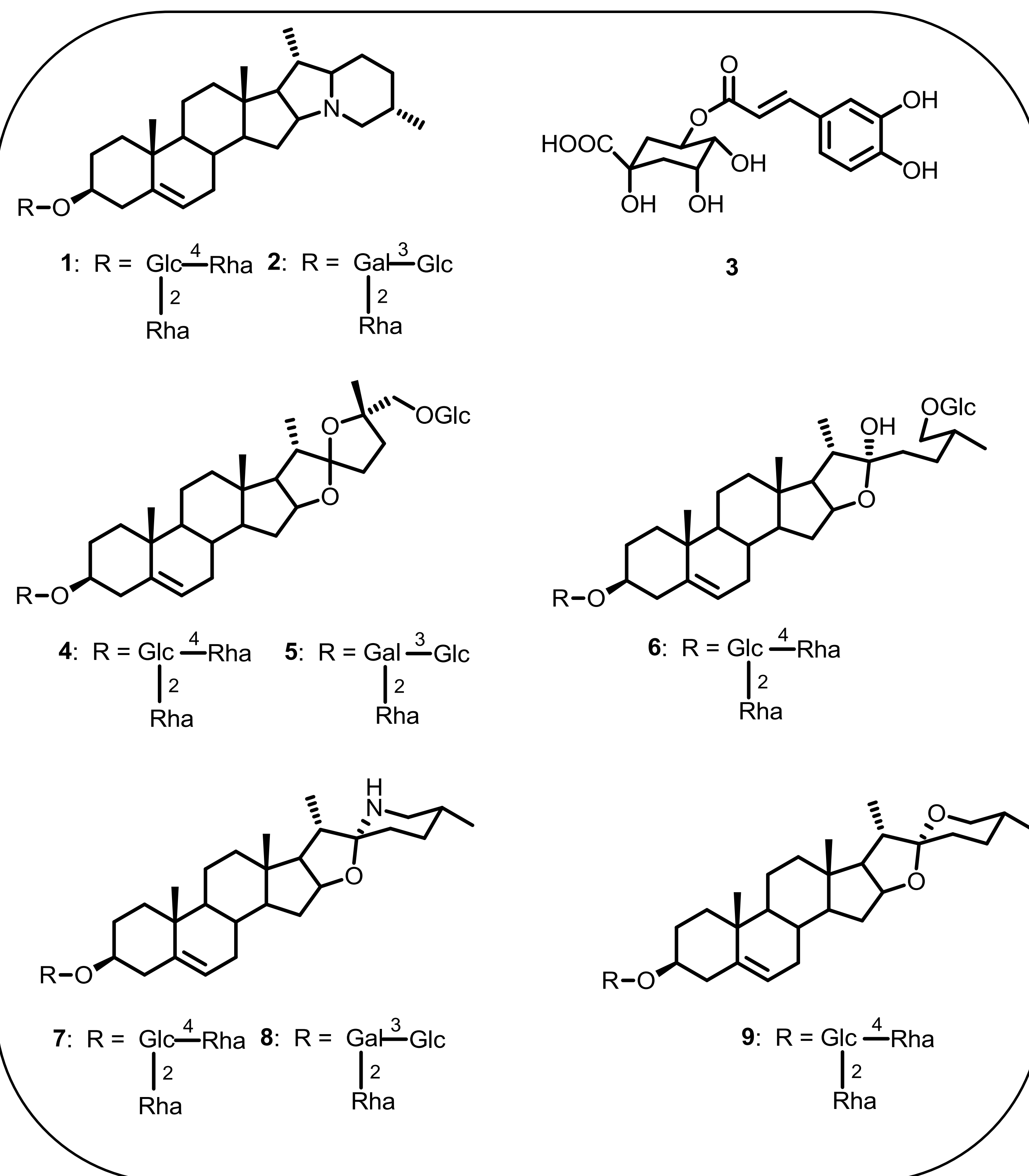


Table 1. ¹³C-NMR data of compounds 1 and 2 in pyridine-d₅

C. No.	1	2	C. No.	1	2
1	37.2	37.4		Glc	Gal
2	31.5	32.2	1	100.0	100.3
3	77.8	77.4	2	78.3	76.3
4	39.8	39.9	3	72.5	84.8
5	140.5	140.8	4	77.7	70.2
6	121.4	121.6	5	76.8	74.8
7	32.0	32.6	6	61.3	62.3
8	31.0	31.5			
9	49.8	50.2		2-Rha	2-Rha
10	36.9	37.0	1	102.0	102.0
11	20.7	21.0	2	72.4	72.4
12	38.6	38.7	3	72.7	72.7
13	40.2	40.4	4	74.0	74.0
14	57.2	57.5	5	69.3	69.3
15	26.0	27.0	6	18.5	18.5
16	69.2	69.3			
17	61.0	62.3		4-Rha	3-Glc
18	16.3	16.6	1	102.0	105.7
19	19.0	19.2	2	72.4	74.9
20	36.4	36.6	3	72.4	78.3
21	18.2	19.1	4	73.7	71.4
22	75.0	74.9	5	70.1	78.2
23	27.8	29.5	6	18.5	62.4
24	29.8	29.8			
25	28.8	30.0			
26	58.7	59.6			
27	19.0	19.2			

Results and Discussion

α -Chaconine (1), α -solanine (2) and chlorogenic acid (3) were isolated and identified from the fresh unripe fruits of potato. Similarly, α -chaconine (1), α -solanine (2), aculeatiside A (4) and B (5) were isolated from aerial parts and α -chaconine (1) α -solanine (2) and protodioscin (6) were isolated from the tubers.

From the fresh fruits of *S. melongena*, protodioscin (6), solamargine (7), solasonine (8), and dioscin (9) were isolated. Protodioscin (6) was also isolated from the fresh aerial parts.

These findings suggest that the unripe fruits and aerial parts of potato contain steroidal alkaloid glycosides and should not be consumed due to their possible toxicity.

References

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