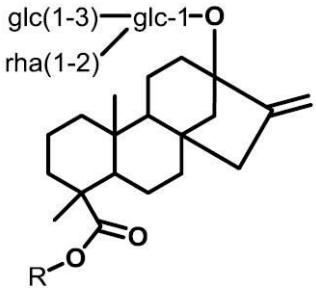
CLAIMS

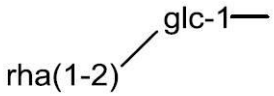
1. A compound represented by Formula (1):



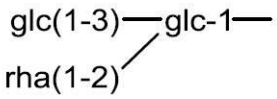
(1)

or a salt or a hydrate thereof,

wherein R represents a sugar chain of Formula (2) or (3); and



(2)

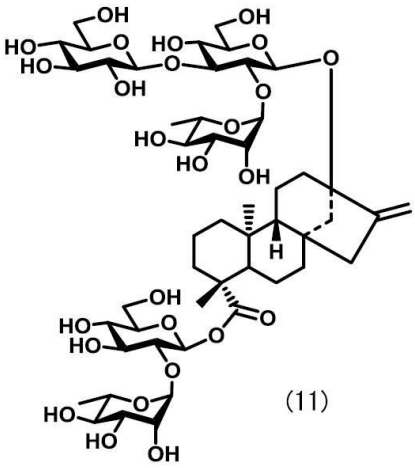


(3)

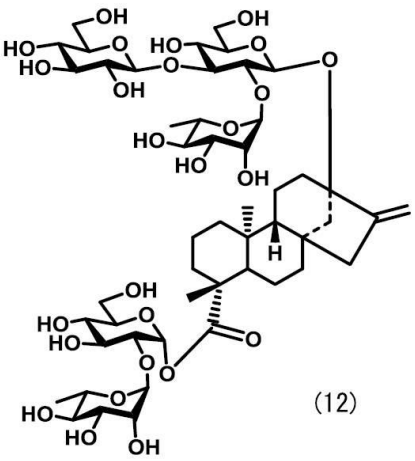
glc represents glucose, and rha represents rhamnose.

2. The compound according to Claim 1, wherein the compound is a plant-derived product, a chemically synthesized product or a biosynthetic product.

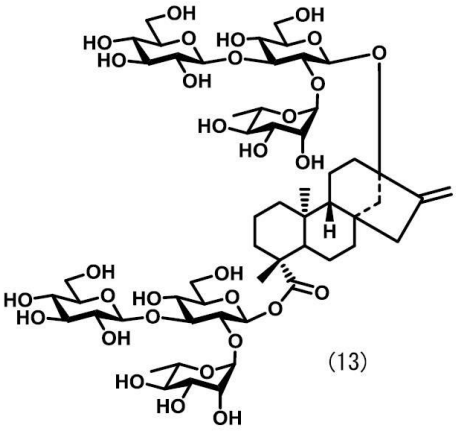
3. A compound represented by Formula (11), (12), (13) or (14):



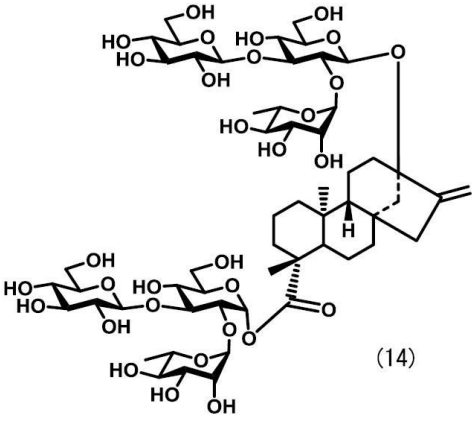
(11)



(12)



(13)



(14)

or a salt or a hydrate thereof.

4. A food or beverage comprising the compound according to any one of Claims 1 to 3.

5. A sweetener composition comprising the compound according to any one of Claims 1 to 3.

6. The sweetener composition according to Claim 5, further comprising one or more types of steviol glycosides selected from the group consisting of rebaudioside A, rebaudioside B, rebaudioside C, rebaudioside D, rebaudioside E, rebaudioside F, rebaudioside I, rebaudioside J, rebaudioside K, rebaudioside N, rebaudioside M, rebaudioside O, rebaudioside Q, rebaudioside R, dulcoside A, dulcoside C, rubusoside, steviol, steviol monoside, steviol bioside and stevioside.

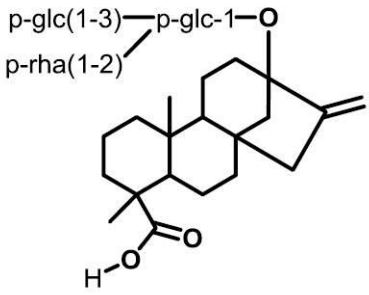
7. A food or beverage comprising the sweetener composition according to Claim 5 or

6.

8. The food or beverage according to Claim 7, which is a beverage.

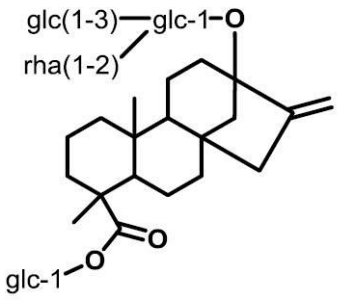
9. A method for producing the compound according to Claim 1, comprising the steps of:

(A) preparing Intermediate 1 represented by Formula (5):



(5)

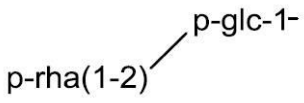
wherein p-glc represents glucose in which at least one hydroxyl group is protected by a protecting group, and p-rha represents rhamnose in which at least one hydroxyl group is protected by a protecting group,
from rebaudioside C represented by Formula (4):



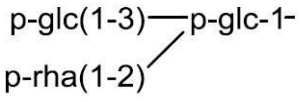
(4)

wherein glc represents glucose and rha represents rhamnose;

(B) preparing Intermediate 2 represented by Formula (6) or Intermediate 3 represented by Formula (7) from a glucopyranoside derivative:



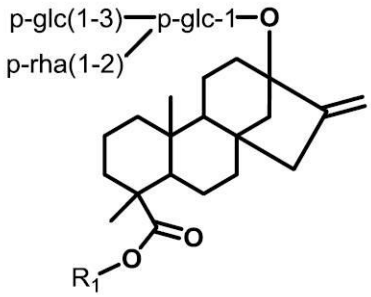
(6)



(7)

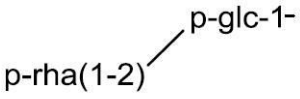
wherein p-glc represents glucose in which at least one hydroxyl group is protected by a protecting group, and p-rha represents rhamnose in which at least one hydroxyl group is protected by a protecting group; and

(C) allowing Intermediate 1 to react with Intermediate 2 or 3 in the presence of a phosphine reagent and an azo compound to obtain Intermediate 4 represented by Formula (8):

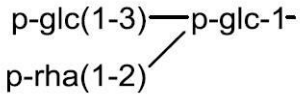


(8)

wherein R_1 represents a sugar chain of Formula (9) or (10): and



(9)



(10)

p-glc represents glucose in which at least one hydroxyl group is protected by a protecting group, and p-rha represents rhamnose in which at least one hydroxyl group is protected by a protecting group.

10. Use of the compound according to any one of Claims 1 to 3 as a sweetener.

11. A method for producing the compound according to Claim 1, the method characterized by use of a non-human transformant that has been introduced with at least one of polynucleotides (a) to (g):

(a) a polynucleotide coding for a protein that has 90% or higher identity with the amino acid sequence of SEQ ID NO:2 and that has an activity of adding glucose to the hydroxyl group at C-13 of the steviol glycoside;

(b) a polynucleotide coding for a protein that has 90% or higher identity with the amino acid sequence of SEQ ID NO:4 and that has an activity of adding glucose to the carboxylic acid at C-19 of the steviol glycoside;

(c) a polynucleotide coding for a protein that has 90% or higher identity with the amino acid sequence of SEQ ID NO:6 and that has an activity of adding rhamnose to glucose attached to C-13 of the steviol glycoside via a 1→2 linkage;

(d) a polynucleotide coding for a protein that has 90% or higher identity with the amino acid sequence of SEQ ID NO:8 and that has an activity of adding glucose to C-3 of glucose at C-13 of the steviol glycoside via a 1→3 linkage;

(e) a polynucleotide coding for a protein that has 90% or higher identity with the amino acid sequence of SEQ ID NO:6 and that has an activity of adding glucose to glucose at C-19 of the steviol glycoside via a 1→2 linkage;

(f) a polynucleotide coding for a protein that has 90% or higher identity with the amino acid sequence of SEQ ID NO:8 and that has an activity of adding glucose to glucose at C-19 of the steviol glycoside via a 1→3 linkage; and

(g) a polynucleotide coding for a protein that has 90% or higher identity with the amino acid sequence of SEQ ID NO:10 and that has an activity of generating UDP-rhamnose from UDP-glucose.

12. The method according to Claim 11, wherein the non-human transformant is a yeast.

13. The method according to Claim 11 or 12, wherein the non-human transformant is cultured in a medium containing steviol.