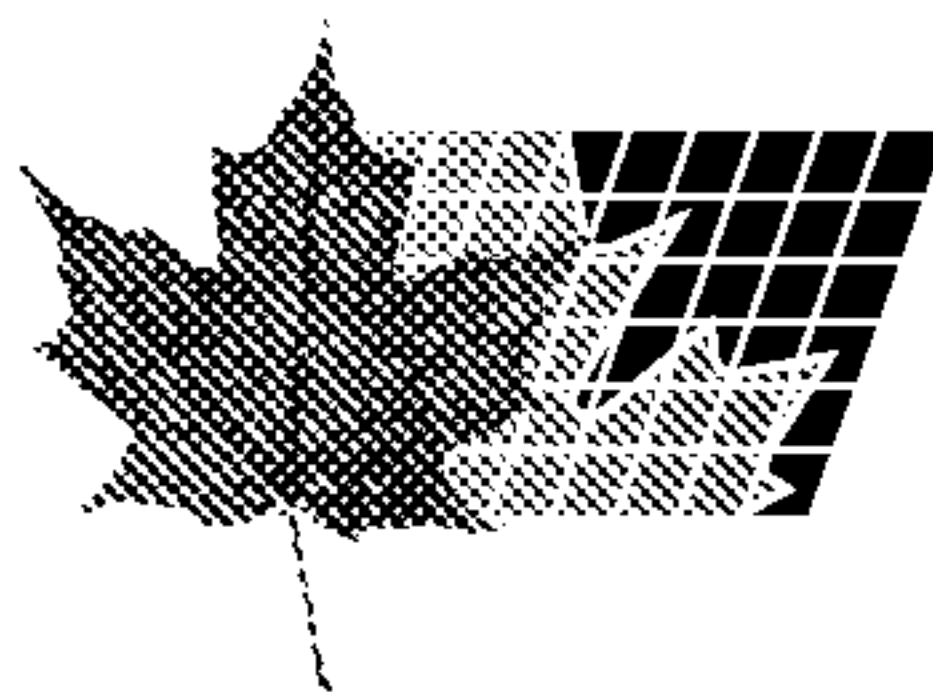




(11) (21) (C) **2,190,236**
(22) 1996/11/13
(43) 1997/05/15
(45) 2000/01/25

(72) Nishii, Shinji, JP

(72) Komatsu, Masashi, JP

(72) Takeuchi, Sachiko, JP

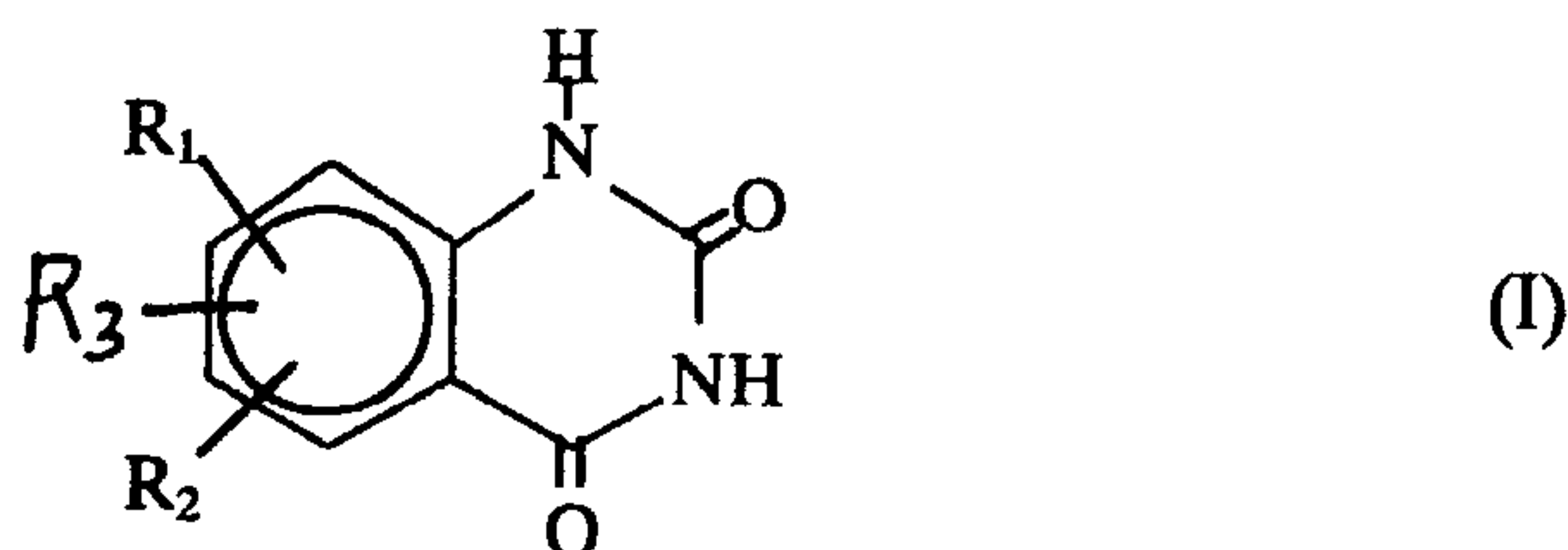
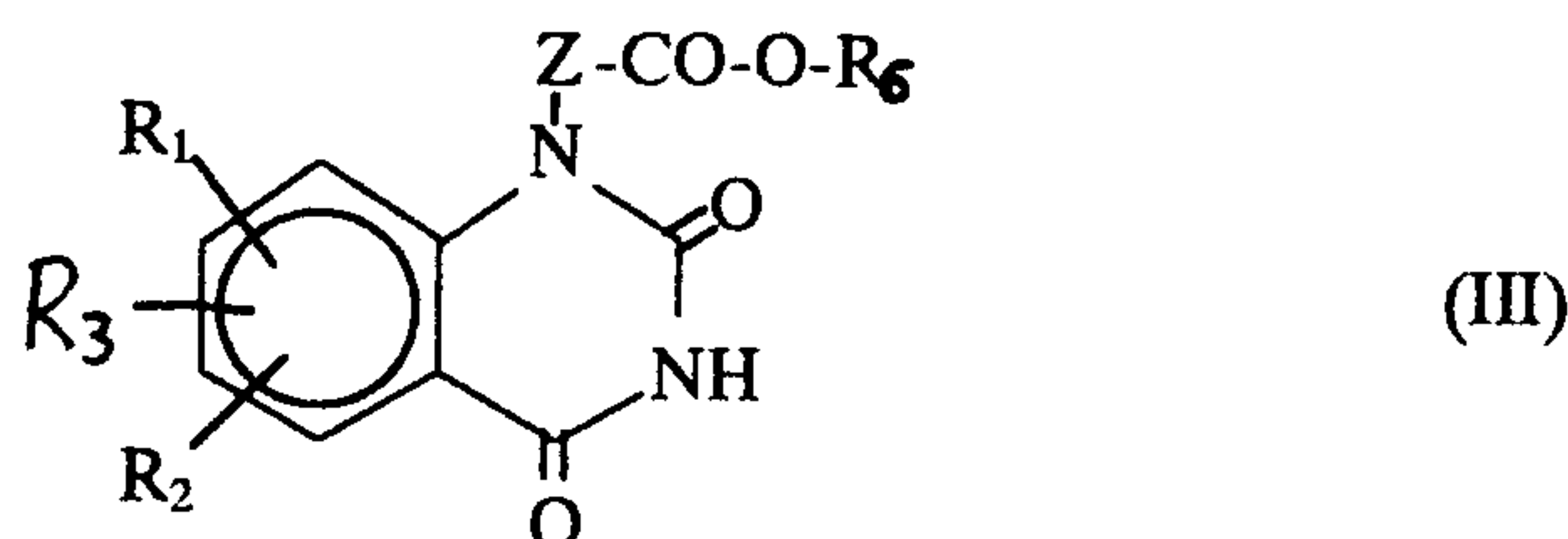
(73) SUMITOMO CHEMICAL COMPANY, LIMITED, JP

(51) Int.Cl.⁶ C07D 239/96, C07D 401/06, C07D 403/02

(30) 1995/11/14 (07-295435) JP

(54) **METHODE POUR L'OBTENTION DE DERIVES DE
SUBSTITUTION EN 1 DE TETRAHYDROQUINAZOLINES**

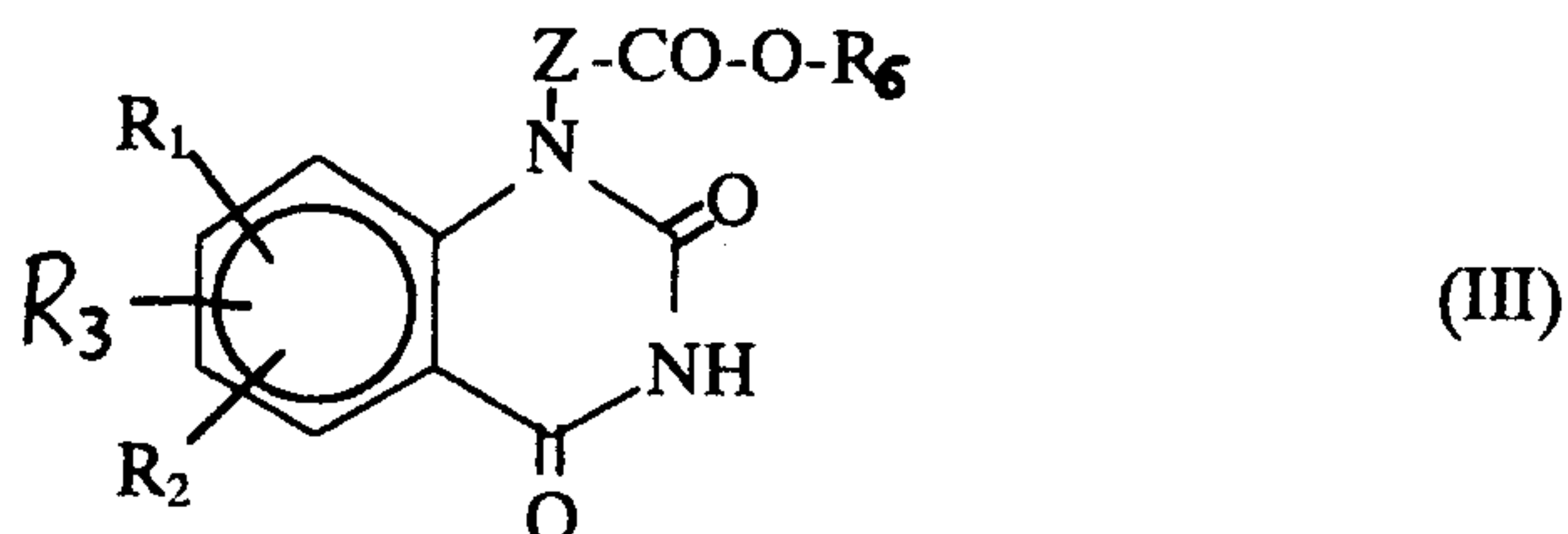
(54) **PROCESS FOR PRODUCING 1-SUBSTITUTED
TETRAHYDROQUINAZOLINES**



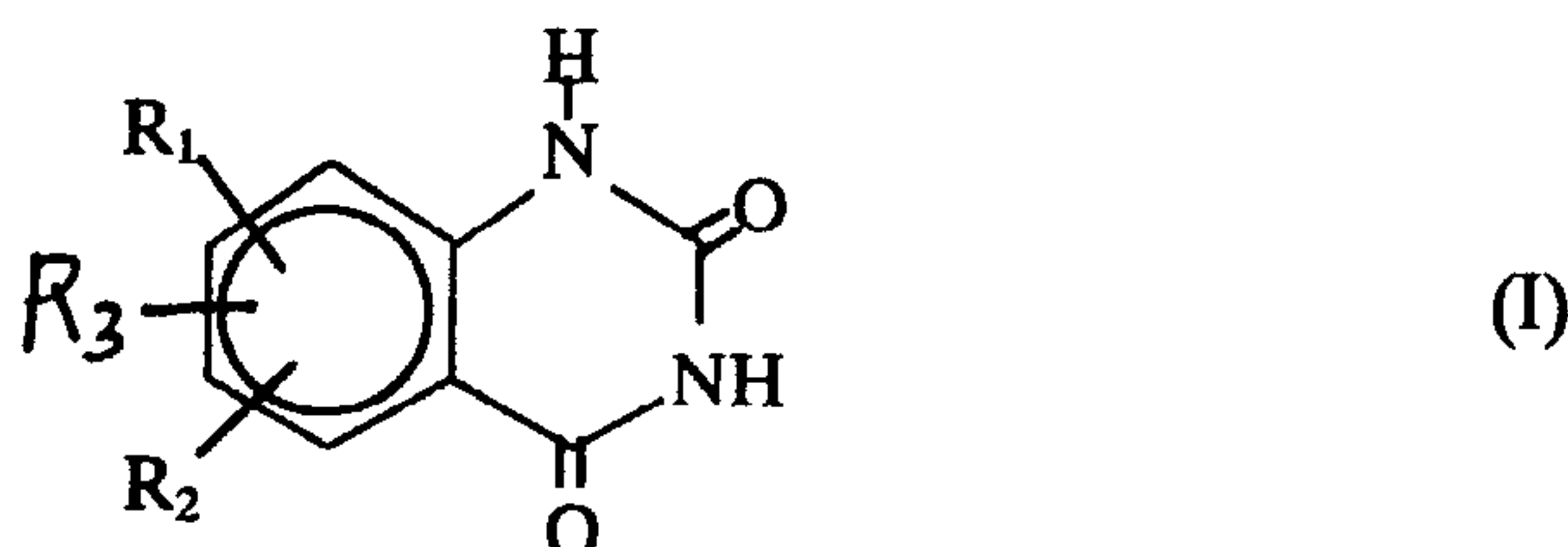
(57) A process for producing 1-substituted tetrahydroquinazolines represented by the formula (III): (see above formula (III)) wherein Z represents a methylene group which is optionally substituted by an alkyl group; R₆ represents an alkyl group or an aralkyl group; R₁ and R₂ independently represent a hydrogen atom, a halogen atom, a nitro group, an azido group, an alkyl group, an alkenyl group, an aralkyl group, an alkoxy group, an alkoxy carbonyl group, an acyloxy group, or an amino group represented by XNR₄R₅ in which X represents a direct bond, an alkylene group or a carbonyl group, and N, R₄ and R₅ may form together a five- or six-membered heterocyclic ring or R₄ and R₅ independently represent an alkyl group or an acyloxy alkyl group; and R₃ represents a hydrogen atom, a halogen atom, a nitro group, an azido group, an alkyl group, an alkenyl group, an aralkyl group, an alkoxy group, or an alkoxy carbonyl group which comprises reacting tetrahydroquinazolines represented by the formula (I): (see above formula (I)) wherein R₁, R₂ and R₃ are as defined above with hexamethyldisilazane; and reacting the resultant product with a chloroalkanoate represented by the formula (II): Cl-Z-CO-O-R₆ (II) wherein Z and R₆ are as defined above in the presence of an iodide of an alkaline metal, followed by desilylation.

Abstract

A process for producing 1-substituted tetrahydroquinazolines represented by the formula (III):



wherein Z represents a methylene group which is optionally substituted by an alkyl group; R₆ represents an alkyl group or an aralkyl group; R₁ and R₂ independently represent a hydrogen atom, a halogen atom, a nitro group, an azido group, an alkyl group, an alkenyl group, an aralkyl group, an alkoxy group, an alkoxycarbonyl group, an acyloxy group, or an amino group represented by XNR₄R₅, in which X represents a direct bond, an alkylene group or a carbonyl group, and N, R₄ and R₅ may form together a five- or six-membered heterocyclic ring or R₄ and R₅ independently represent an alkyl group or an acyloxy alkyl group; and R₃ represents a hydrogen atom, a halogen atom, a nitro group, an azido group, an alkyl group, an alkenyl group, an aralkyl group, an alkoxy group, or an alkoxycarbonyl group which comprises reacting tetrahydroquinazolines represented by the formula (I):



wherein R_1 , R_2 and R_3 are as defined above with hexamethyldisilazane; and reacting the resultant product with a chloroalkanoate represented by the formula (II):



- 5 wherein Z and R_6 are as defined above in the presence of an iodide of an alkaline metal, followed by desilylation.

PROCESS FOR PRODUCING 1-SUBSTITUTED TETRAHYDROQUINAZOLINES

The present invention relates to a process for producing 1-substituted tetrahydroquinazolines (III). More particularly, it relates to a process for producing 1-substituted tetrahydroquinazolines (III) which comprises reacting tetrahydroquinazolines (I) with hexamethyldisilazane; reacting the resultant product with a chloroalkanoate (II) in the presence of an iodide of an alkaline metal; followed by desilylation.

1-Substituted tetrahydroquinazolines (III) are compounds known as intermediate for antiphlogistic, remedies for diabetic complication; it is also known that 1-substituted tetrahydroquinazolines (III) are produced by reacting tetrahydroquinazolines (I) with hexamethyldisilazane; reacting the resultant product with a bromoalkanoate; followed by desilylation (see e.g. JP-A-64-25767).

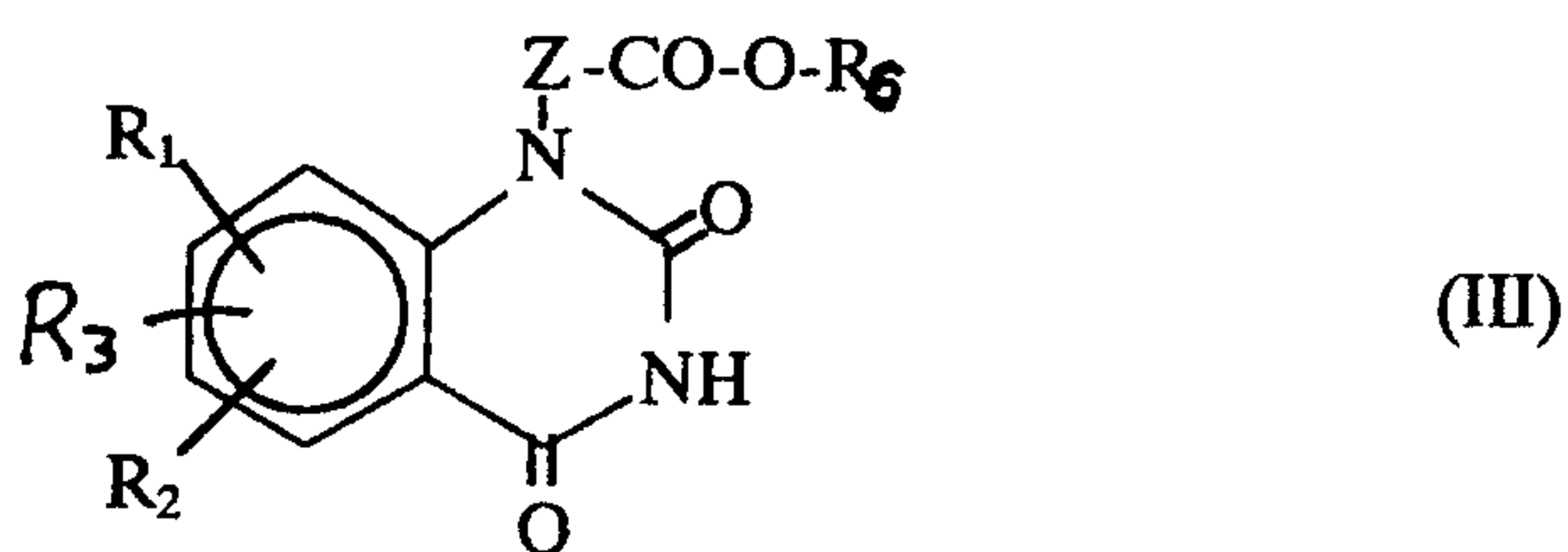
However, this process had the problem that expensive bromoalkanoate is used.

On the other hand, a process for producing 1-substituted tetrahydroquinazolines (III) in which a cheap chloroalkanoate (II) is used in place of the bromoalkanoate has the problem that the yield is drastically lowered.

The present inventors have intensively studied about the process for producing 1-substituted tetrahydroquinazolines (III) so as to solve above-mentioned

drawbacks. As a result, it has been found, according to the present invention, that the desired product can be produced with high yield in an industrially advantageous manner, when the chloroalkanoate (II) is used in place of the bromoalkanoate and the reaction is conducted in the presence of an iodide of an alkaline metal.

Accordingly, the present invention provides a process for producing 1-substituted tetrahydroquinazolines represented by the formula (III):



wherein

Z represents a methylene group which is optionally substituted by an alkyl group;

R₆ represents an alkyl group or an aralkyl group;

R₁ and R₂ independently represent a hydrogen atom, a halogen atom, a nitro group, an azido group, an alkyl group which is optionally substituted with one or more halogen atoms, an alkenyl group which is optionally substituted with one or more halogen atoms, an aralkyl group which is optionally substituted with one or more halogen atoms, an alkoxy group which is optionally substituted with one or more halogen atoms,

an alkoxycarbonyl group which is optionally substituted with one or more halogen atoms, an acyloxy group, or an amino group represented by XNR_4R_5

in which X represents a direct bond, an alkylene group or a carbonyl group, or

N, R_4 and R_5 may form together a five- or six-membered heterocyclic ring which optionally contains another hetero atom which may be substituted or

when X is a direct bond or an alkylene group, R_4 and R_5

independently represent an alkyl group or

when X is a carbonyl group, R_4 and R_5 independently represent an acyloxy alkyl group; and

R_3 represents a hydrogen atom, a halogen atom, a nitro group, an azido group, an alkyl group which is optionally substituted

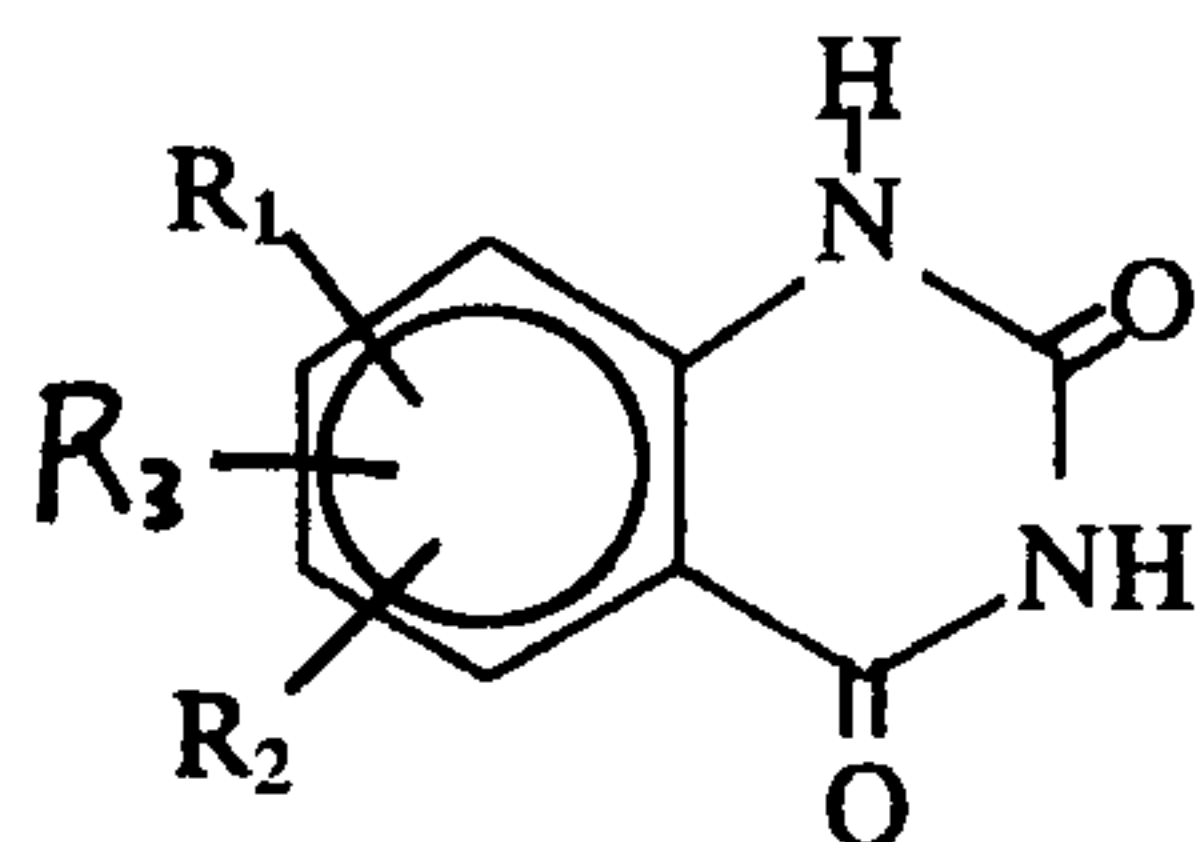
with one or more halogen atoms, an alkenyl group which is optionally substituted with one or more halogen atoms, an

aralkyl group which is optionally substituted with one or more halogen atoms, an alkoxy group which is optionally substituted

with one or more halogen atoms, or an alkoxycarbonyl group

which is optionally substituted with one or more halogen atoms

which comprises reacting a tetrahydroquinazoline represented by the formula (I):



(I)

wherein R_1 , R_2 and R_3 are as defined above with hexamethyldisilazane; and

reacting the resultant product with a chloroalkanoate

5 represented by the formula (II):



wherein Z and R_6 are as defined above, in the presence of an iodide of an alkali metal, followed by desilylation.

10 Hereinafter, the present invention will be described in detail.

The substituents R_1 and R_2 in tetrahydroquinazolines (I), the starting material of the present invention, independently represent a hydrogen atom, a halogen atom, a nitro group, an
15 azido group, an alkyl group which is optionally substituted with one or more halogen atoms, an alkenyl group which is optionally substituted with one or more halogen atoms, an aralkyl group which is optionally substituted with one or more halogen atoms, an alkoxy group which is optionally substituted
20 with one or more halogen atoms, an alkoxycarbonyl group which is optionally substituted with one or more halogen atoms, an acyloxy group, or

an amino group represented by XNR_4R_5

in which X represents a direct bond, an alkylene group or a

25 carbonyl group, and

N , R_4 and R_5 may form together a five- or six-membered heterocyclic ring which optionally contains another hetero atom which may be substituted or

when X is a direct bond or an alkylene group, R_4 and R_5 independently represent an alkyl group or when X is a carbonyl group, R_4 and R_5 independently represent an acyloxy alkyl group.

Examples of the halogen atom include chlorine, bromine and fluorine.

Examples of the alkyl group which is optionally substituted with the halogen atom include lower alkyl groups such as methyl, ethyl, propyl, i-propyl, butyl, i-butyl, t-butyl, pentyl, i-pentyl and hexyl; monohalo lower alkyl groups such as chloromethyl, bromomethyl and chloropropyl; and dihalo lower alkyl groups such as 1,2-dichloroethyl, 1,2-dibromoethyl and 2,2-dichloroethyl; and trihalo lower alkyl groups such as trifluoromethyl. (By "lower", as used in this specification, is meant "one to six carbon atoms".)

Examples of the alkenyl group which is optionally substituted with the halogen atom include lower alkenyl groups such as 1-propenyl, 2-propenyl, 1-butenyl, 2-butenyl, 3-butenyl, 1-pentenyl, 2-pentenyl, 3-pentenyl and 4-pentenyl; monohalo lower alkenyl groups such as 3-chloro-1-propenyl and 3-chloro-1-butenyl; and dihalo lower alkenyl groups such as 3,4-dichloro-1-butenyl; and trihalo lower alkenyl groups such as 3,4,5-trichloro-1-pentenyl.

Examples of the aralkyl group which is optionally substituted with the halogen atom include benzyl, phenylethyl, 4-chlorobenzyl, 2,4-dichlorobenzyl and 2,4-dibromobenzyl.

Examples of the alkoxy group which is optionally substituted with the halogen atom include lower alkoxy groups such as methoxy, ethoxy, propoxy, i-propoxy, butoxy, i-butoxy,

t-butoxy, pentyloxy, i-pentyloxy and hexyloxy; halogenated lower alkoxy groups such as chloromethoxy, bromomethoxy, 1-chloroethoxy, 2-chloroethoxy, 1-chloropropoxy, 2-chloropropoxy, 3-chloropropoxy, dichloromethoxy, 5 dibromomethoxy, 1,2-dichloroethoxy, 2,2-dichloroethoxy, and trifluoromethoxy.

10 Examples of the alkoxycarbonyl group which is optionally substituted with the halogen atom include carbonyl groups substituted with an alkoxy group such as those exemplified above.

Examples of the acyloxy group include lower alkylcarbonyloxy groups such as acetoxy, propionyloxy, butylyloxy, i-butylyloxy, valeryloxy, i-valeryloxy and pivaloyloxy; and arylcarbonyloxy such as benzyloxy.

15 Examples of the alkylene group represented by X in the amino group XNR_4R_5 include lower alkylene groups such as methylene, dimethylene, trimethylene and tetramethylene.

Examples of R_4 and R_5 as the lower alkyl group in the amino group XNR_4R_5 include the same lower alkyl group as that 20 exemplified above. In this case, specific examples of the amino group of XNR_4R_5 include dimethylamino, diethylamino, dipropylamino and dibutylamino.

Specific examples of the amino group of XNR_4R_5 , in case that N, R_4 and R_5 form together to a five- or six-membered 25 heterocyclic ring which optionally have another hetero atom, include pyrrolyl, 2H,4H-pyrrolyl, pyrrolidino, pyrazolyl, piperidino, piperazinyl, morpholino and imidazolyl.

When the other hetero atom in the heterocyclic ring is a nitrogen atom, it may be substituted. Examples of the substituent include alkyl groups such as those exemplified above, aralkyl groups such as those exemplified above, aralkyl groups which are optionally substituted by an alkoxy group and a phenylcarbonyl group which is optionally substituted by an alkoxy group.

Examples of the tetrahydroquinazolines (I) include

	2,4-dioxo-1,2,3,4-tetrahydroquinazoline,	5-chloro-2,4-
10	dioxo-1,2,3,4-tetrahydroquinazoline,	6-chloro-2,4-dioxo-
	1,2,3,4-tetrahydroquinazoline,	7-chloro-2,4-dioxo-
	1,2,3,4-tetrahydroquinazoline,	8-chloro-2,4-dioxo-
	1,2,3,4-tetrahydroquinazoline,	5-bromo-2,4-dioxo-1,2,3,4-
	tetrahydroquinazoline,	6-bromo-2,4-dioxo-1,2,3,4-
15	tetrahydroquinazoline,	7-bromo-2,4-dioxo-1,2,3,4-
	tetrahydroquinazoline,	8-bromo-2,4-dioxo-1,2,3,4-
	tetrahydroquinazoline,	5-fluoro-2,4-dioxo-1,2,3,4-
	tetrahydroquinazoline,	6-fluoro-2,4-dioxo-1,2,3,4-
	tetrahydroquinazoline,	7-fluoro-2,4-dioxo-1,2,3,4-
20	tetrahydroquinazoline,	8-fluoro-2,4-dioxo-1,2,3,4-
	tetrahydroquinazoline,	5,6-dichloro-2,4-dioxo-1,2,3,4-
	tetrahydroquinazoline,	5,7-dichloro-2,4-dioxo-1,2,3,4-
	tetrahydroquinazoline,	5,8-dichloro-2,4-dioxo-1,2,3,4-
	tetrahydroquinazoline,	6,7-dichloro-2,4-dioxo-1,2,3,4-
25	tetrahydroquinazoline,	6,8-dichloro-2,4-dioxo-1,2,3,4-
	tetrahydroquinazoline,	7,8-dichloro-2,4-dioxo-1,2,3,4-
	tetrahydroquinazoline,	5,6-dibromo-2,4-dioxo-1,2,3,4-
	tetrahydroquinazoline,	5,7-dibromo-2,4-dioxo-1,2,3,4-

- tetrahydroquinazoline, 5,8-dibromo-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6,7-dibromo-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6,8-dibromo-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 7,8-dibromo-2,4-dioxo-1,2,3,4-
 5 tetrahydroquinazoline, 5,6-difluoro-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 5,7-difluoro-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 5,8-difluoro-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6,7-difluoro-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 7,8-difluoro-2,4-dioxo-1,2,3,4-
 10 tetrahydroquinazoline,

 5-bromo-6-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 5-bromo-7-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 5-bromo-8-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 15 6-bromo-5-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 6-bromo-7-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 6-bromo-8-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 7-bromo-5-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 7-bromo-6-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 20 7-bromo-8-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 8-bromo-5-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 8-bromo-6-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 8-bromo-7-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 5,6,7-trichloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 25 5,6,8-trichloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 5,7,8-trichloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 6,7,8-trichloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 5,6,7-tribromo-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,

- 5,6,8-tribromo-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 5,7,8-tribromo-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 6,7,8-tribromo-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 5,6,7-trifluoro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 5 5,6,8-trifluoro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 5,7,8-trifluoro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 6,7,8-trifluoro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 5-nitro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-nitro-
 2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-nitro-2,4-
 10 dioxo-1,2,3,4-tetrahydroquinazoline, 8-nitro-2,4-dioxo-
 1,2,3,4-tetrahydroquinazoline, 5-azido-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-azido-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 7-azido-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 8-azido-2,4-dioxo-1,2,3,4-
 15 tetrahydroquinazoline, 5-carboxy-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-carboxy-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 7-carboxy-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 8-carboxy-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 5-methyl-2,4-dioxo-1,2,3,4-
 20 tetrahydroquinazoline, 6-methyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 7-methyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 8-methyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 5-ethyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-ethyl-2,4-dioxo-1,2,3,4-
 25 tetrahydroquinazoline, 7-ethyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 8-ethyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 5-propyl-2,4-dioxo-1,2,3,4-

- tetrahydroquinazoline, 6-propyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 7-propyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 8-propyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 5-i-propyl-2,4-dioxo-1,2,3,4-
 5 tetrahydroquinazoline, 6-i-propyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 7-i-propyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 8-i-propyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 5-chloromethyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-chloromethyl-2,4-dioxo-1,2,3,4-
 10 tetrahydroquinazoline, 7-chloromethyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 8-chloromethyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 5-bromomethyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-bromomethyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 7-bromomethyl-2,4-dioxo-1,2,3,4-
 15 tetrahydroquinazoline, 8-bromomethyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 5-(1-chloroethyl)-2,4-dioxo-
 1,2,3,4-tetrahydroquinazoline, 6-(1-chloroethyl)-2,4-
 dioxo-1,2,3,4-tetrahydroquinazoline, 7-(1-chloroethyl)-
 2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 8-(1-
 20 chloroethyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 5-
 (2-chloroethyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 6-(2-chloroethyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 7-(2-chloroethyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 8-(2-chloroethyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 25 5-dichloromethyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 6-dichloromethyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 7-dichloromethyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,

- 8-dichloromethyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 5-(1,2-dichloroethyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-(1,2-dichloroethyl)-2,4-dioxo-
 1,2,3,4-tetrahydroquinazoline, 7-(1,2-dichloroethyl)-2,4-
 5 dioxo-1,2,3,4-tetrahydroquinazoline, 8-(1,2-
 dichloroethyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 5-(2,2-dichloroethyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-(2,2-dichloroethyl)-2,4-dioxo-
 1,2,3,4-tetrahydroquinazoline, 7-(2,2-dichloroethyl)-2,4-
 10 dioxo-1,2,3,4-tetrahydroquinazoline, 8-(2,2-
 dichloroethyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
 5-(2,2-dichloroethyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 5-ethenyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-ethenyl-2,4-dioxo-1,2,3,4-
 15 tetrahydroquinazoline, 7-ethenyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 8-ethenyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 5-(1-propenyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-(1-propenyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 7-(1-propenyl)-2,4-dioxo-1,2,3,4-
 20 tetrahydroquinazoline, 8-(1-propenyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 5-(2-propenyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-(2-propenyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 7-(2-propenyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 8-(2-propenyl)-2,4-dioxo-1,2,3,4-
 25 tetrahydroquinazoline, 5-(1-butenyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-(1-butenyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 7-(1-butenyl)-2,4-dioxo-1,2,3,4-

- tetrahydroquinazoline, 8-(1-butenyl)-2,4-dioxo-1,2,3,4-
- tetrahydroquinazoline, , 5-(1-pentenyl)-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 6-(1-pentenyl)-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 7-(1-pentenyl)-2,4-dioxo-
- 5 1,2,3,4-tetrahydroquinazoline, 8-(1-pentenyl)-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 5-(3-chloro-1-propenyl)-
- 2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(3-chloro-1-
- propenyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-(3-
- chloro-1-propenyl)-2,4-dioxo-1,2,3,4-
- 10 tetrahydroquinazoline, 8-(3-chloro-1-propenyl)-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 5-(3,4-dichloro-1-
- butenyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(3,4-
- dichloro-1-butenyl)-2,4-dioxo-1,2,3,4-
- tetrahydroquinazoline, 7-(3,4-dichloro-1-butenyl)-2,4-
- 15 dioxo-1,2,3,4-tetrahydroquinazoline, 8-(3,4-dichloro-1-
- butenyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 5-
- methoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-
- methoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-
- methoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 8-
- 20 methoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 5-
- ethoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-ethoxy-
- 2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-ethoxy-2,4-
- dioxo-1,2,3,4-tetrahydroquinazoline, 8-ethoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 5-propoxy-2,4-dioxo-
- 25 1,2,3,4-tetrahydroquinazoline, 6-propoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 7-propoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 8-propoxy-2,4-dioxo-

- 1,2,3,4-tetrahydroquinazoline, 5-i-propoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 6-i-propoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 7-i-propoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 8-i-propoxy-2,4-dioxo-
- 5 1,2,3,4-tetrahydroquinazoline, 5-t-butoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 6-t-butoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 7-t-butoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 8-t-butoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 5-chloromethoxy-2,4-dioxo-
- 10 1,2,3,4-tetrahydroquinazoline, 6-chloromethoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 7-chloromethoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 8-chloromethoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 5-bromomethoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 6-bromomethoxy-2,4-dioxo-
- 15 1,2,3,4-tetrahydroquinazoline, 7-bromomethoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 8-bromomethoxy-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 5-(2-chloroethoxy)-2,4-
- dioxo-1,2,3,4-tetrahydroquinazoline, 6-(2-chloroethoxy)-
- 2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-(2-
- 20 chloroethoxy)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 8-
- (2-chloroethoxy)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,
- 5-(1-chloropropoxy)-2,4-dioxo-1,2,3,4-
- tetrahydroquinazoline, 6-(1-chloropropoxy)-2,4-dioxo-
- 1,2,3,4-tetrahydroquinazoline, 7-(1-chloropropoxy)-2,4-
- 25 dioxo-1,2,3,4-tetrahydroquinazoline, 8-(1-chloropropoxy)-
- 2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 5-(2-
- chloropropoxy)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline,

- 6-(2-chloropropoxy)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-(2-chloropropoxy)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 8-(2-chloropropoxy)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 5-(3-chloropropoxy)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(3-chloropropoxy)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-(3-chloropropoxy)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 8-(3-chloropropoxy)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 5-dichloromethoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-dichloromethoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-dichloromethoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 8-dichloromethoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 5-dibromomethoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-dibromomethoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-dibromomethoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 8-dibromomethoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 5-trifluoromethoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-trifluoromethoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-trifluoromethoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 8-trifluoromethoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 5-chloromethoxycarbonyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-chloromethoxycarbonyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-chloromethoxycarbonyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 8-chloromethoxycarbonyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline.

- tetrahydroquinazoline, 5-bromomethoxycarbonyl-2,4-dioxo-
 1,2,3,4-tetrahydroquinazoline, 6-bromomethoxycarbonyl-
 2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-
 bromomethoxycarbonyl-2,4-dioxo-1,2,3,4-
 5 tetrahydroquinazoline, 8-bromomethoxycarbonyl-2,4-dioxo-
 1,2,3,4-tetrahydroquinazoline, 5-(1-
 chloroethoxycarbonyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-(1-chloroethoxycarbonyl)-2,4-
 dioxo-1,2,3,4-tetrahydroquinazoline, 7-(1-
 10 chloroethoxycarbonyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 8-(1-chloroethoxycarbonyl)-2,4-
 dioxo-1,2,3,4-tetrahydroquinazoline, 5-(2-
 chloroethoxycarbonyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-(2-chloroethoxycarbonyl)-2,4-
 15 dioxo-1,2,3,4-tetrahydroquinazoline, 7-(2-
 chloroethoxycarbonyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 8-(2-chloroethoxycarbonyl)-2,4-
 dioxo-1,2,3,4-tetrahydroquinazoline, 5-(1-
 chloropropoxycarbonyl)-2,4-dioxo-1,2,3,4-
 20 tetrahydroquinazoline, 6-(1-chloropropoxycarbonyl)-2,4-
 dioxo-1,2,3,4-tetrahydroquinazoline, 7-(1-
 chloropropoxycarbonyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 8-(1-chloropropoxycarbonyl)-2,4-
 dioxo-1,2,3,4-tetrahydroquinazoline, 5-
 25 dichloromethoxycarbonyl-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-dichloromethoxycarbonyl-2,4-
 dioxo-1,2,3,4-tetrahydroquinazoline, 7-

- dichloromethoxycarbonyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 8-dichloromethoxycarbonyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 5-dibromomethoxycarbonyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-dibromomethoxycarbonyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-dibromomethoxycarbonyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 8-dibromomethoxycarbonyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 5-(1,2-dichloroethoxycarbonyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(1,2-dichloroethoxycarbonyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-(1,2-dichloroethoxycarbonyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 8-(1,2-dichloroethoxycarbonyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 5-(2,2-dichloroethoxycarbonyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(2,2-dichloroethoxycarbonyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-(2,2-dichloroethoxycarbonyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 8-(2,2-dichloroethoxycarbonyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 5-trifluoromethoxycarbonyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-trifluoromethoxycarbonyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7-trifluoromethoxycarbonyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 8-trifluoromethoxycarbonyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 7,8-dimethyl-2,4-

- dioxo-1,2,3,4-tetrahydroquinazoline, 7,8-diethyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-benzyl-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(2-phenylethyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(4-chlorobenzyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(2,4-dichlorobenzyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(2,4-dibromobenzyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 5,6-dimethoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6,8-dimethoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 5,8-dipropoxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(N,N-dimethylamino)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(N,N-diethylamino)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(N,N-dimethylamino)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(N,N-dibutylamino)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(1-pyrrolyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(1-imidazolyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(1-pyrazolyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(2H,4H-pyrrolyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-piperidino-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-morpholino-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(4-methylpiperazinyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(4-chloromethylpiperazinyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(4-benzylpiperazinyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(4-(3-methoxybenzyl)-

piperazinyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-
 (4-(phenylcarbonyl) piperazinyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-(4-(3,4-dimethoxyphenylcarbonyl)
 piperazinyl)-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-
 5 (1-pyrrolylmethyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-morpholinomethyl-2,4-dioxo-
 1,2,3,4-tetrahydroquinazoline, 7-(4-piperazinylmethyl)-
 2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-(4-(3-
 phenylcarbonylpropyl) piperazinylcarbonyl)-2,4-dioxo-
 10 1,2,3,4-tetrahydroquinazoline, 7-(4-
 methylpiperazinylcarbonyl)-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline, 6-(4-benzylpiperidinocarbonyl)-
 2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 6-acetoxy-2,4-
 dioxo-1,2,3,4-tetrahydroquinazoline, 6-propionyloxy-2,4-
 15 dioxo-1,2,3,4-tetrahydroquinazoline, 6-butyloxy-2,4-
 dioxo-1,2,3,4-tetrahydroquinazoline, 6-i-butyloxy-2,4-
 dioxo-1,2,3,4-tetrahydroquinazoline, 6-valeryloxy-2,4-
 dioxo-1,2,3,4-tetrahydroquinazoline, 6-pivaloyloxy-2,4-
 dioxo-1,2,3,4-tetrahydroquinazoline, 6-benzoyloxy-2,4-
 20 dioxo-1,2,3,4-tetrahydroquinazoline, 5,7-dimethyl-6-
 propionyloxy-2,4-dioxo-1,2,3,4-tetrahydroquinazoline and
 8-chloro-5,6-dimethoxy-2,4-dioxo-1,2,3,4-
 tetrahydroquinazoline

The hexamethyldisilazane as a silylation agent is
 25 normally used in a 1 to 10fold molar amount, preferably from
 about 2 to 5 fold molar amount, relative to the tetrahydro
 quinazolines (I).

The silylation reaction is normally carried out in a solvent at from room temperature to the reflux temperature of the solvent. The reaction can be accelerated by carrying it out in the presence of a salt such as ammonium sulfate, ammonium chloride, guanidine hydrochloride and pyridine hydrochloride. In this case, the salt is normally used in a 0.01 to 1 fold molar amount, preferably about 0.05 to 0.5 fold molar amount, relative to the tetrahydroquinazolines (I).

The solvent may be any one which does not inhibit the reaction. Examples thereof include aromatic hydrocarbon such as benzene, toluene and xylene; hydrocarbon halides such as dichloromethane and chloroform; ether solvent such as tetrahydrofuran and dioxane; and a mixture thereof. The solvent is normally used in a 1 to 10 fold amount by weight, preferably about 1 to 3 fold amount by weight, relative to the tetrahydroquinazolines (I).

The resultant 2,4-disilyl product may be used in the following step after isolation from the reaction mass, but is normally subjected to the following step as it is.

After silylation, the resultant product is reacted with the chloroalkanoate (II) in the presence of the iodide of the alkaline metal, followed by desilylation. The substituent Z in the chloroalkanoate (II) is a methylene group which is optionally substituted with an alkyl group and R₆ is an alkyl group or an aralkyl group. Examples of the alkyl group include a lower alkyl group as that exemplified above. Examples of the methylene group which is optionally substituted with an

alkyl group include methylene and methylenemethylene, preferably methylene. Examples of the aralkyl group include aralkyl group whose aromatic ring is optionally substituted with a nitro group, such as benzyl, 4-nitrobenzyl, phenylethyl, benzhydryl and trityl.

As the chloroalkanoate (II), those wherein R₆ is a lower alkyl group are preferred. Examples include methyl chloroacetate, ethyl chloroacetate, propyl chloroacetate, t-butyl chloroacetate and ethyl 2-chloropropionate.

10 The chloroalkanoate (II) is normally used in a 1 to 5 fold molar amount relative to the tetrahydroquinazolines (I).

The present invention is characterized by reacting the above-described chloroalkanoate (II) in the presence of the iodide of the alkaline metal. Examples of the iodide of the alkaline metal include potassium iodide, sodium iodide and lithium iodide. Among them, potassium iodide is preferably used.

15 The iodide of the alkali metal is normally used in a 0.001 to 1 fold molar amount, preferably from about 0.1 to 1 fold molar amount, relative to the tetrahydroquinazolines (I).

The reaction temperature with the chloroalkanoate (II) is normally from about 0°C to a boiling point of the solvent, preferably from about 80°C to a boiling point of the solvent.

25 The desilylation can be carried out by, for example, adding water or an alcohol such as methanol, ethanol and i-propanol. These are normally used in a 2 to 30 fold molar

amount, preferably from about 10 to 20 fold molar amount, relative to the tetrahydroquinazolines (I).

Thus, 1-substituted tetrahydroquinazolines (III), the objective product, are produced. When the objective product is deposited as a solid in the reaction mass, it can be removed from the reaction mass, for example by filtration. When the objective product is dissolved in the reaction mass, it can be removed from the reaction mass by, for example, distilling off the solvent, adding water, extracting with an organic solvent and distilling off the organic solvent.

The 1-substituted tetrahydroquinazolines (III) can also be removed in the form of a salt, for example, with an inorganic base, such as an alkali metal salt, alkaline earth metal salt and ammonium salt; salt with an organic base, such as an organic amine salt; addition salt with an inorganic acid, such as hydrochloride, hydrobromide, sulfate and phosphate; and addition salt with an organic acid, such as formate, acetate, trifluoroacetate, maleate, tartrate, methanesulfonate, benzenesulfonate and toluenesulfonate according to known processes.

The resultant 1-substituted tetrahydroquinazolines (III) or salt thereof can also be further purified, for example, by recrystallization or various chromatographic treatments.

The 1-substituted tetrahydroquinazolines (III) can be produced with high yield by reacting with the chloroalkanoate (II) in the presence of the iodide of the alkaline metal.

The following Examples further illustrate the present invention in detail but are not to be construed to limit the scope thereof.

5

Example 1

A mixture of 17.3 g of toluene, 10 g of 7-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline, 19.7 g of hexamethyldisilazane and 1 g of ammonium sulfate was
10 refluxed for 2 hours with stirring, and then excess hexamethyldisilazane and toluene (26.3 g) were distilled off at 55°C under a reduced pressure of 20 to 30 mmHg.

To this were added 8.45 g of potassium iodide and 27.6 g of ethyl chloroacetate and, after stirring continuously at
15 110 to 120°C for 12 hours, 40 g of ethanol was added and the mixture was refluxed for 1 hour. After cooling to room temperature, the deposited crystals were filtered, washed with ethanol and water, and then dried to obtain 13.9 g of crystal.

20 The content of 2-(7-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazolin-1-yl)ethyl acetate in this was 100%. (yield 96.4%)

Example 2

25 According to the same manner as that described in Example 1 except that the amount of hexamethyldisilazane was changed to 38.2 g, the time of reflux was changed to 5 hours, the amount

of toluene distilled off was 40.8 g, the amount of potassium iodide was changed to 1.69 g and time of stirring was changed to 32 hours, the reaction was carried out to obtain 14.1 g of crystals.

5 The content of 2-(7-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazolin-1-yl)ethyl acetate in this crystal was 95.5%. (yield 93.7%)

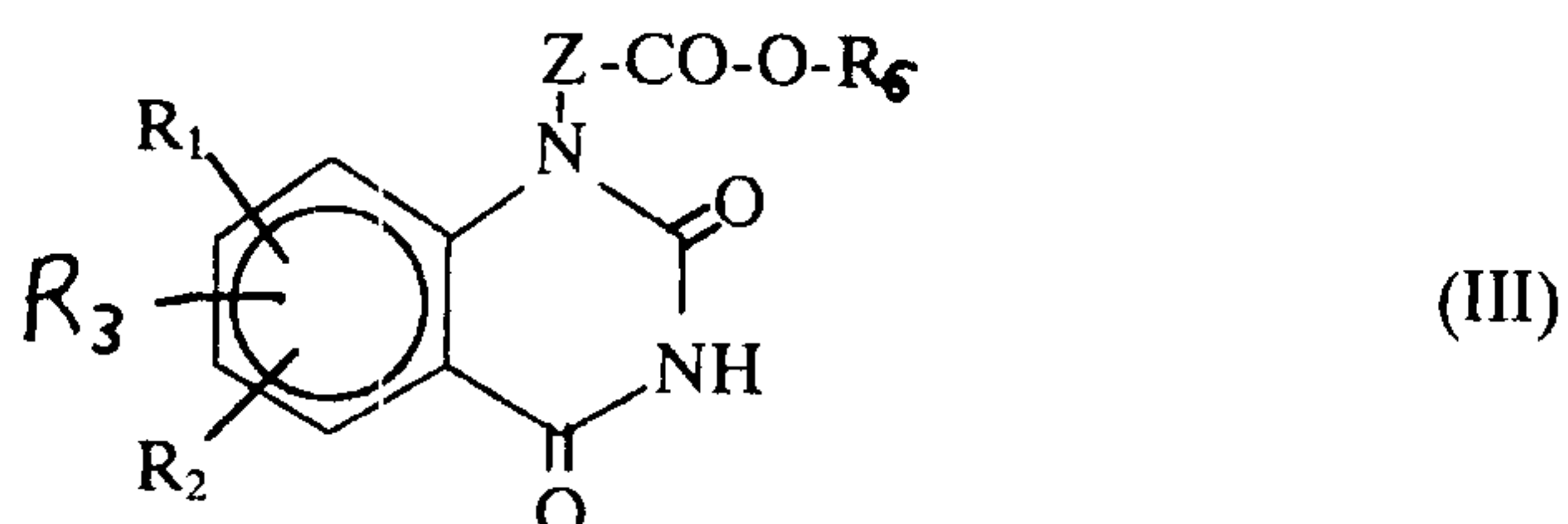
Comparative Example 1

10 According to the same manner as that described in Example 1 except that potassium iodide was not used, the reaction was carried out to obtain 11.5 g of crystals.

 The content of 2-(7-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazolin-1-yl)ethyl acetate in this crystal was
15 56.8%. (yield 45.7%)

What is claimed is:

1. A process for producing a 1-substituted tetrahydroquinazoline represented by the formula (III):



5

wherein

Z represents a methylene group which is optionally substituted by an alkyl group;

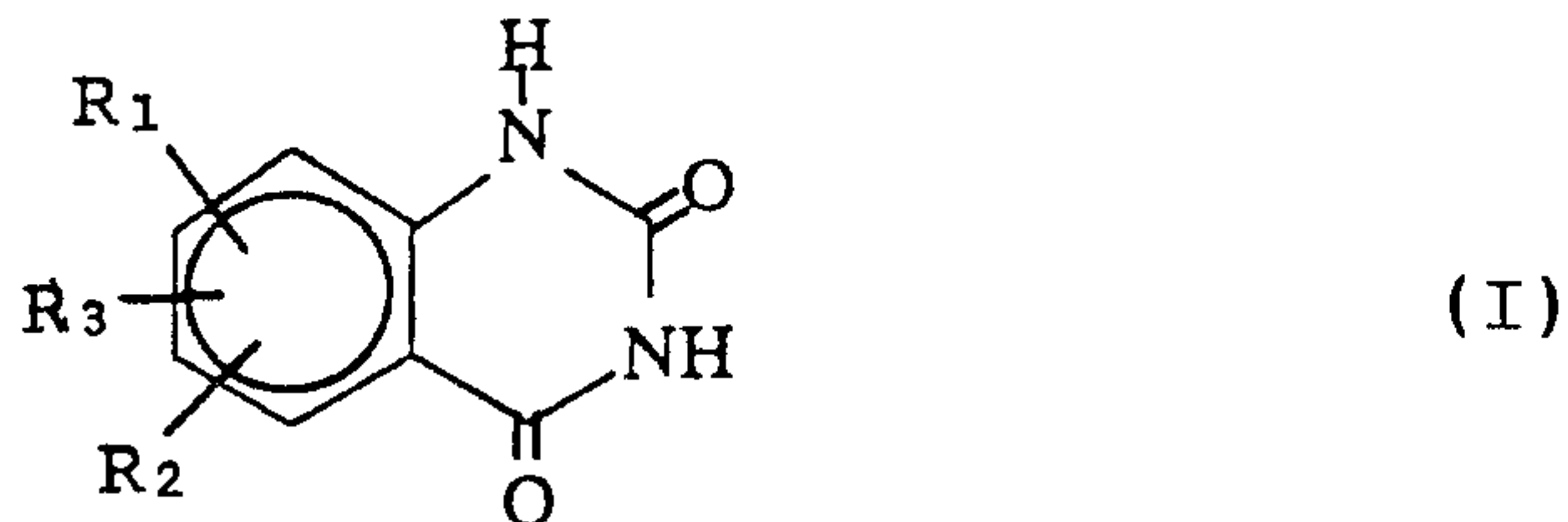
10 R₆ represents an alkyl group or an aralkyl group;

R₁ and R₂ independently represent a hydrogen atom, a halogen atom, a nitro group, an azido group, an alkyl group which is optionally substituted with one or more halogen atoms, an alkenyl group which is optionally substituted with one or more
15 halogen atoms, an aralkyl group which is optionally substituted with one or more halogen atoms, an alkoxy group which is optionally substituted with one or more halogen atoms, an alkoxycarbonyl group which is optionally substituted with one or more halogen atoms, an acyloxy group, or
20 an amino group represented by XNR₄R₅

in which X represents a direct bond, an alkylene group or a carbonyl group, and

N, R₄ and R₅ may form together a five- or six-membered heterocyclic ring which optionally contains another hetero
25 atom which may be substituted or

when X is a direct bond or an alkylene group, R_4 and R_5 independently may additionally represent an alkyl group or when X is a carbonyl group, R_4 and R_5 independently may additionally represent an acyloxy alkyl group; and R_3 represents a hydrogen atom, a halogen atom, a nitro group, an azido group, an alkyl group which is optionally substituted with one or more halogen atoms, an alkenyl group which is optionally substituted with one or more halogen atoms, an aralkyl group which is optionally substituted with one or more halogen atoms, an alkoxy group which is optionally substituted with one or more halogen atoms, or an alkoxycarbonyl group which is optionally substituted with one or more halogen atoms which comprises reacting a tetrahydroquinazoline represented by the formula (I):



wherein R_1 , R_2 and R_3 are as defined above with hexamethyl-disilazane; and reacting the resultant product with a chloro-alkanoate represented by the formula (II):



wherein Z and R_6 are as defined above in the presence of an iodide of an alkali metal, followed by desilylation.

2. The process according to claim 1, wherein the substituent R_1 of the tetraquinazoline (I) is a halogen atom and the substituent R_2 is a hydrogen atom.
3. The process according to claims 1 and 2, wherein the tetrahydroquinazolines (I) is 7-chloro-2,4-dioxo-1,2,3,4-tetrahydroquinazoline.
4. The process according to any one of claims 1 and 3, wherein R_6 of the chloroalkanoate (II) is a lower alkyl group.
5. The process according to any one of claims 1 to 4, wherein Z of the chloroalkanoate (II) is methylene or methyl-methylene.
6. The process according to any one of claims 1 to 5, wherein the chloroalkanoate (II) is ethyl chloroacetate.
7. The process according to any one of claims 1 to 6, wherein the chloroalkanoate (II) is used in a 1- to 5-fold molar amount relative to the tetrahydroquinazolines (I).
8. The process according to any one of claims 1 to 7, wherein the iodide of the alkali metal is potassium iodide.
9. The process according to any one of claims 1 to 8, which is carried out in at least one solvent selected from an aromatic hydrocarbon, a hydrocarbon halide and an ether solvent.

Fetherstonhaugh & Co.,
Ottawa, Canada
Patent Agents