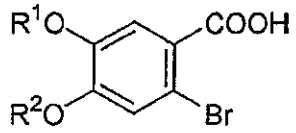
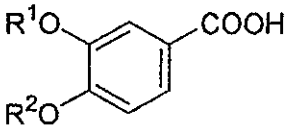
Claims

1. A method for producing a 2-bromo-4,5-dialkoxybenzoic acid represented by the following formula (2):



(2)

(wherein each of R^1 and R^2 represents a lower alkyl group), the method comprising causing a 3,4-dialkoxybenzoic acid represented by the following formula (1):



(1)

(wherein R^1 and R^2 have the same meanings as defined above) to react with bromine in concentrated hydrochloric acid.

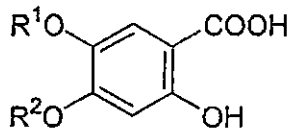
2. The production method according to claim 1, wherein the concentrated hydrochloric acid has a hydrogen chloride content of 33% or more.

3. The production method according to claim 1 or 2, wherein bromine is employed in an amount of 1.0 to 1.1 equivalents.

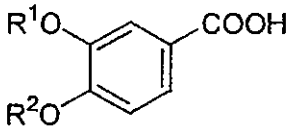
4. The production method according to any one of claims 1 to 3, wherein the reaction is carried out at 10 to 45°C.

5. The production method according to any one of claims 1 to 4, wherein, in formulas (1) and (2), both R^1 and R^2 are a methyl group.

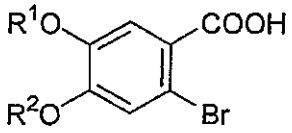
6. A method for producing a 4,5-dialkoxy-2-hydroxybenzoic acid represented by the following formula (3):


(3)

(wherein each of R^1 and R^2 represents a lower alkyl group), the method comprising causing a 3,4-dialkoxybenzoic acid represented by the following formula (1):


(1)

(wherein R^1 and R^2 have the same meanings as defined above) to react with bromine in concentrated hydrochloric acid; and hydrolyzing the resultant 2-bromo-4,5-dialkoxybenzoic acid represented by the following formula (2):


(2)

(wherein R^1 and R^2 have the same meanings as defined above) in the presence of a copper compound and an amine compound.

7. The production method according to claim 6, wherein the copper compound is selected from among copper sulfate, cuprous chloride, cupric chloride, cuprous bromide, cupric bromide, cuprous oxide, cupric oxide, copper acetate, and copper powder.

8. The production method according to claim 6 or 7, wherein the amine compound is selected from among pyridine, dialkylamine, morpholine, piperidine, pyrrolidine, piperazine, and trialkylamine.

9. The production method according to any one of claims 6 to 8, wherein the hydrolysis reaction is carried out under alkaline conditions.

10. The production method according to any one of claims 6 to 9, wherein the concentrated hydrochloric acid has a hydrogen chloride content of 30% or more.

11. The production method according to any one of claims 6 to 10, wherein bromine is employed in an amount of 1.0 to 1.1 equivalents.

12. The production method according to any one of claims 6 to 11, wherein the 3,4-dialkoxybenzoic acid is caused to react with bromine at 10 to 45°C.

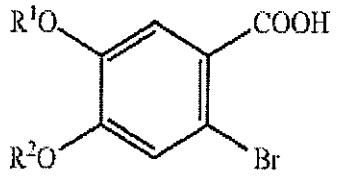
13. The production method according to any one of claims 6 to 12, wherein, in formulas (1), (2), and (3), both R^1 and R^2 are a methyl group.

The invention claimed is:

1. A method for producing a 2-bromo-4,5-dialkoxybenzoic acid, the method comprising:

reacting a 3,4-dialkoxybenzoic acid with bromine in concentrated hydrochloric acid, thereby obtaining the 2-bromo-4,5-dialkoxybenzoic acid wherein said reacting is at a temperature ranging from 10 to 35° C.,

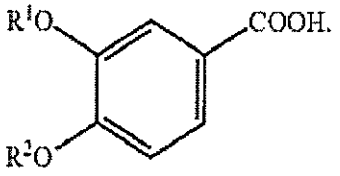
wherein the 2-bromo-4,5-dialkoxybenzoic acid is of formula (2):



(2)

each of R^1 and R^2 is a lower alkyl group, and

the 3,4-dialkoxybenzoic acid is of formula (1):



(1)

2. The method according to claim 1, wherein the concentrated hydrochloric acid has a hydrogen chloride content of 33% or more.

3. The method according to claim 1, wherein an amount of bromine in the reacting is from 1.0 to 1.1 equivalents.

4. The method according to claim 1, wherein a temperature of the reacting is achieved without application of energy.

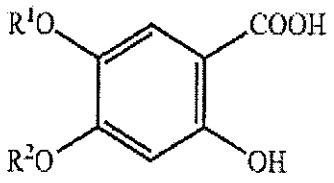
5. The method according to claim 1, wherein both R^1 and R^2 are methyl.

6. A method for producing a 4,5-dialkoxy-2-hydroxybenzoic acid, the method comprising:

reacting a 3,4-dialkoxybenzoic acid with bromine in concentrated hydrochloric acid, thereby obtaining a 2-bromo-4,5-dialkoxybenzoic acid wherein said reacting is at a temperature ranging from 10 to 35° C., and

hydrolyzing the 2-bromo-4,5-dialkoxybenzoic acid in the presence of a copper compound and an amine compound, thereby obtaining the 4,5-dialkoxy-2-hydroxybenzoic acid,

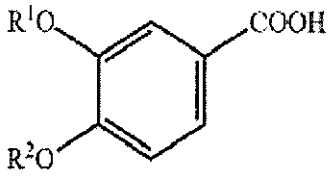
wherein the 4,5-dialkoxy-2-hydroxybenzoic acid is of formula (3):



(3)

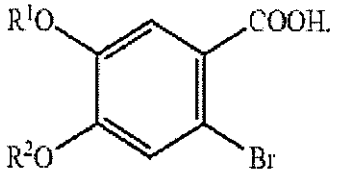
each of R^1 and R^2 is a lower alkyl group,

the 3,4-dialkoxybenzoic acid is of formula (1):



(1)

and the 2-bromo-4,5-dialkoxybenzoic acid is of formula (2):



(2)

7. The method according to claim 6, wherein the copper compound is selected from the group consisting of copper sulfate, cuprous chloride, cupric chloride, cuprous bromide, cupric bromide, cuprous oxide, cupric oxide, copper acetate, and copper powder.

8. The method according to claim 6, wherein the amine compound is selected from the group consisting of pyridine, dialkylamine, morpholine, piperidine, pyrrolidine, piperazine, and trialkylamine.

9. The method according to claim 6, wherein the hydrolyzing is under an alkaline condition.

10. The method according to claim 6, wherein the concentrated hydrochloric acid has a hydrogen chloride content of 30% or more.

11. The method according to claim 6, wherein an amount of bromine in the reacting is from 1.0 to 1.1 equivalents.

12. The method according to claim 6, wherein reacting the 3,4-dialkoxybenzoic acid with bromine is achieved without application of energy.

13. The method according to claim 6, wherein both R^1 and R^2 are methyl.

14. The method according to claim 1, wherein the concentrated hydrochloric acid has a hydrogen chloride content of 33% to 40%.

15. The method according to claim 1, wherein an amount of bromine in the reacting is from 1.0 to 1.5 equivalents.

16. The method according to claim 6, wherein the concentrated hydrochloric acid has a hydrogen chloride content of 33% to 40%.

17. The method according to claim 6, wherein an amount of bromine in the reacting is from 1.0 to 1.5 equivalents.