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(54) **THIAZOLIDIN-4-ONE DERIVATIVES**

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Related U.S. Patent Documents

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(57) ABSTRACT

The invention relates to pharmaceutical compositions containing at least one thiazolidin-4-one derivative to prevent or treat disorders associated with an activated immune system. Furthermore, the invention relates to novel thiazolidin-4-one derivatives notably for use as pharmaceutically active compounds. Said compounds particularly act also as immunosuppressive agents.

7 Claims, No Drawings

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THIAZOLIDIN-4-ONE DERIVATIVES

Matter enclosed in heavy brackets [] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a reissue of U.S. application Ser. No. 12/132,443, filed on Jun. 3, 2008, now U.S. Pat. No. 7,875,726, which is a divisional of U.S. application Ser. No. 10/580,169, filed on Dec. 1, 2006, now U.S. Pat. No. 7,435,828, which is a continuation-in-part of Application of PCT/EP2004/012953, filed Nov. 16, 2004, which claims priority to PCT/EP03/13072, filed on Nov. 21, 2003.

FIELD OF THE INVENTION

The present invention relates to novel thiazolidin-4-one derivatives of the General Formula (I) and their use as active ingredients in the preparation of pharmaceutical compositions. The invention also concerns related aspects including processes for the preparation of the compounds, pharmaceutical compositions containing one or more compounds of the General Formula (I), and their use as immunosuppressant agents, either alone or in combination with other immunosuppressant therapies.

BACKGROUND OF THE INVENTION

The immune system attempts to fight a transplanted organ in the same way it fights an infection or a cancer. Without immunosuppressive medication to inhibit the immune system's action, a transplanted organ is quickly rejected and stops functioning. Organ transplant recipients can experience some organ rejection even when they are taking immunosuppressive drugs. Rejection occurs most frequently in the first few weeks after transplantation, but rejection episodes can also happen months or even years after transplantation. Combinations of up to three or four medications are commonly used to give maximum protection against rejection while minimizing side effects. Current standard drugs used to treat the rejection of transplanted organs interfere with discrete intracellular pathways in the activation of T-type or B-type white blood cells. Examples of such drugs are cyclosporin, daclizumab, basiliximab, everolimus, or FK506, which interfere with cytokine release or signaling; azathioprine or leflunomide, which inhibit nucleotide synthesis; or 15-deoxyspergualin, an inhibitor of leukocyte differentiation. The beneficial effects of these therapies relate to their broad immunosuppressive effects; however, the generalized immunosuppression which these drugs produce also diminishes the immune system's defence against infection and malignancies. Furthermore, standard immunosuppressive drugs are often used at high dosages and can themselves cause or accelerate organ damage in either the transplanted organ itself, or in other target organs of the transplant recipient.

DESCRIPTION OF THE INVENTION

The present invention provides compounds having a powerful and long-lasting immunosuppressive effect which is achieved by reducing the number of circulating and infiltrating T- and B-lymphocytes, without affecting their maturation,

memory, or expansion. In consequence, the compounds of the present invention can be utilized alone or in combination with standard T-cell activation inhibiting drugs, to provide a new immunosuppressive therapy with a reduced propensity for infections or malignancies when compared to standard immunosuppressive therapy. Furthermore, the compounds of the present invention can be used in combination with reduced dosages of traditional immunosuppressant therapies, to provide on the one hand effective immunosuppressive activity, while on the other hand reducing end organ damage associated with higher doses of standard immunosuppressive drugs.

Biological Assay

The immunosuppressive activity of the compounds of the invention can be demonstrated by measuring the number of circulating lymphocytes in whole blood of rats as follows.

Normotensive male Wistar rats are housed in climate-controlled conditions with a 12-hour light/dark cycle, and have free access to normal rat chow and drinking water. Blood (0.5 mL) is collected by retro-orbital sampling before drug administration, and 3 and 6 h thereafter. Blood cell count is measured in whole blood using a Beckman-Coulter Synchron CX5 Pro cytometer. Statistical analysis of lymphocyte counts are performed by analysis of variance (ANOVA) using Statistica (StatSoft) and the Student-Newman-Keuls procedure for multiple comparisons.

Thus, compounds of the invention decrease the number of circulating lymphocytes in whole blood when compared to pre-drug values.

Table 1 shows the effect on lymphocyte counts 6 h after oral administration of 10 mg/kg of a compound of the present invention to normotensive male Wistar rats as compared to a group of animals treated with vehicle only.

TABLE 1

Compound of Example	Lymphocyte counts [%]
4	-32
7	-67
24	-54
42	-23
46	-37
75	-47
76	-58
77	-55
84	-68
85	-63
86	-30*
91	-35
95	-53
100	-53
103	-47
110	-30
130	-26

*at 3 mg/kg p.o.

The following paragraphs provide definitions of the various chemical moieties that make up the compounds according to the invention and are intended to apply uniformly throughout the specification and claims unless an otherwise expressly set out definition provides a broader definition.

The term lower alkyl, alone or in combination with other groups, means saturated, straight or branched chain groups with one to seven carbon atoms, preferably one to four carbon atoms. Examples of lower alkyl groups are methyl, ethyl, n-propyl, iso-propyl, n-butyl, iso-butyl, sec-butyl, tert-butyl, n-pentyl, n-hexyl or n-heptyl.

The term lower alkoxy means a R—O group, wherein R is a lower alkyl. Preferred examples of lower alkoxy groups are methoxy, ethoxy, propoxy, iso-propoxy, iso-butoxy, sec-butoxy or tert-butoxy.

3

The term mono- or di-lower alkylamino means a R'-NH- or a R'-NR''-group, wherein R' and R'' are each independently a lower alkyl. Preferred examples of mono- or di-lower alkylamino groups are methylamino, ethylamino, N,N-dimethylamino, or N-methyl-N-ethyl-amino.

The term lower alkenyl, alone or in combination with other groups, means straight or branched chain groups comprising an olefinic bond and three to seven carbon atoms, preferably three to five carbon atoms. Examples of lower alkenyl are allyl, (E)-but-2-enyl, (Z)-but-2-enyl, or but-3-enyl.

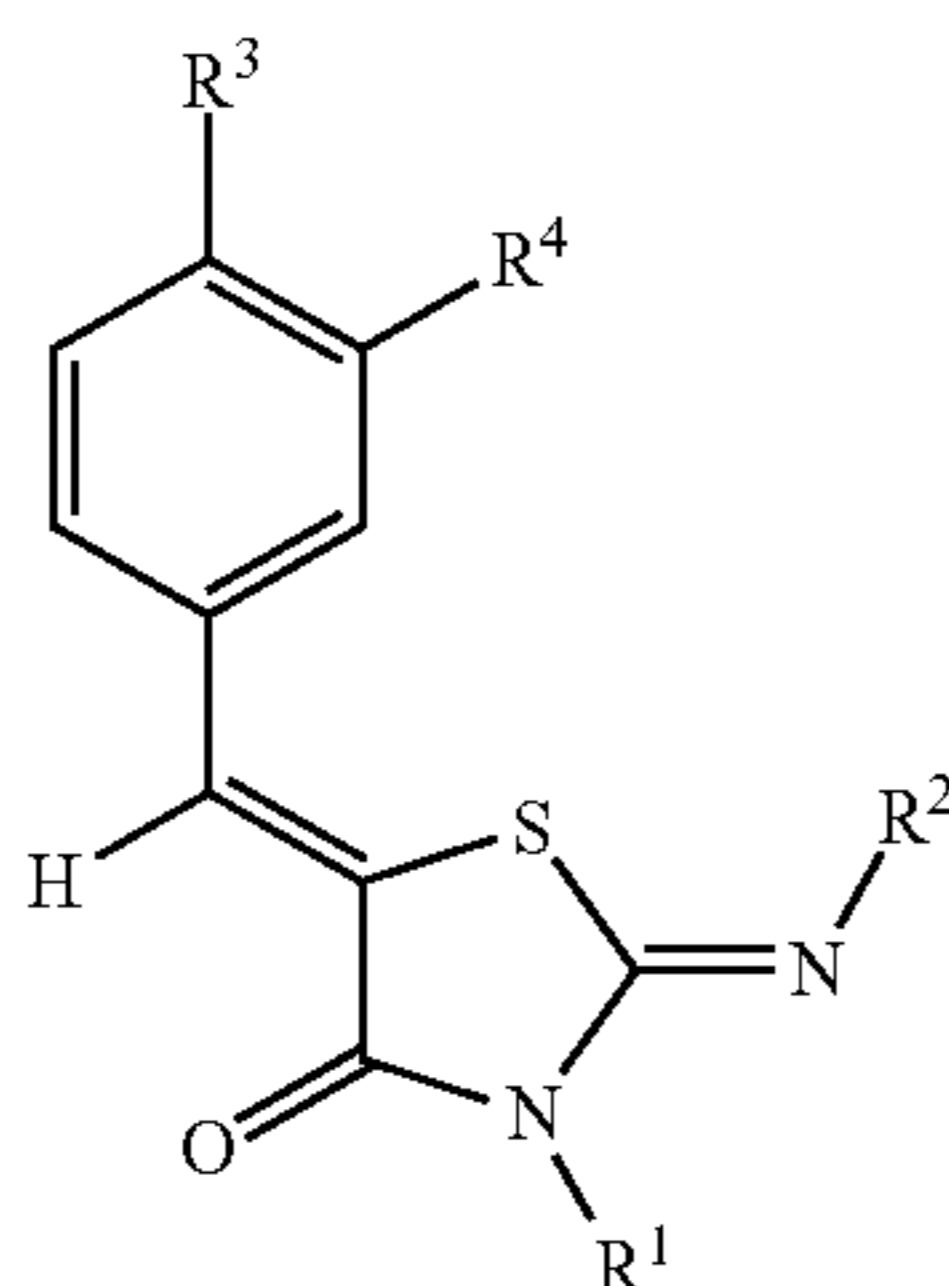
The term halogen means fluoro, chloro, bromo or iodo.

The term cycloalkyl alone or in combination, means a saturated cyclic hydrocarbon ring system with 3 to 7 carbon atoms, preferably three to six carbon atoms. Examples of cycloalkyl are cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl or cycloheptyl.

The expression pharmaceutically acceptable salts encompasses either salts with inorganic acids or organic acids like hydrochloric or hydrobromic acid, sulfuric acid, phosphoric acid, citric acid, formic acid, acetic acid, maleic acid, tartaric acid, benzoic acid, methanesulfonic acid, and the like that are non-toxic to living organisms. In case the compound of General Formula (I) or General Formula (II) is acidic in nature the expression encompasses salts with an inorganic base like an alkali or earth alkali base, e.g. sodium hydroxide, potassium hydroxide, calcium hydroxide, or with an organic base such as benzathine, choline, meglumine, and the like which are also non-toxic to living organisms (S. M. Berge, L. D. Bighley and D. C. Monkhouse, *Pharmaceutical salts*, J. Pharm. Sci., 66 (1977), 1-19; P. L. Gould, *Salt selection of basic drugs*, Int. J. Pharmaceutics 33 (1986), 201-217).

The compounds of the General Formula (I) and General Formula (II) can contain one or more asymmetric carbon atoms and may be prepared in form of optically pure enantiomers, mixtures of enantiomers such as racemates, diastereomers, mixtures of diastereomers, diastereomeric racemates, mixtures of diastereomeric racemates, and meso-forms. The present invention encompasses all these forms.

A first aspect of the invention consists of a novel pharmaceutical composition comprising at least one thiazolidin-4-one derivative of the General Formula (I):



General Formula (I)

wherein:

R¹ represents lower alkyl, lower alkenyl; cycloalkyl; 5,6,7,8-tetrahydronaphth-1-yl; 5,6,7,8-tetrahydronaphth-2-yl; a phenyl group; a phenyl group independently mono-, di- or trisubstituted with lower alkyl, halogen, lower alkoxy, or CF₃;

R² represents lower alkyl; allyl; cyclopropyl; cyclobutyl; cyclopentyl; mono- or di-lower alkylamino;

R³ represents —NR⁵R⁶; —O—CR⁷R⁸—CR⁹R¹⁰—(CR¹¹R¹²)₁—O—R¹³;

R⁴ represents hydrogen; hydroxy; lower alkoxy; lower alkyl; halogen; or R³ and R⁴ together may form a methylenedioxy or ethylenedioxy ring optionally further substituted with a hydroxy methyl group;

4

R⁵ and R⁶ each represents independently lower alkyl;

R⁷ represents hydrogen, lower alkyl, or hydroxymethyl;

R⁸, R⁹, R¹¹ and R¹² each represents independently hydrogen or methyl;

R¹⁰ represents hydrogen or lower alkyl; in case n represents the integer 1, R¹⁰ in addition represents lower alkoxy, hydroxy, —NH₂, —NHR⁵ or —NR⁵R⁶;

R¹³ represents hydrogen; lower alkyl; hydroxycarbonyl-lower alkyl; 1-glycerol or 2-glycerol;

n represents the integer 0 or 1;

and configurational isomers, optically pure enantiomers, mixtures of enantiomers such as racemates, diastereomers, mixtures of diastereomers, diastereomeric racemates, mixtures of diastereomeric racemates and the meso-form, as well as pharmaceutically acceptable salts, solvent complexes, and morphological forms, and inert carrier material.

The compounds of General Formula (I) and their pharmaceutically acceptable salts can be used as medicaments, e.g. in the form of pharmaceutical preparations for enteral, parental or topical administration. They can be administered, for example, perorally, e.g. in the form of tablets, coated tablets, dragées, hard and soft gelatine capsules, solutions, emulsions or suspensions, rectally, e.g. in the form of suppositories, parenterally, e.g. in the form of injection solutions or infusion solutions, or topically, e.g. in the form of ointments, cream or oils.

The production of the pharmaceutical preparations can be effected in a manner which will be familiar to any person skilled in the art (see for example Mark Gibson, Editor, *Pharmaceutical Preformulation and Formulation*, IHS Health Group, Englewood, Colo., USA, 2001; Remington, *The Science and Practice of Pharmacy*, 20th Edition, Philadelphia College of Pharmacy and Science) by bringing the described compounds of General Formula (I) and their pharmaceutically acceptable salts, optionally in combination with other therapeutically valuable substances, into a galenical administration form together with suitable, non-toxic, inert, therapeutically compatible solid or liquid carrier materials and, if desired, usual pharmaceutical adjuvants.

Suitable inert carrier materials are not only inorganic carrier materials, but also organic carrier materials. Thus, for example, lactose, corn starch or derivatives thereof, talc, stearic acid or its salts can be used as carrier materials for tablets, coated tablets, dragées and hard gelatine capsules. Suitable carrier materials for soft gelatine capsules are, for example, vegetable oils, waxes, fats and semi-solid and liquid polyols (depending on the nature of the active ingredient no carriers are, however, required in the case of soft gelatine capsules). Suitable carrier materials for the production of solutions and syrups are, for example, water, polyols, sucrose, invert sugar and the like. Suitable carrier materials for injection solutions are, for example, water, alcohols, polyols, glycerol and vegetable oils. Suitable carrier materials for suppositories are, for example, natural or hardened oils, waxes, fats and semi-liquid or liquid polyols. Suitable carrier materials for topical preparations are glycerides, semi-synthetic and synthetic glycerides, hydrogenated oils, liquid waxes, liquid paraffins, liquid fatty alcohols, sterols, polyethylene glycols and cellulose derivatives.

Usual stabilizers, preservatives, wetting and emulsifying agents, consistency-improving agents, flavour-improving agents, salts for varying the osmotic pressure, buffer substances, solubilizators, colorants and masking agents and antioxidants come into consideration as pharmaceutical adjuvants.

The dosage of the compounds of General Formula (I) can vary within wide limits depending on the disease to be controlled, the age and the individual condition of the patient and the mode of administration, and will, of course, be fitted to the individual requirements in each particular case. For adult

5

patients a daily dosage of about 0.5 mg to about 1000 mg, especially about 1 mg to about 500 mg, comes into consideration for the treatment of disorders associated with an activated immune system for adult patients. Depending on the dosage it may be convenient to administer the daily dosage in several dosage units.

The pharmaceutical preparations conveniently contain about 0.5 to 500 mg, preferably 1 to 250 mg, of a compound of General Formula (I).

In a preferred embodiment according to the invention, the above-mentioned pharmaceutical composition comprises the (Z, Z)-isomers of the thiazolidin-4-one derivatives of the General Formula (I).

The above-mentioned pharmaceutical composition is useful for the prevention and treatment of disorders associated with an activated immune system.

Such diseases or disorders are selected from the group consisting of rejection of transplanted organs or tissue; graft-versus-host diseases brought about by transplantation; autoimmune syndromes including rheumatoid arthritis; systemic lupus erythematosus; Hashimoto's thyroiditis; lymphocytic thyroiditis; multiple sclerosis; myasthenia gravis; type I diabetes; uveitis; posterior uveitis; uveitis associated with Behcet's disease; uveomeningitis syndrome; allergic encephalomyelitis; chronic allograft vasculopathy; post-infectious autoimmune diseases including rheumatic fever and post-infectious glomerulonephritis; inflammatory and hyperproliferative skin diseases; psoriasis; atopic dermatitis; osteomyelitis; contact dermatitis; eczematous dermatitis; seborrhoeic dermatitis; lichen planus; pemphigus; bullous pemphigoid; epidermolysis bullosa; urticaria; angioedema; vasculitis; erythema; cutaneous eosinophilia; acne; alopecia greata; keratoconjunctivitis; vernal conjunctivitis; keratitis; herpetic keratitis; dystrophia epithelialis corneae; corneal leukoma; ocular pemphigus; Mooren's ulcer; ulcerative keratitis; scleritis; Graves' ophthalmopathy; Vogt-Koyanagi-Harada syndrome; sarcoidosis; pollen allergies; reversible obstructive airway disease; bronchial asthma; allergic asthma; intrinsic asthma; extrinsic asthma; dust asthma; chronic or inveterate asthma; late asthma and airway hyperresponsiveness; bronchitis; gastric ulcers; ischemic bowel diseases; inflammatory bowel diseases; necrotizing enterocolitis; intestinal lesions associated with thermal burns; coeliac diseases; proctitis; eosinophilic gastroenteritis; mastocytosis; Crohn's disease; ulcerative colitis; vascular damage caused by ischemic diseases and thrombosis; atherosclerosis; fatty heart; myocarditis; cardiac infarction; arteriosclerosis; aortitis syndrome; cachexia due to viral disease; vascular thrombosis; migraine; rhinitis; eczema; interstitial nephritis; IgA-induced nephropathy; Goodpasture's syndrome; hemolytic-uremic syndrome; diabetic nephropathy; glomerulosclerosis; glomerulonephritis; multiple myositis; Guillain-Barre syndrome; Meniere's disease; polyneuritis; multiple neuritis; mononeuritis; radiculopathy; hyperthyroidism; Basedow's disease; thyrotoxicosis; pure red cell aplasia; aplastic anemia; hypoplastic anemia; idiopathic thrombocytopenic purpura; autoimmune hemolytic anemia; agranulocytosis; pernicious anemia; megaloblastic anemia; anerythroplasia; osteoporosis; sarcoidosis; fibroid lung; idiopathic interstitial pneumonia; dermatomyositis; leukoderma vulgaris; ichthyosis vulgaris; photoallergic sensitivity; cutaneous T cell lymphoma; polyarteritis nodosa; Huntington's chorea; Sydenham's chorea; myocarditis; scleroderma; Wegener's granuloma; Sjogren's syndrome; adiposis; eosinophilic fasciitis; lesions of gingiva, periodontium, alveolar bone, substantia ossea dentis; male pattern alopecia or alopecia senilis; muscular dystrophy; pyoderma;

6

Sezary's syndrome; chronic adrenal insufficiency; Addison's disease; ischemia-reperfusion injury of organs which occurs upon preservation; endotoxin shock; pseudomembranous colitis; colitis caused by drug or radiation; ischemic acute renal insufficiency; chronic renal insufficiency; lung cancer; malignancy of lymphoid origin; acute or chronic lymphocytic leukemias; lymphoma; psoriasis; pulmonary emphysema; cataracta; siderosis; retinitis pigmentosa; senile macular degeneration; vitreal scarring; corneal alkali burn; dermatitis erythema; bullous dermatitis; cement dermatitis; gingivitis; periodontitis; sepsis; pancreatitis; carcinogenesis; metastasis of carcinoma; hypobaropathy; autoimmune hepatitis; primary biliary cirrhosis; sclerosing cholangitis; partial liver resection; acute liver necrosis; cirrhosis; alcoholic cirrhosis; hepatic failure; fulminant hepatic failure; late-onset hepatic failure; "acute-on-chronic" liver failure.

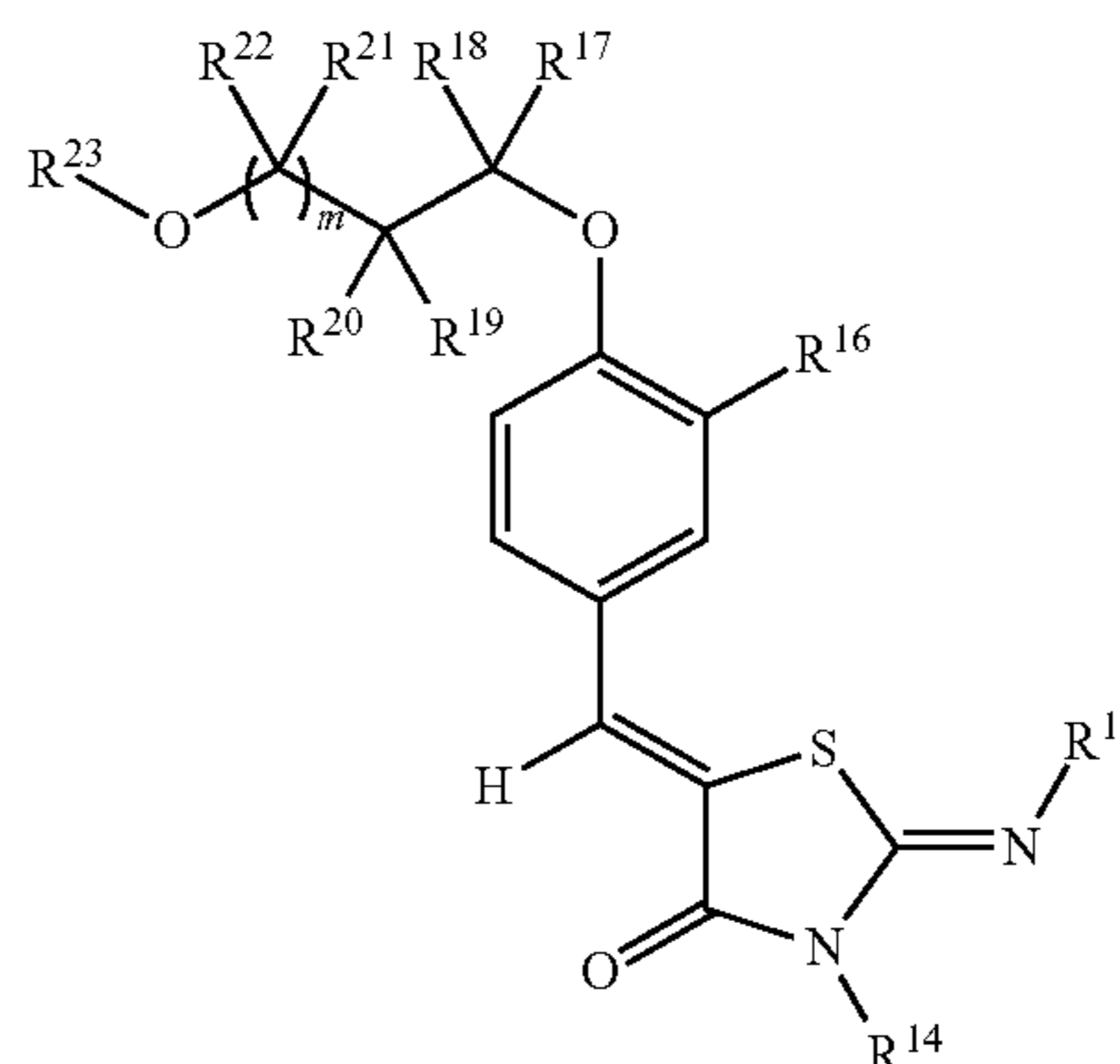
Particularly preferred diseases comprise the group consisting of rejection of transplanted organs or tissue; graft-versus-host diseases brought about by transplantation; autoimmune syndromes including rheumatoid arthritis, multiple sclerosis, myasthenia gravis; pollen allergies; type I diabetes; prevention of psoriasis; Crohn's disease; post-infectious autoimmune diseases including rheumatic fever and post-infectious glomerulonephritis; and metastasis of carcinoma.

Furthermore, compounds of the General Formula (I) are also useful, in combination with one or several immunosuppressant agents, for the treatment of disorders associated with an activated immune system and selected from the list as above-mentioned. According to a preferred embodiment of the invention, said immunosuppressant agent is selected from the group comprising or consisting of cyclosporin, daclizumab, basiliximab, everolimus, tacrolimus (FK506), azathiopirine, leflunomide, 15-deoxyspergualin, or other immunosuppressant drugs.

Another aspect of the invention concerns a method for the prevention or treatment of disorders associated with an activated immune system comprising the administration to the patient of a pharmaceutical composition containing a compound of the General Formula (I). A suitable dose of the compound of General Formula (I) in the pharmaceutical composition is between 0.5 mg and 1000 mg per day. In a preferred embodiment of the invention, said dose is comprised between 1 mg and 500 mg per day and more particularly between 5 mg and 200 mg per day.

A further aspect of the invention are novel thiazolidin-4-one derivatives of the following General Formula (II):

General Formula (II)



wherein:

R¹⁴ represents lower alkyl, lower alkenyl; cycloalkyl; 5,6,7,8-tetrahydronaphth-1-yl; 5,6,7,8-tetrahydronaphth-2-yl; a phenyl group; a phenyl group mono-, di- or trisubstituted independently with lower alkyl, halogen, lower alkoxy, or CF₃;

R¹⁵ represents lower alkyl; allyl; cyclopropyl; cyclobutyl; cyclopentyl; mono- or di-lower alkylamino;

R¹⁶ represents hydrogen; hydroxy; lower alkoxy; lower alkyl or halogen;

R¹⁷ represents hydrogen, lower alkyl, or hydroxymethyl;

R¹⁸, R¹⁹, R²¹ and R²² each represents independently hydrogen or methyl;

R²⁰ represents hydrogen or lower alkyl; and in case m represents the integer 1, R²⁰ in addition represents lower alkoxy, hydroxy, —NH₂, —NHR⁵ or —NR⁵R⁶;

R²³ represents hydrogen; lower alkyl; hydroxycarbonyl-lower alkyl; 1-glyceryl or 2-glyceryl;

m represents the integer 0 or 1;

and configurational isomers, optically pure enantiomers, mixtures of enantiomers such as racemates, diastereomers, mixtures of diastereomers, diastereomeric racemates, mixtures of diastereomeric racemates and the meso-form, as well as pharmaceutically acceptable salts.

Preferred thiazolidin-4-one derivatives according to General Formula (II) are (Z,Z) isomers of General Formula (II).

In a preferred embodiment, R¹⁴ represents an unsubstituted, a mono- or disubstituted phenyl group.

In another preferred embodiment, R¹⁴ represents an unsubstituted, a mono- or disubstituted phenyl group, substituted with methyl or halogen.

In a further preferred embodiment, R¹⁵ represents lower alkyl.

In another preferred embodiment, R¹⁶ represents halogen or methyl.

In another preferred embodiment, m represents the integer 0; and R¹⁷, R¹⁸, R¹⁹ and R²⁰ represent hydrogen.

In yet another preferred embodiment, m represents the integer 1, R¹⁷, R¹⁸, R¹⁹, R²¹, R²² represent hydrogen, and R²⁰ represents hydroxy.

In a particularly preferred embodiment, R²³ represents hydrogen.

In another particularly preferred embodiment, m represents the integer 0; R¹⁷, R¹⁸, R¹⁹, R²¹, and R²³ represents hydrogen.

In another particularly preferred embodiment, m represents the integer 1, R¹⁷, R¹⁸, R¹⁹, R²¹, R²², and R²³ represent hydrogen, and R²⁰ represents hydroxy.

In a further preferred embodiment, R¹⁴ represents an unsubstituted, a mono- or disubstituted phenyl group, substituted with methyl or halogen, and R¹⁵ represents lower alkyl.

In another further preferred embodiment, R¹⁴ represents an unsubstituted, a mono- or disubstituted phenyl group, substituted with methyl or halogen, m represents the integer 0; R¹⁷, R¹⁸, R¹⁹, R²⁰, and R²³ represents hydrogen.

In another further preferred embodiment, R¹⁴ represents an unsubstituted, a mono- or disubstituted phenyl group, substituted with methyl or halogen, m represents the integer 1, R¹⁷, R¹⁸, R¹⁹, R²¹, R²², and R²³ represent hydrogen, and R²⁰ represents hydroxy.

In particularly preferred embodiment, R¹⁴ represents an unsubstituted, a mono- or disubstituted phenyl group, substituted with methyl or halogen, R¹⁵ represents lower alkyl; R¹⁶ represents halogen or methyl, m represents the integer 0, and R¹⁷, R¹⁸, R¹⁹, R²⁰ and R²³ each represent hydrogen.

In another particularly preferred embodiment, R¹⁴ represents an unsubstituted, a mono- or disubstituted phenyl

group, substituted with methyl or halogen, R¹⁵ represents lower alkyl; R¹⁶ represents halogen or methyl, m represents the integer 1, R¹⁷, R¹⁸, R¹⁹, R²¹, R²², and R²³ represent hydrogen, and R²⁰ represents hydroxy.

Specific thiazolidin-4-one derivatives according to formula (II) are:

5-[4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-phenyl-thiazolidin-4-one,

{2-[4-(2-([Z]-isopropylimino)-4-oxo-3-phenyl-thiazolidin-5-[Z]-ylidenemethyl)-phenoxy]-ethoxy}-acetic acid,

rac-5-{4-[2-(2,3-dihydroxy-propoxy)-ethoxy]-benz[Z]ylidene}-2-([Z]-isopropylimino)-3-phenyl-thiazolidin-4-one,

5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-phenyl-thiazolidin-4-one,

5-[3-fluoro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-phenyl-thiazolidin-4-one,

5-[4-(2-hydroxy-ethoxy)-3-methyl-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-phenyl-thiazolidin-4-one,

5-[4-(2-hydroxy-ethoxy)-3-methoxy-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-phenyl-thiazolidin-4-one,

5-[4-(3-hydroxy-propoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-phenyl-thiazolidin-4-one,

rac-5-[4-(2,3-dihydroxy-propoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-phenyl-thiazolidin-4-one,

rac-5-[3-chloro-4-(2,3-dihydroxy-propoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-phenyl-thiazolidin-4-one,

5-[4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-o-tolyl-thiazolidin-4-one,

rac-5-{4-[2-(2,3-dihydroxy-propoxy)-ethoxy]-benz[Z]ylidene}-2-([Z]-isopropylimino)-3-o-tolyl-thiazolidin-4-one,

5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-o-tolyl-thiazolidin-4-one,

5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-o-tolyl-thiazolidin-4-one,

5-[4-(2-hydroxy-ethoxy)-3-methoxy-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-o-tolyl-thiazolidin-4-one,

5-[4-(3-hydroxy-propoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-o-tolyl-thiazolidin-4-one,

rac-5-[3-chloro-4-(2,3-dihydroxy-propoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-o-tolyl-thiazolidin-4-one,

5-[4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-m-tolyl-thiazolidin-4-one,

5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-m-tolyl-thiazolidin-4-one,

rac-5-[3-chloro-4-(2,3-dihydroxy-propoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-m-tolyl-thiazolidin-4-one,

5-[4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-p-tolyl-thiazolidin-4-one,

5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-p-tolyl-thiazolidin-4-one,

rac-5-[3-chloro-4-(2,3-dihydroxy-propoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-p-tolyl-thiazolidin-4-one,

3-(2,3-dimethyl-phenyl)-5-[4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-thiazolidin-4-one,

rac-5-{4-[2-(2,3-dihydroxy-propoxy)-ethoxy]-benz[Z]ylidene}-3-(2,3-dimethyl-phenyl)-2-([Z]-isopropylimino)-thiazolidin-4-one,

5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-3-(2,3-dimethyl-phenyl)-2-([Z]-isopropylimino)-thiazolidin-4-one,

11

2-([Z]-allylimino)-5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-3-phenyl-thiazolidin-4-one,
 3-allyl-2-([Z]-allylimino)-5-[4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-thiazolidin-4-one,
 3-allyl-2-([Z]-allylimino)-5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-thiazolidin-4-one,
 5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-2-([Z]-methylimino)-3-phenyl-thiazolidin-4-one,
 5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-3-(2,3-dimethyl-phenyl)-2-([Z]-methylimino)-thiazolidin-4-one,
 More specific thiazolidin-4-one derivatives according to formula (II) are:
 5-[4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-phenyl-thiazolidin-4-one, 5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-phenyl-thiazolidin-4-one,
 rac-5-[3-chloro-4-(2,3-dihydroxy-propoxy)-benz[Z]ylidene]-2-([Z]-isopropylimino)-3-o-tolyl-thiazolidin-4-one,
 5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-3-(2,3-dimethyl-phenyl)-2-([Z]-isopropylimino)-thiazolidin-4-one,
 rac-5-[3-chloro-4-(2,3-dihydroxy-propoxy)-benz[Z]ylidene]-3-(2,3-dimethyl-phenyl)-2-([Z]-isopropylimino)-thiazolidin-4-one,
 5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-3-phenyl-2-([Z]-propylimino)-thiazolidin-4-one,
 5-[4-(2-hydroxy-ethoxy)-3-methyl-benz[Z]ylidene]-3-phenyl-2-([Z]-propylimino)-thiazolidin-4-one,
 rac-5-[3-chloro-4-(2,3-dihydroxy-propoxy)-benz[Z]ylidene]-3-phenyl-2-([Z]-propylimino)-thiazolidin-4-one,
 rac-5-[3-chloro-4-(2,3-dihydroxy-propoxy)-benz[Z]ylidene]-2-([Z]-propylimino)-3-o-tolyl-thiazolidin-4-one,
 (R)-5-[3-chloro-4-(2,3-dihydroxy-propoxy)-benz[Z]ylidene]-2-([Z]-propylimino)-3-o-tolyl-thiazolidin-4-one,

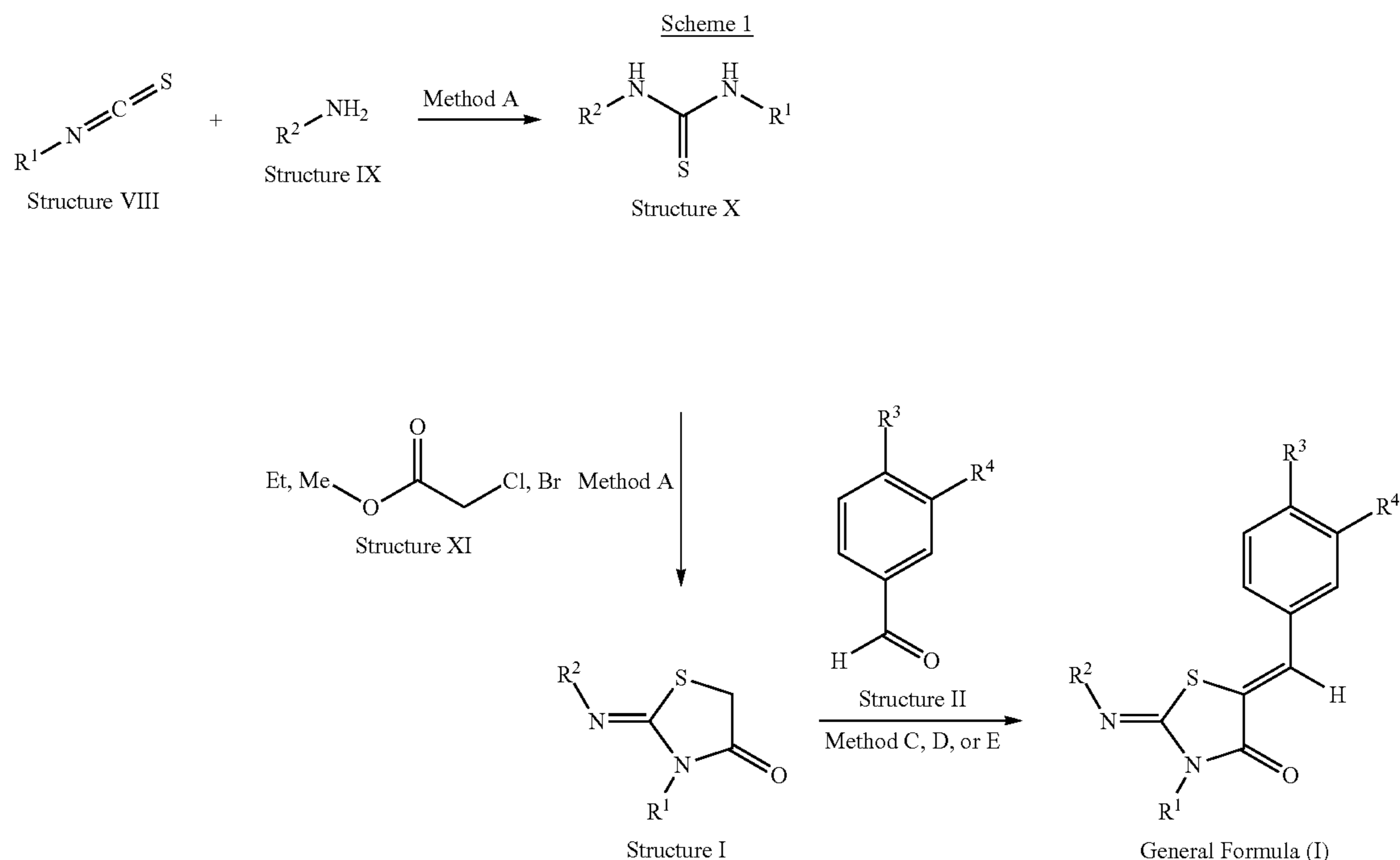
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(S)-5-[3-chloro-4-(2,3-dihydroxy-propoxy)-benz[Z]ylidene]-2-([Z]-propylimino)-3-o-tolyl-thiazolidin-4-one,
 5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-3-(2,3-dimethyl-phenyl)-2-([Z]-propylimino)-thiazolidin-4-one,
 rac-5-[3-chloro-4-(2,3-dihydroxy-propoxy)-benz[Z]ylidene]-3-(2,3-dimethyl-phenyl)-2-([Z]-propylimino)-thiazolidin-4-one,
 2-(dimethyl-hydrazono)-5-[4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-3-phenyl-thiazolidin-4-one,
 5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-2-([Z]-ethylimino)-3-phenyl-thiazolidin-4-one,
 5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-3-(2,3-dimethyl-phenyl)-2-([Z]-ethylimino)-thiazolidin-4-one,
 5-[3-chloro-4-(2-hydroxy-ethoxy)-benz[Z]ylidene]-3-isopropyl-2-([Z]-isopropylimino)-thiazolidin-4-one,
 Compounds of General Formula (I) and General Formula (II) are suitable for the use as medicament.

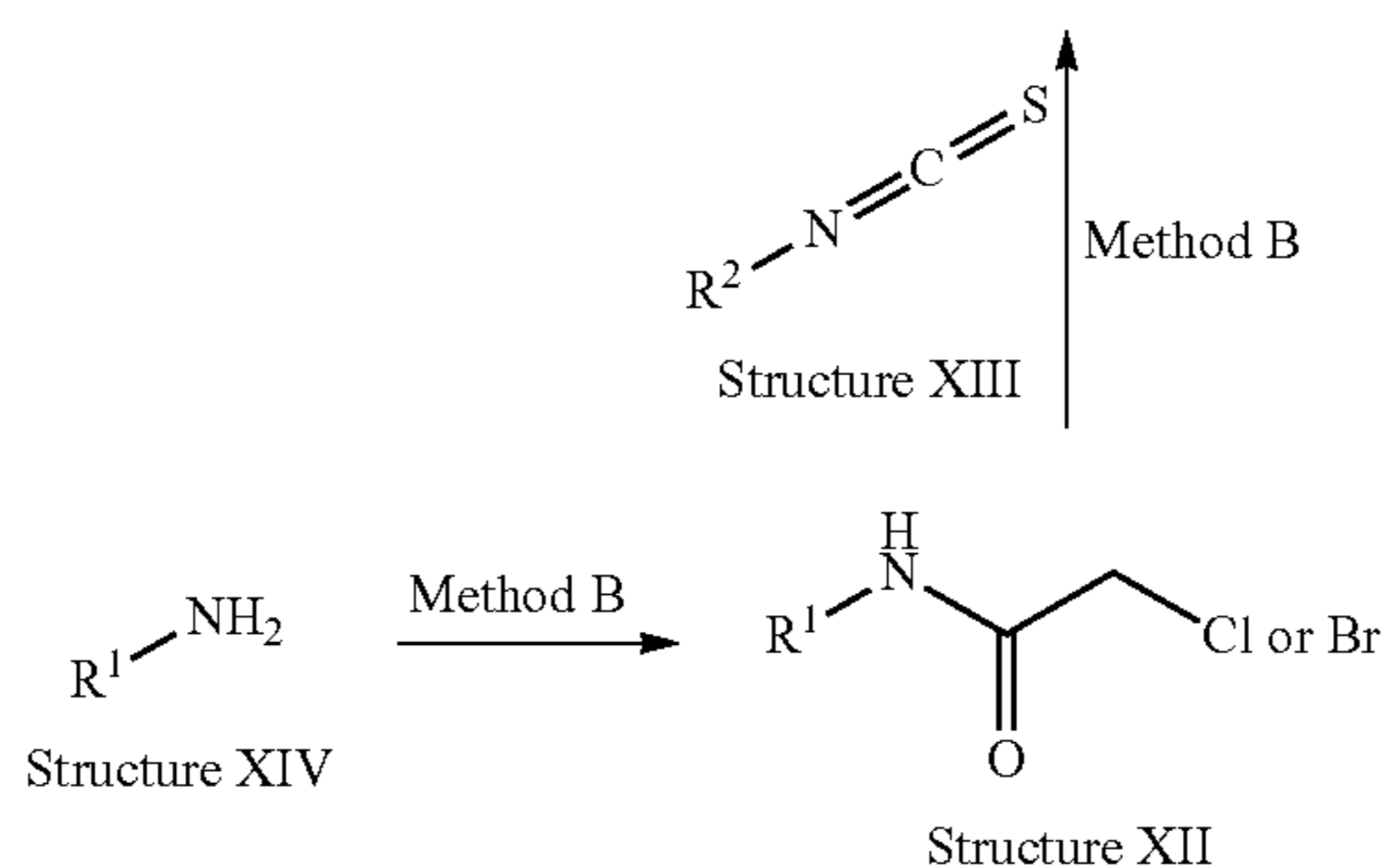
Still a further object of the present invention is a process to prepare a pharmaceutical composition comprising a compound of the General Formula (I) or a compound of the General Formula (II) by mixing one or more active ingredients with inert excipients in a manner known per se.

The compounds of General Formulae (I) and (II) can be manufactured by the methods given below, by the methods given in the Examples or by analogous methods. Optimum reaction conditions may vary with the particular reactants or solvents used, but such conditions can be determined by a person skilled in the art by routine optimisation procedures.

Compounds of the General Formula (I) and General Formula (II) of the present invention can be prepared according to the general sequence of reactions outlined below. Only a few of the synthetic possibilities leading to compounds of General Formula (I) and General Formula (II) are described as summarized in Scheme 1.



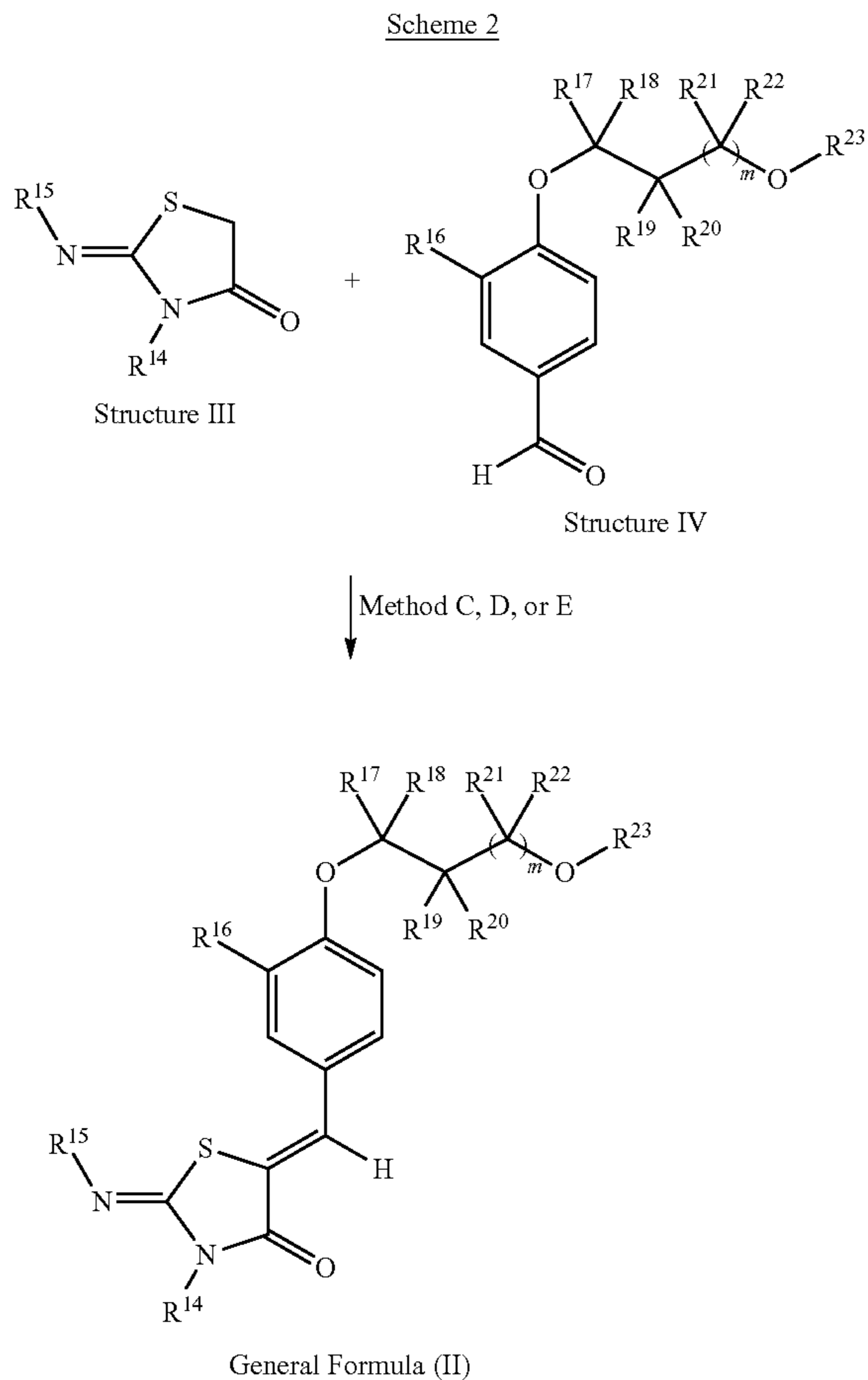
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According to Scheme 1, compounds of the General Formula (I) can be prepared by reacting a compound of Structure I with a compound of Structure II, for instance, in acetic acid at elevated temperatures and in the presence of a base such as sodium acetate. The reaction can also be carried out in a non-polar solvent such as toluene or benzene in the presence of an amine such as pyrrolidine or piperidine.

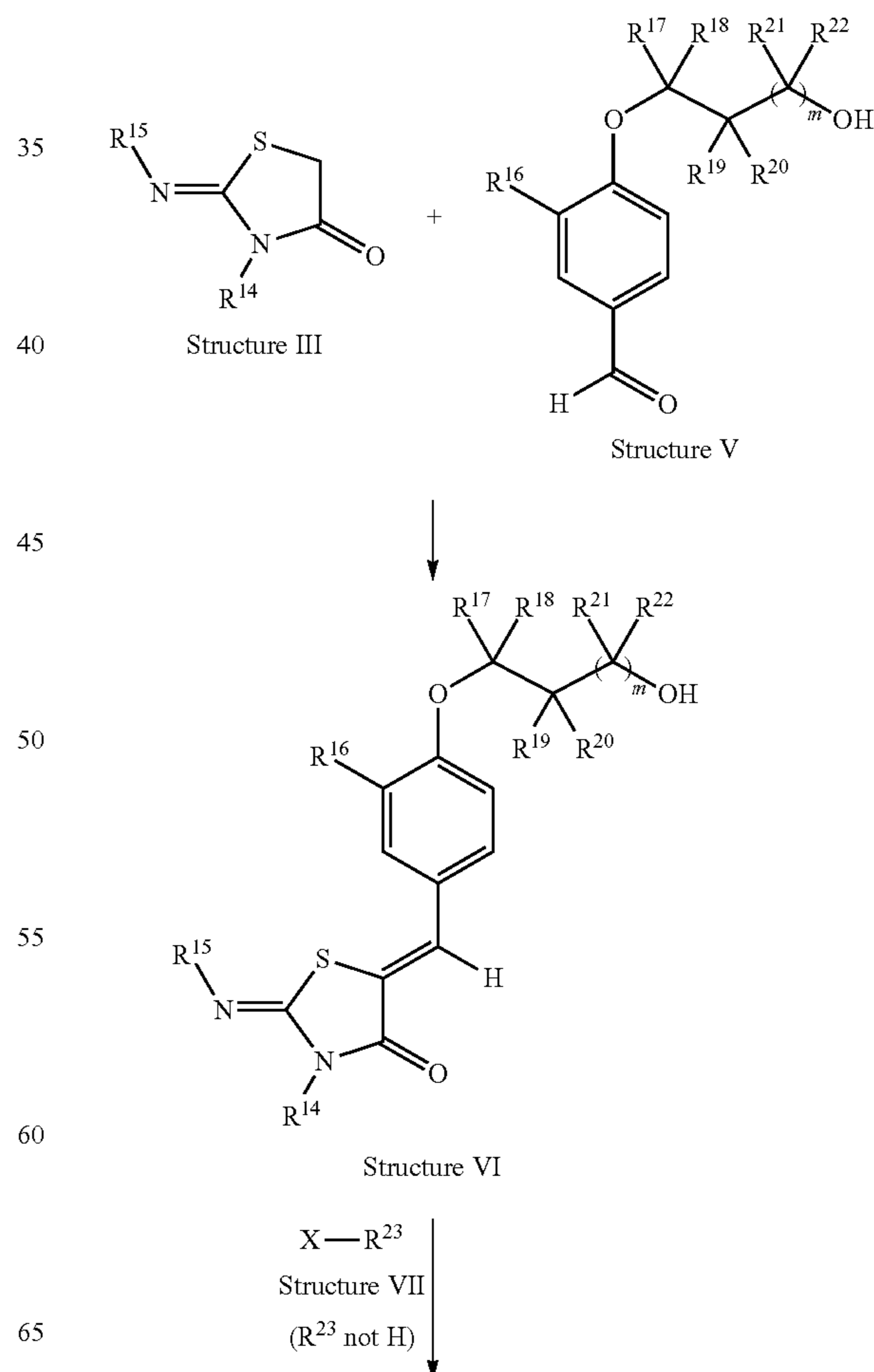
Likewise, compounds of the General Formula (II) can be prepared by reacting a compound of Structure III with a compound of Structure IV (Scheme 2).

Depending on the nature of R^{23} , it may be beneficial to prepare the compounds of General Formula (II) by first reacting a compound of Structure III with the compound of Structure V to form a compound of Structure VI (Scheme 3). The compound of Structure VI is then treated with a compound of Structure VII wherein X represents a leaving group such a chlorine, a bromine or an iodine atom, or a sulfonic acid ester group in the presence of a base such as K_2CO_3 , NaH, or triethylamine in a solvent such as THF, DMF, acetone, or DMSO.



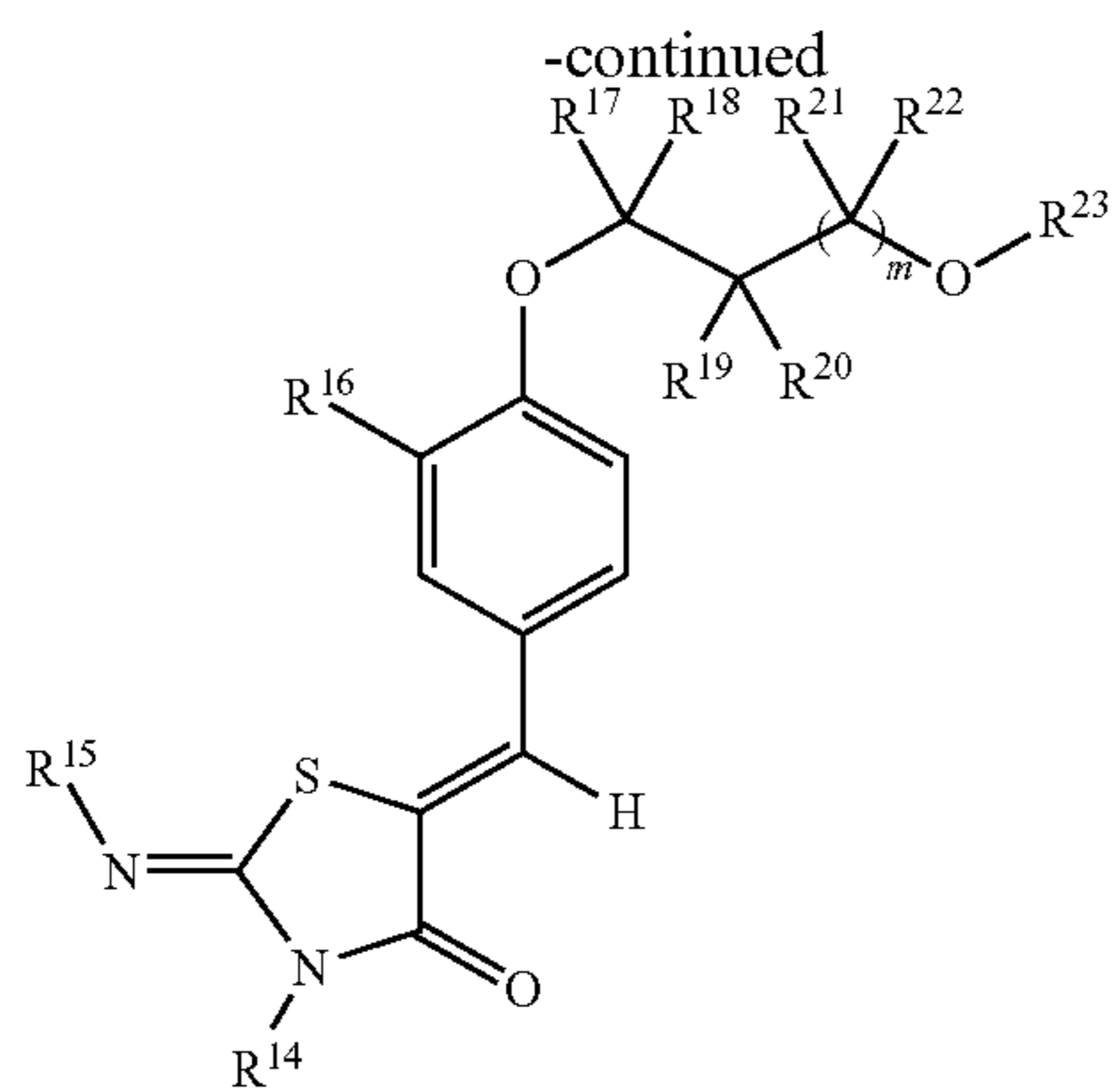
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Scheme 3



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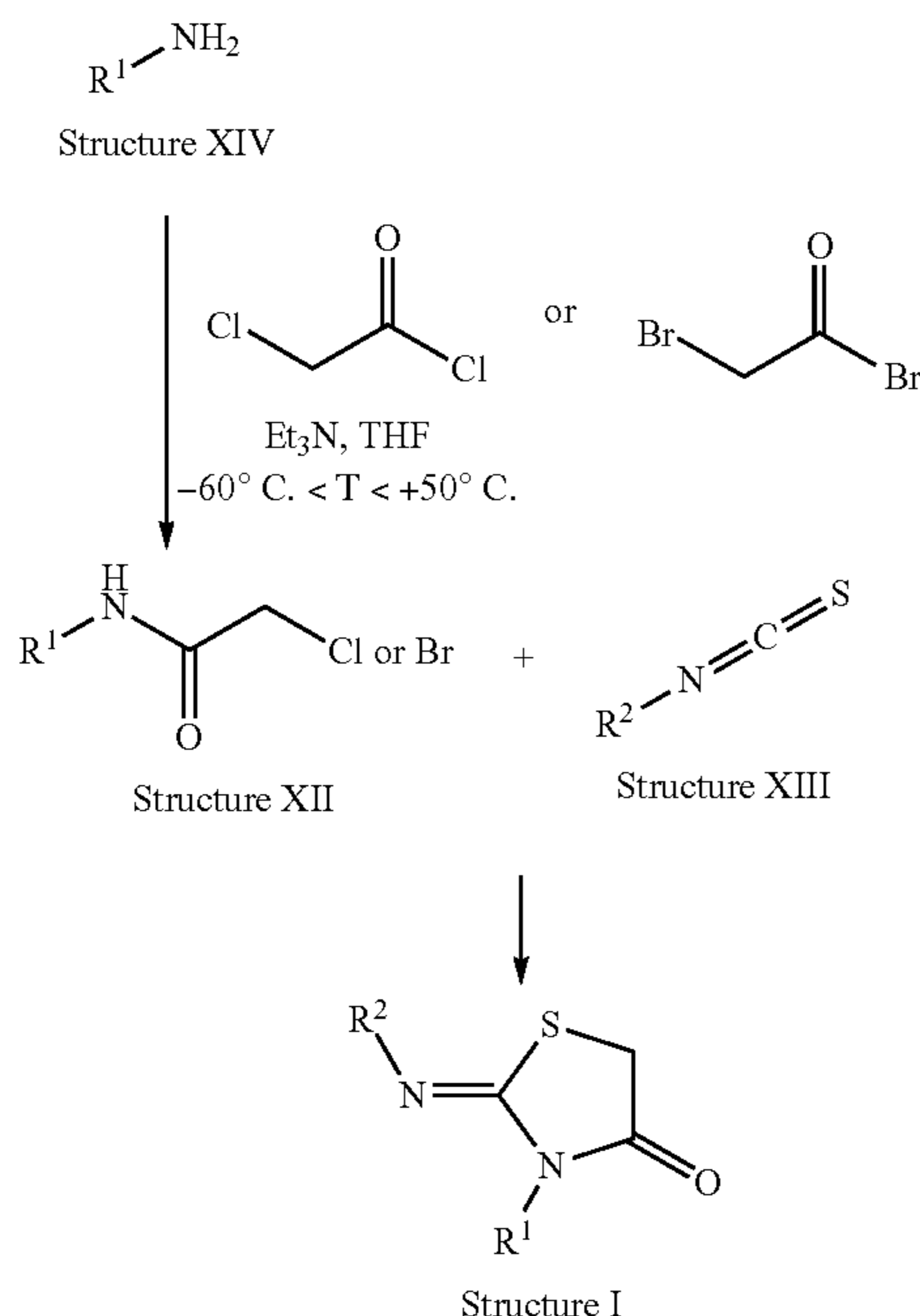


General Formula (II)

As outlined in Scheme 1, the compounds of Structure I can be prepared by reacting a compound of Structure VIII with a compound of Structure IX to form the intermediate of Structure X which is then cyclised to the compound of Structure I with a bromo- or chloroacetic acid ester of Structure XI. This reaction is ideally performed in a two step-one pot procedure at room temperature using an alcohol such as methanol or ethanol as solvent. The second step can be catalysed by the addition of pyridine.

Alternatively, the compounds of Structure I can also be prepared by reacting a compound of Structure XII with a compound of Structure XIII in the presence of a base such as NaH in a solvent such as THF or DMF. Compounds of the Structure XII are prepared by treating a compound of Structure XIV with chloroacetic acid chloride or bromoacetic acid bromide in a solvent such as THF, DMF or DCM in the presence of a base such as triethylamine, ethyldiisopropylamine at temperatures between -60 and $+50^{\circ}\text{C}$. (Scheme 4).

Scheme 4



The preparation of compounds of Structure III is in analogy to the preparation of compounds of Structure I.

16

EXAMPLES

The following examples illustrate the invention but do not at all limit the scope thereof.

- 5 All temperatures are stated in $^{\circ}\text{C}$. Compounds are characterized by $^1\text{H-NMR}$ (300 MHz) or $^{13}\text{C-NMR}$ (75 MHz) (Varian Oxford; chemical shifts are given in ppm relative to the solvent used; multiplicities: s=singlet, d=doublet, t=triplet; p=pentuplet, hex=hexet, hept=heptet, m=multiplet, br=broad, coupling constants are given in Hz); by LC-MS (Finnigan Navigator with HP 1100 Binary Pump and DAD, column: 4.6×50 mm, Zorbax SB-AQ, 5 m, 120A, gradient: 5-95% acetonitrile in water, 1 min, with 0.04% trifluoroacetic acid, flow: 4.5 ml/min), t_R is given in min; by TLC (TLC-plates from Merck, Silica gel 60 F₂₅₄), or by melting point.
- 10 Compounds are purified by preparative HPLC (column: Grom Saphir Rp-C₁₈, 110A, 5 m, 30×30 mm, gradient: 10-95% acetonitrile in water containing 0.5% of formic acid, in 2 min, flow: 75 mL/min) or by MPLC (Labomatic MD-80-100 pump, Linear UVIS-201 detector, column: 350×18 mm, Labogel-RP-18-5s-100, gradient: 10% methanol in water to 100% methanol).

Abbreviations

- 25 aq. aqueous
atm atmosphere
DCM dichloromethane
DMF dimethylformamide
DMSO dimethylsulfoxide
30 EA ethyl acetate
h hour
Hex hexane
HV high vacuum conditions
min minutes
THF tetra hydrofuran
rt room temperature
sat. saturated
 t_R retention time
40 tlc thin layer chromatography
Typical Procedure for the Preparation of the 2-imino-thiazolidin-4-one Scaffold (Method A)

To a solution of isopropylamine (1.31 g, 22.19 mmol) in methanol (25 mL) is added portionwise phenylisothiocyanate (3.0 g, 22.19 mmol). The solution which becomes slightly warm during the addition is stirred at rt for 4 h before pyridine (2.63 g, 33.29 mmol) and methyl bromoacetate (3.39 g, 22.19 mmol) is added. The mixture is stirred for another 16 h at rt before it is poured onto 1 N aq. HCl (100 mL) and extracted with diethyl ether (150 mL). The aq. layer is neutralised by adding sat. aq. NaHCO₃ and extracted with diethyl ether (4 \times 150 mL). The organic extracts are dried over MgSO₄ and evaporated. The remaining solid is suspended in diethyl ether/heptane, filtered off, washed with additional diethyl ether/heptane and dried to give 3-phenyl-2-[(Z)-isopropylimino]-thiazolidin-4-one.

Typical Procedure for the Preparation of the 2-imino-thiazolidin-4-one Scaffold (Method B)

- a) A solution of aniline (9.31 g, 100 mmol) and triethylamine (15.2 g, 150 mmol) in THE (150 mL) is cooled to -40°C . before chloroacetic acid chloride (11.3 g, 100 mmol) is slowly added in portions such that the temperature does not rise above 0°C . After completion of the addition, the brown suspension is stirred at rt for 1 h. The dark purple mixture is poured onto water (300 mL) and extracted twice with EA (300 mL). The organic extracts are washed with sat. aq. NaHCO₃, 0.5 N aq. HCl, followed by water, and evaporated.

17

The brown residue is suspended in diethyl ether, filtered off, washed with additional diethyl ether and dried under high vacuum to give 2-chloro-N-phenyl-acetamide. LC-MS: $t_R=0.75$ min, $[M+1]^+=170$, 1H NMR ($CDCl_3$): δ 8.22 (s br, 1H), 7.56-7.51 (m, 2H), 7.40-7.24 (m, 2H), 7.20-7.14 (m, 1H), 4.20 (s, 2H).

b) At rt, NaH (154 mg of 55% dispersion in mineral oil, 3.54 mmol) is added in portions to a solution of n-propyl-isothiocyanate (596 mg, 5.90 mmol) and the above 2-chloro-N-phenyl-acetamide (1000 mg, 5.90 mmol) in DMF (30 mL). Stirring is continued for 2 h after completion of the addition. The mixture is poured onto EA (150 mL) and is extracted twice with 1 N aq. HCl (200 mL). The aq. layer is neutralised by adding 3 N NaOH followed by sat. aq. $NaHCO_3$, and extracted twice with EA (200 mL). The organic extracts are washed with water (200 mL) and evaporated to give a pale yellow, crystalline solid. This material is suspended in a small amount of diethyl ether/hexane 1:1, filtered, washed with additional diethyl ether/hexane and dried under high vacuum to give 3-phenyl-2-[(Z)-propylimino]-thiazolidin-4-one.

Typical Procedure for the Introduction of the Benzylidene Substituent (Method C)

A solution of 3-phenyl-2-[(Z)-isopropylimino]-thiazolidin-4-one (150 mg, 0.64 mmol), piperonate (192 mg, 1.28 mmol) and sodium acetate (105 mg, 1.28 mmol) in acetic acid (3 mL) is stirred at $110^\circ C$. for 4 h. The dark yellow to brown solution is cooled to rt, diluted with EA (75 mL), washed with sat. aq. $NaHCO_3$, followed by water, and evaporated. The crude product is purified by crystallisation from a small amount of methanol (approx. 5 mL) to give 5-benzo[1,3]dioxol-5-ylmeth-(Z)-ylidene-2-[(Z)-isopropylimino]-3-phenyl-thiazolidin-4-one.

Typical Procedure for the Introduction of the benz-(Z)-ylidene Substituent (Method D)

A solution of 3-phenyl-2-[(Z)-isopropylimino]-thiazolidin-4-one (150 mg, 0.64 mmol), 4-(2-hydroxyethoxy)benzaldehyde (213 mg, 1.28 mmol) and sodium acetate (105 mg, 1.28 mmol) in acetic acid (3 mL) is stirred at $110^\circ C$. for 3 h. The brown solution is cooled to rt, diluted with EA (75 mL), washed with sat. aq. $NaHCO_3$, followed by water, and evaporated. The residue is dissolved in methanol (20 mL) and sodium methylate is added (150 mg). The resulting solution is allowed to stand for 40 min at it before it is diluted with EA, washed with 10% aq. citric acid, and twice with water. The organic extracts are evaporated and the residue is crystallised from methanol to give (2Z,5Z)-3-phenyl-5-[4-(2-hydroxyethoxy)-benz-(Z)-ylidene]-2-[(Z)-isopropylimino]-thiazolidin-4-one.

Typical Procedure for the Introduction of the benz-(Z)-ylidene Substituent (Method E)

A solution of 3-(2-methylphenyl)-2-[(Z)-isopropylimino]-thiazolidin-4-one (50 mg, 0.200 mmol), 2,3-dihydro-benzo[1,4]dioxine-6-carbaldehyde (49 mg, 0.300 mmol) and sodium acetate (33 mg, 0.400 mmol) in acetic acid (1 mL) is stirred at $110^\circ C$. for 5 h. The reaction mixture is cooled to rt and subjected to prep. HPLC purification. The product containing fractions are evaporated and dried to give 5-(2,3-dihydro-benzo[1,4]dioxin-6-ylmeth-(Z)-ylidene)-2-[(Z)-isopropylimino]-3-o-tolyl-thiazolidin-4-one.

Typical Procedure for the Introduction of the benz-(Z)-ylidene Substituent (Method F)

A solution of 3-(2-methylphenyl)-2-[(Z)-propylimino]-thiazolidin-4-one (87 mg, 0.351 mmol), 3-chloro-4-((4R)-2,2-dimethyl-[1,3]dioxolan-4-ylmethoxy)-benzaldehyde (190 mg, 0.702 mmol) and sodium acetate (58 mg, 0.702 mmol) in acetic acid (4 mL) is stirred at $110^\circ C$. for 4 h. Water is added (50 μ L) and stirring is continued at $110^\circ C$. for 1 h. The

18

reaction mixture is cooled to rt, diluted with EA (75 mL), washed with sat. aq. $NaHCO_3$, followed by water, and evaporated. The residue is dissolved in methanol (20 mL) and sodium methylate is added (150 mg). The resulting solution is allowed to stand for 40 min at it before it is diluted with EA, washed with 10% aq. citric acid, and twice with water. The organic extracts are evaporated and the residue is purified on prep. TLC plates using toluene/EA 1:3 to give 5-[3-chloro-4-((2R)-2,3-dihydroxy-propoxy)-benz-(Z)-ylidene]-2-[(Z)-propylimino]-3-o-tolyl-thiazolidin-4-one (98 mg) as a pale yellow foam.

Preparation of rac-4-[2-(2,3-dihydroxy-propoxy)-ethoxy]-benzaldehyde

To a solution of 4-(2-hydroxyethoxy)-benzaldehyde (2.50 g, 15.0 mmol) in THF (100 mL) is added NaH (722 mg of 55% dispersion in mineral oil, 16.5 mmol) in two portions. The mixture is stirred at it for 30 min and allylbromide (2.18 g, 18.0 mmol) is added. After stirring for 1 h at it the thick mixture is diluted with DMF (20 mL) and stirring is continued for another 2 h. The mixture is diluted with EA (300 mL), washed with sat. aq. $NaHCO_3$ (150 mL), and water (2 \times 150 mL) and concentrated. The residue is chromatographed on silica gel eluting with heptane/EA 3:2 to afford 4-(2-allyloxyethoxy)-benzaldehyde (2.11 g) as an almost colourless oil. LC-MS: $t_R=0.88$ min, $[M+1]^+=207$.

The above material (1.5 g, 7.27 mmol) is dissolved in acetone (40 mL) and treated with a 2.5% solution of OsO_4 in tert.-butanol (1.48 mL, 0.146 mmol). N-Methylmorpholine-N-oxide (1.03 g, 8.73 mmol) followed by water (1 mL) is added and the resulting yellow to green solution is stirred at it for 4.5 h before it is diluted with EA (250 mL) and washed with 10% aq. citric acid solution (100 mL) and water (2 \times 200 mL). The washings are extracted back once with EA (200 mL). The combined organic extracts are concentrated to leave rac-4-[2-(2,3-dihydroxy-propoxy)-ethoxy]-benzaldehyde (1.26 g) as a brownish oil. This material which reversibly polymerizes upon standing is used without further purification in the next step. LC-MS: $t_R=0.62$ min, $[M+1]^+=241$.

Preparation of 3-chloro-4-(2-acetoxy-ethoxy)-benzaldehyde

A mixture of 3-chloro-4-hydroxybenzaldehyde (10 g, 63.9 mmol), K_2CO_3 (26.5 g, 191.6 mmol) and 2-bromoethyl acetate (26.7 g, 159.7 mmol) in acetone (250 mL) is refluxed for 18 h before it is diluted with diethyl ether (200 mL) and washed with water (3 \times 200 mL). The washings are extracted with diethyl ether (200 mL). The combined organic extracts are dried over $MgSO_4$ and concentrated. The remaining residue is purified by column chromatography on silica gel eluting with heptane/EA 1:1 to afford the title compound (6.44 g) as colourless solid. 1H NMR ($CDCl_3$): δ 9.85 (s, 1H), 7.91 (d, J=1.8 Hz, 1H), 7.75 (dd, J=1.8, 8.2 Hz, 1H), 7.03 (d, J=8.8 Hz, 1H), 4.53-4.49 (m, 2H), 4.35-4.31 (m, 2H), 2.12 (s, 3H).

Preparation of 4-(2-acetoxy-ethoxy)-3-fluoro-benzaldehyde

A mixture of 3-fluoro-4-hydroxybenzaldehyde (2.0 g, 14.3 mmol), K_2CO_3 (5.92 g, 42.8 mmol) and 2-bromoethyl acetate (4.77 g, 28.5 mmol) in acetone (30 mL) is stirred at $55^\circ C$. for 24 h before it is diluted with diethyl ether (150 mL) and washed with water (3 \times 50 mL). The organic extract is dried over $MgSO_4$ and concentrated. The remaining residue is chromatographed on silica gel to give the title aldehyde (1.65 g) as

19

a colourless oil. $^1\text{H NMR}$ (CDCl_3): δ 9.85 (s, 1H), 7.64-7.58 (m, 2H), 7.07 (t, $J=8.2$ Hz, 1H), 4.49-4.45 (m, 2H), 4.35-4.30 (m, 2H), 2.10 (s, 3H).

Preparation of
4-(2-acetoxy-ethoxy)-3-methylbenzaldehyde

A mixture of 4-hydroxy-3-methyl-benzaldehyde (7.0 g, 51.4 mmol), K_2CO_3 (21.32 g, 154.2 mmol) and 2-bromoethyl acetate (25.8 g, 154.2 mmol) in acetone (250 mL) is refluxed for 18 h before it is diluted with diethyl ether (300 mL) and washed with water (3×250 mL). The washings are extracted with diethyl ether (200 mL). The combined organic extracts are dried over MgSO_4 and concentrated. The remaining residue is purified by column chromatography on silica gel eluting with heptane/EA 1:1 to afford the title compound (11.14 g) as colourless solid. $^1\text{H NMR}$ (CDCl_3): δ 9.85 (s, 1H), 7.72-7.67 (m, 2H), 6.92-6.88 (m, 1H), 4.51-4.46 (m, 2H), 4.29-4.25 (m, 2H), 2.27 (s, 3H), 2.11 (s, 3H).

Preparation of
4-(2-acetoxy-ethoxy)-3-methoxy-benzaldehyde

A mixture of 4-hydroxy-3-methoxy-benzaldehyde (2.5 g, 16.4 mmol), K_2CO_3 (6.81 g, 49.3 mmol) and 2-bromoethyl acetate (5.49 g, 32.9 mmol) in acetone (50 mL) is refluxed for 48 h before it is diluted with diethyl ether (250 mL) and washed with water (2×200 mL). The washings are extracted with diethyl ether (200 mL). The combined organic extracts are dried over MgSO_4 and concentrated. The remaining residue is purified by column chromatography on silica gel eluting with heptane/EA 1:1 to afford the title compound (2.94 g) as colourless solid. $^1\text{H NMR}$ (CDCl_3): δ 9.85 (s, 1H), 7.45-7.41 (m, 2H), 6.99 (d, $J=7.6$ Hz, 1H), 4.51-4.47 (m, 2H), 4.34-4.30 (m, 2H), 3.94 (s, 3H), 2.11 (s, 3'-1).

Preparation of 4-(3-hydroxy-propoxy)-benzaldehyde

To a solution of 3-(4-hydroxymethylphenoxy)propionic acid (4.00 g, 20.40 mmol) in THF (20 mL) is added a solution of LiAlH_4 (10 mL, 1 M in THF). The mixture becomes warm and is diluted with THF (20 mL) before it is refluxed. After 1 and 2 h two further portions of LiAlH_4 (2×10 mL, 1 M in THF) are added. The mixture is refluxed overnight, cooled to it and carefully quenched by the addition of water (1.2 g), 15% aq. NaOH (1.2 g) and water (3.2 g). The white precipitate is filtered off, and the filtrate is evaporated and dried to give 3-(4-hydroxymethyl-phenoxy)-propan-1-ol. $^1\text{H NMR}$ (D_6 -DMSO): δ 7.21-7.15 (m, 2H), 6.86-6.81 (m, 2H), 5.00 (t, $J=5.9$ Hz, 1H), 4.51 (t, $J=5.3$ Hz, 1H), 4.39 (d, $J=5.3$ Hz, 2H), 3.99 (t, $J=6.4$ Hz, 2H), 3.57-3.50 (m, 2H), 1.83 (p, $J=6.4$ Hz, 2H).

To a suspension of the above 3-(4-hydroxymethyl-phenoxy)-propan-1-ol (1.50 g, 8.23 mmol) in acetonitrile (25 mL) is added N-methylmorpholine-N-oxide (1.50 g, 12.38 mmol) followed by tetrapropylammonium perruthenate (140 mg, 0.43 mmol). The dark solution is stirred at rt for 2 h before the solvent is removed in vacuo. The crude product is purified by column chromatography on silica gel (heptane/EA) to give 4-(3-hydroxy-propoxy)-benzaldehyde. $^1\text{H NMR}$ (D_6 -DMSO): δ 9.83 (s, 1H), 7.85-7.81 (m, 2H), 7.12-7.07 (m, 2H), 4.56 (t, $J=5.3$ Hz, 1H), 4.14 (t, $J=6.4$ Hz, 2H), 3.57-3.51 (m, 2H), 1.88 (p, $J=6.4$ Hz, 2H).

Preparation of
rac-4-(2,3-dihydroxy-propoxy)-benzaldehyde

To a solution of 4-allyloxybenzaldehyde (1.0 g, 6.17 mmol) in acetone (40 mL) and water (5 mL) is added a 2.5%

20

solution of OsO_4 in tert. butanol (1.25 mL) followed by N-methyl morpholine-N-oxide (867 mg, 7.4 mmol). The pale yellow solution is stirred at it for 6 h, diluted with EA (250 mL) and washed with 10% aq. citric acid solution (100 mL) and water (2×100 mL). The washings are extracted with EA (150 mL). The combined organic extracts are concentrated and purified by column chromatography on silica gel to give the title compound (731 mg) as a turbid oil. The title compound reversibly polymerizes upon standing. LC-MS: $t_R=0.58$ min, $[\text{M}+1+\text{CH}_3\text{CN}]^+=238$.

Preparation of rac-4-(2,3-dihydroxy-propoxy)-3-chloro-benzaldehyde

To a solution of 3-chloro-4-hydroxybenzaldehyde (5.0 g, 31.9 mmol) in DMF/THF 1:3 (120 mL) is added NaH (1.67 g of a 55% dispersion in mineral oil, 38.3 mmol) in four portions. The mixture is stirred at it for 1 h before allylbromide (9.66 g, 79.8 mmol) is added. The reaction mixture is heated to 65°C . for 18 h, diluted with water (250 mL) and extracted with diethyl ether (3×250 mL). The organic extracts are washed with water (250 mL), combined and concentrated. The remaining oil is chromatographed on silic gel with heptane/EA 4:1 to afford 4-allyloxy-3-chlorobenzaldehyde (5.37 g) as an almost colourless oil. LC: $t_R=0.95$ min. The above 4-allyloxy-3-chloro-benzaldehyde (5.37 g, 27.3 mmol) is dissolved in acetone (100 mL) and water (10 mL) and treated with a 2.5% solution of OsO_4 in tert.-butanol (1.71 mL, 0.137 mmol OsO_4). N-methyl morpholine-N-oxide (3.87 g, 32.8 mmol) is added and the reaction mixture is stirred at it for 20 h before it is diluted with EA (300 mL) and washed with 10% aq. citric acid solution (200 mL) and water (2×150 mL). The washings are extracted with EA (300 mL) and the combined organic extracts are dried over MgSO_4 , filtered and concentrated to furnish the title compound (6.02 g) as beige foam which was used in the following steps without further purification. LC: $t_R=0.67$ min.

Preparation of 3-chloro-4-((4R)-2,2-dimethyl-[1,3]-dioxolan-4-ylmethoxy)-benzaldehyde

To a solution of 3-chloro-4-hydroxybenzaldehyde (4.21 g, 27 mmol) in degassed toluene (100 mL) is added ((4R)-2,2-dimethyl-[1,3]-dioxolan-4-yl)-methanol (5.35 g, 40.5 mmol), 1,1'-(azodicarbonyl)dipiperidide (13.63 g, 54 mmol) followed by tributylphosphine (10.93 g, 54 mmol). The mixture becomes slightly warm and a precipitate forms. The reaction mixture is diluted with degassed toluene (500 mL) and is stirred at it for 2 h, then at 60°C . for further 18 h before it is washed with 1 N aq. NaOH (3×150 mL) and water (150 mL). The organic phase is dried over MgSO_4 , filtered and concentrated to leave a dark brown oil which is chromatographed on silica gel eluting with hexane/EA 4:1 to give the title compound (4.30 g) as yellow oil. $^1\text{H NMR}$ (CDCl_3): δ 9.82 (s, 1H), 7.89 (d, $J=1.8$ Hz, 1H), 7.74 (dd, $J=1.8, 8.2$ Hz, 1H), 7.05 (d, $J=8.2$ Hz, 1H), 4.56-4.43 (m, 1H), 4.23-4.17 (m, 2H), 4.14-4.08 (m, 1H), 4.06-4.00 (m, 1H), 1.47 (s, 3H), 1.41 (s, 3H).

Preparation of 3-chloro-4((4S)-2,2-dimethyl-[1,3]-dioxolan-4-ylmethoxy)-benzaldehyde

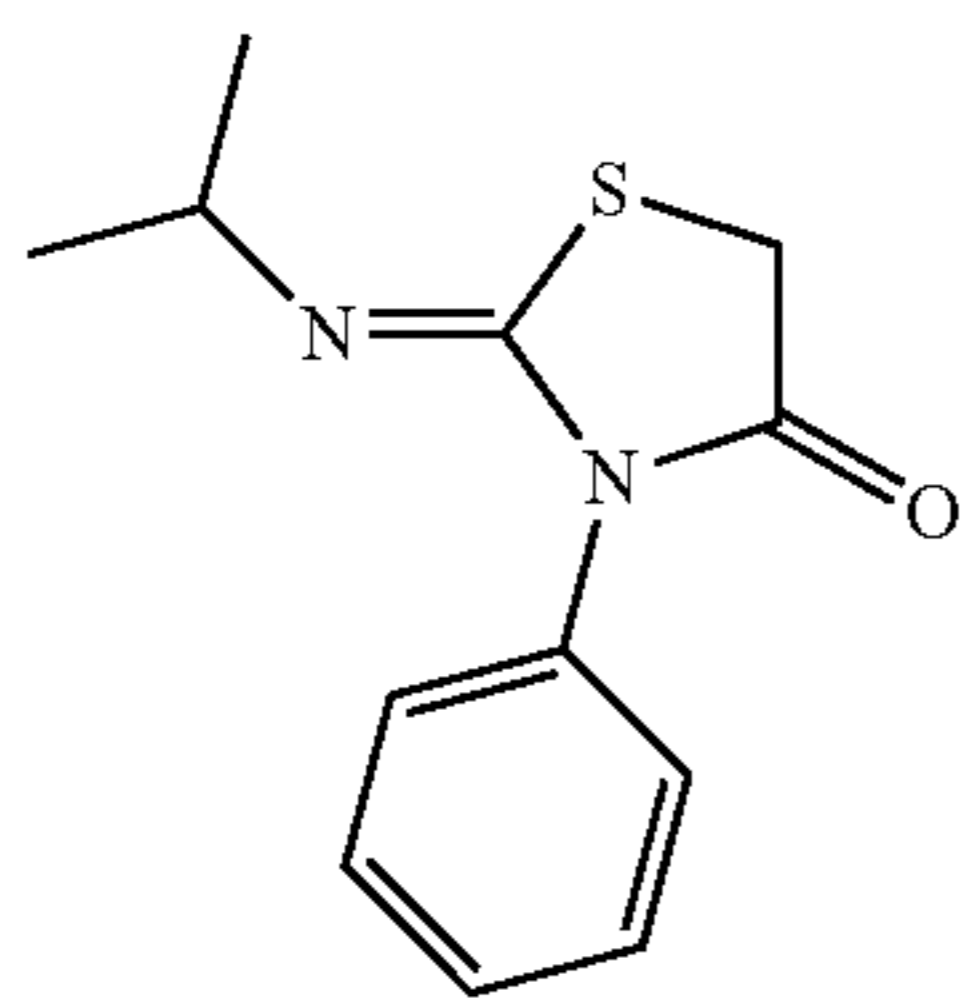
The title compound (174 mg) is obtained as a pale yellow oil starting from 3-chloro-4-hydroxybenzaldehyde (500 mg, 3.20 mmol), ((4S)-2,2-dimethyl-[1,3]dioxolan-4-yl)-methanol (633 mg, 4.79 mmol), 1,1'-(azodicarbonyl)dipiperidide (1.61 g, 6.39 mmol), and tributylphosphine (1.29 g, 6.39

21

mmol) following the procedure given for the (R)-enantiomer above using THF as solvent, however.

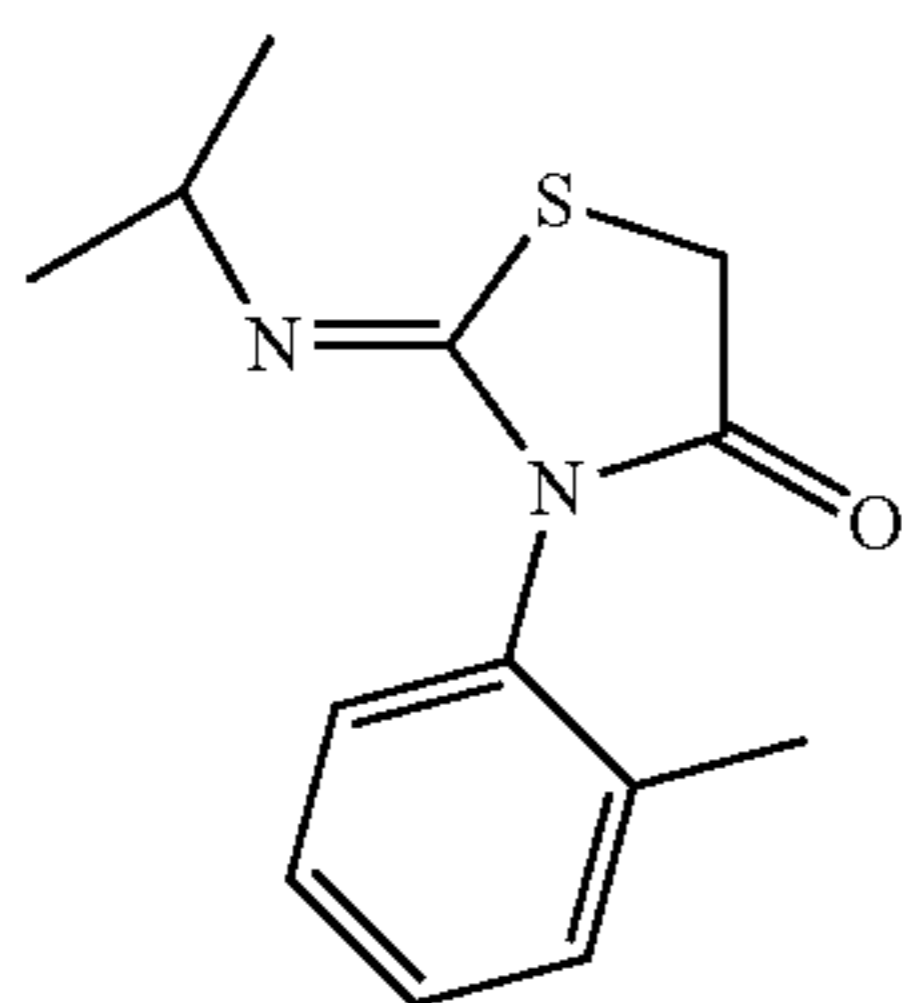
Preparation of rac-2-hydroxymethyl-2,3-dihydrobenzo[1,4]dioxine-6-carbaldehyde

To a cold (5° C.) solution of 3,4-dihydroxybenzaldehyde (3.20 g, 23.2 mmol) in DMF (70 mL) is carefully added NaH (1.96 g 55% in mineral oil, 48.5 mmol) in portions. The temperature rises to 12° C. Upon completion of the addition, the cooling is removed and a solution of 2-chloromethyl-oxirane (2.57 g, 27.7 mmol) in DMF (3 mL) is added. The reaction mixture is stirred at it overnight. The mixture is diluted with 1N aq. NaOH (150 mL) and extracted with EA (2×200 mL). The organic extracts are washed with 1 M aq. NaOH (2×200 mL) and water (200 mL), combined, dried over MgSO₄, filtered and concentrated. The remaining residue is purified by column chromatography on silica gel eluting with heptene/EA 5:1 to 1:1 to afford the title aldehyde (0.53 g) as a solid. LC: t_R=0.69 min. ¹H NMR (D₆-DMSO): δ 9.77 (s, 1H), 7.41 (dd, J=2.3, 8.2 Hz, 1H), 7.36 (d, J=2.3 Hz, 1H), 7.04 (d, J=8.2 Hz, 1H), 5.10 (t, J=5.9 Hz, 1H, D₂O exchangeable), 4.37 (dd, J=2.3, 11.1 Hz, 1H), 4.30-4.23 (m, 1H), 4.05 (dd, J=7.6, 11.1 Hz, 1H), 3.67-3.60 (m, 2H).



Scaffold 1

2-[(Z)-Isopropylimino]-3-phenyl-thiazolidin-4-one is prepared as described in Method A. LC-MS: t_R=0.58 min, [M+1]⁺=235. ¹H NMR (CDCl₃): δ 7.50-7.36 (m, 3H), 7.29-7.24 (m, 2H), 3.98 (s, 2H), 3.51 (hept, J=6.4 Hz, 1H), 1.14 (d, J=5.9 Hz, 6H).

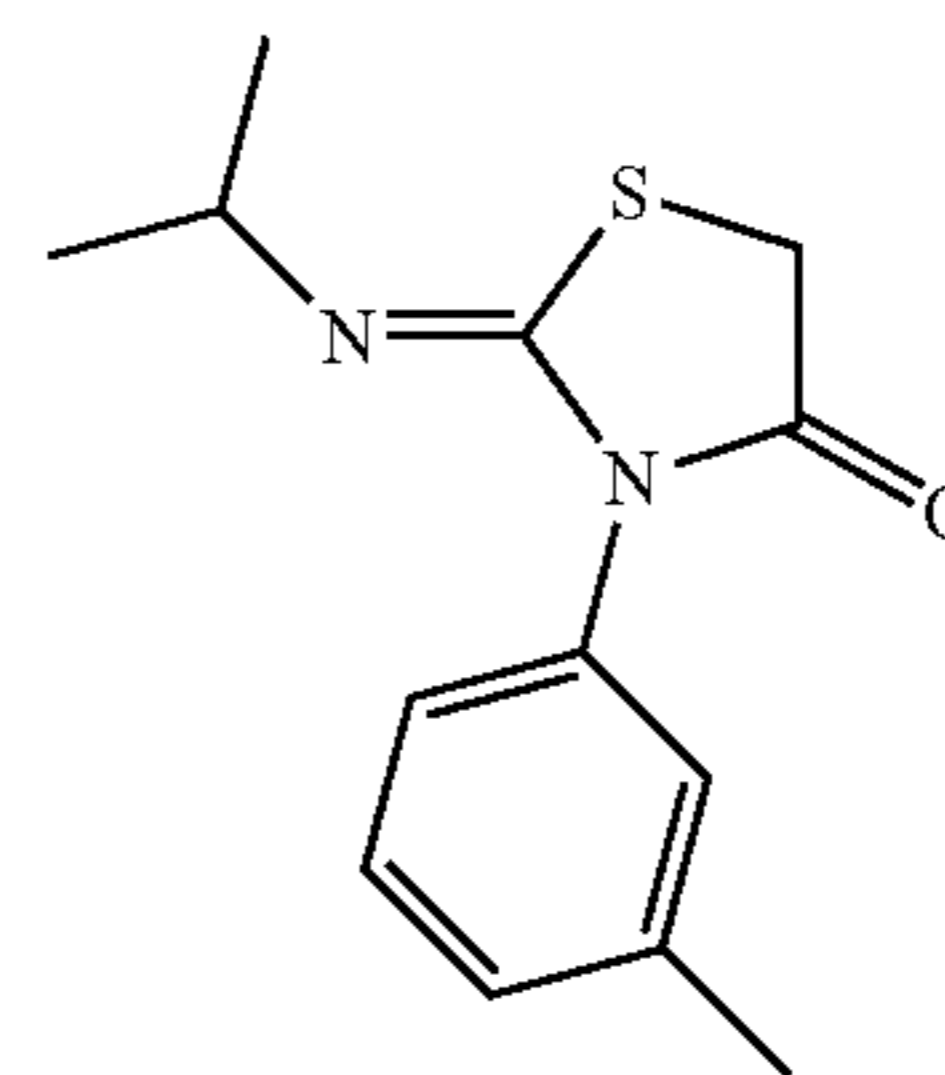


Scaffold 2

2-[(Z)-Isopropylimino]-3-o-tolyl-thiazolidin-4-one is obtained following Method A and starting from o-tolyl-isothiocyanate (3.0 g, 20.10 mmol), isopropylamine (1.19 g, 20.10 mmol), and methyl bromoacetate (3.08 g, 20.1 mmol). LC-MS: t_R=0.67 min, [M+1]⁺=249; ¹H NMR (CDCl₃): δ

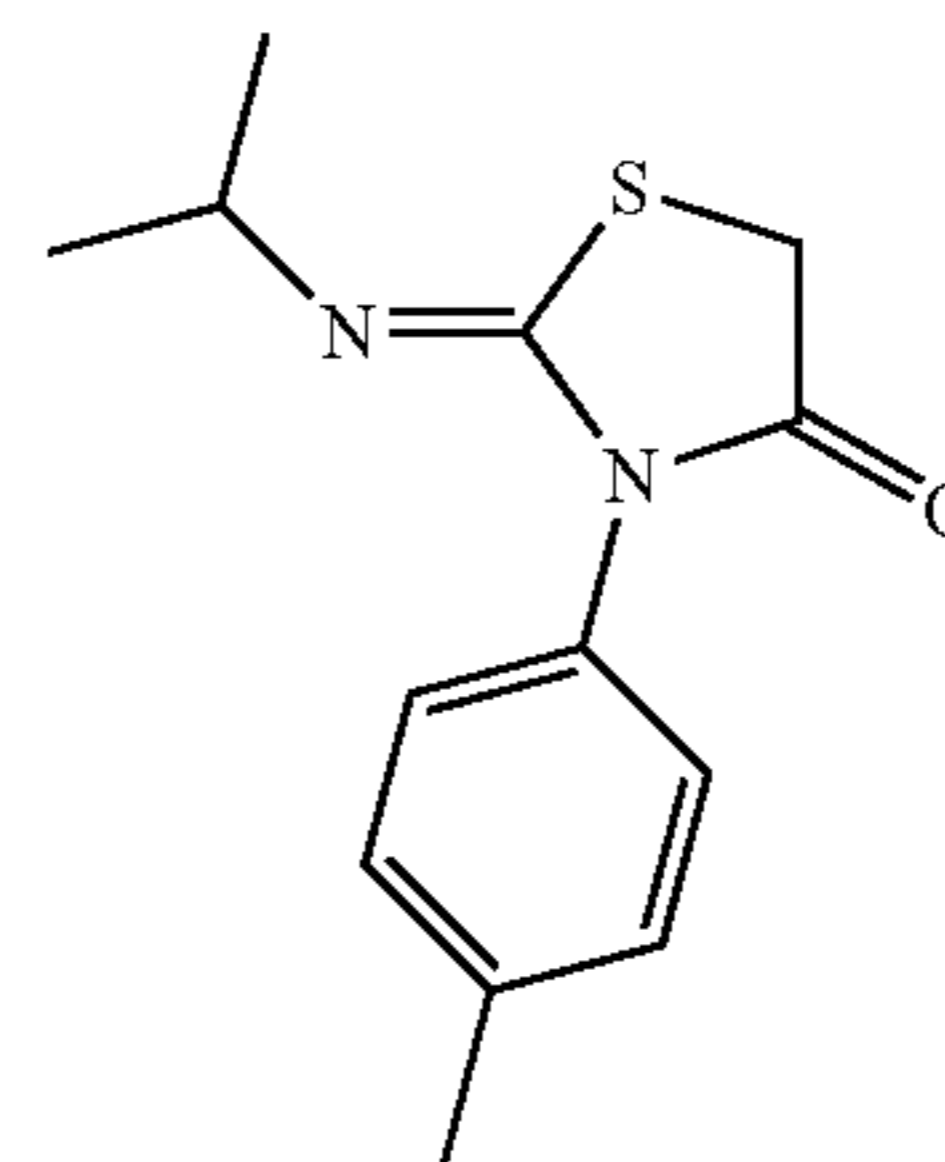
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7.34-7.26 (m, 3H), 7.14-7.08 (m, 1H), 4.00 (s, 2H), 3.50 (hept, J=6.4 Hz, 1H), 2.16 (s, 3H), 1.12 (d, J=6.4 Hz, 3H), 1.11 (d, J=6.4 Hz, 3H).



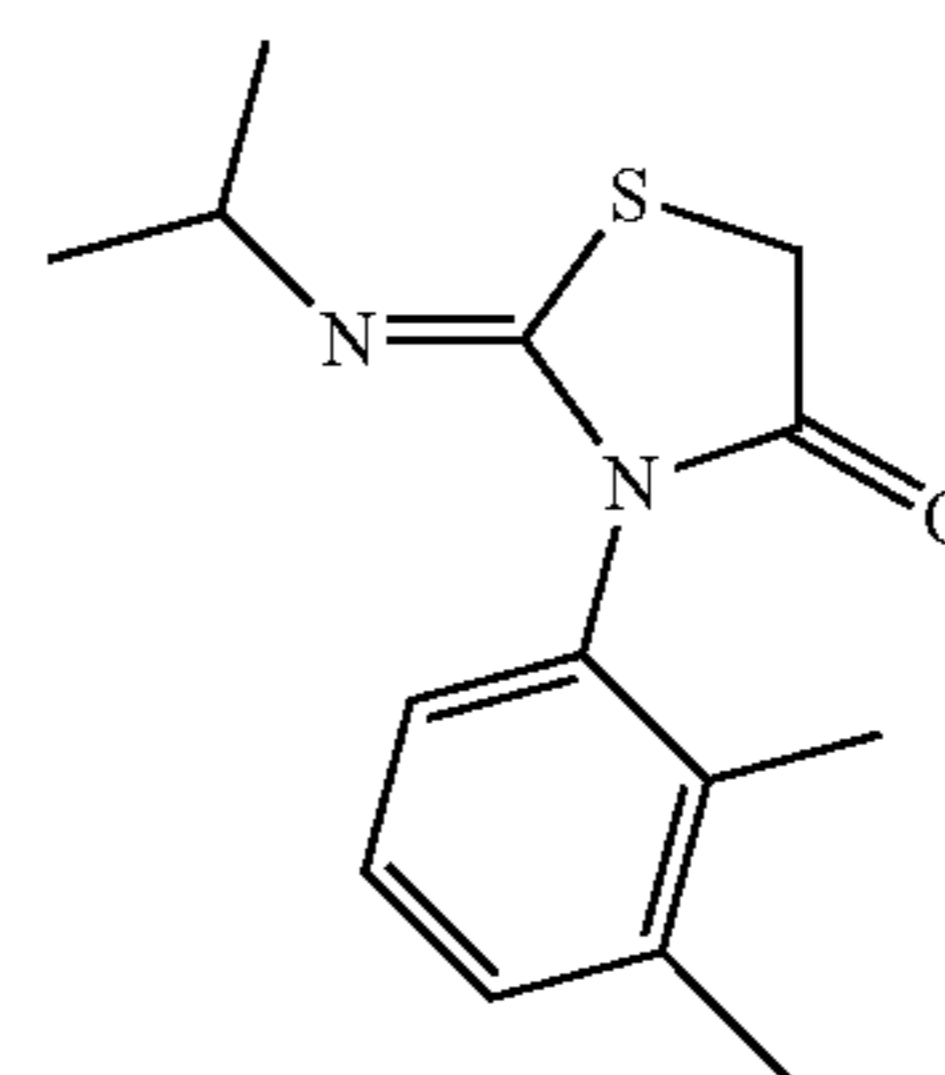
Scaffold 3

2-[4(Z)-Isopropylimino]-3-m-tolyl-thiazolidin-4-one is obtained following Method A and starting from m-tolyl-isothiocyanate (3.0 g, 20.10 mmol), isopropylamine (1.19 g, 20.10 mmol), and methyl bromoacetate (3.08 g, 20.1 mmol). LC-MS: t_R=0.65 min, [M+1]⁺=249; ¹H NMR (CDCl₃): δ 7.37-7.30 (m, 1H), 7.21-7.17 (m, 1H), 7.08-7.03 (m, 2H), 3.96 (s, 2H), 3.50 (hept, J=6.4 Hz, 1H), 2.40 (s, 3H), 1.14 (d, J=6.4 Hz, 6H).



Scaffold 4

2-[(Z)-Isopropylimino]-3-p-tolyl-thiazolidin-4-one is obtained following Method A and starting from p-tolyl-isothiocyanate (3.0 g, 20.10 mmol), isopropylamine (1.19 g, 20.10 mmol), and methyl bromoacetate (3.08 g, 20.1 mmol). LC-MS: t_R=0.64 min, [M+1]⁺=249; ¹H NMR (CDCl₃): δ 7.28-7.24 (m, 2H), 7.16-7.12 (m, 2H), 3.96 (s, 2H), 3.50 (hept, J=6.4 Hz, 1H), 2.39 (s, 3H), 1.14 (d, J=6.4 Hz, 6H).

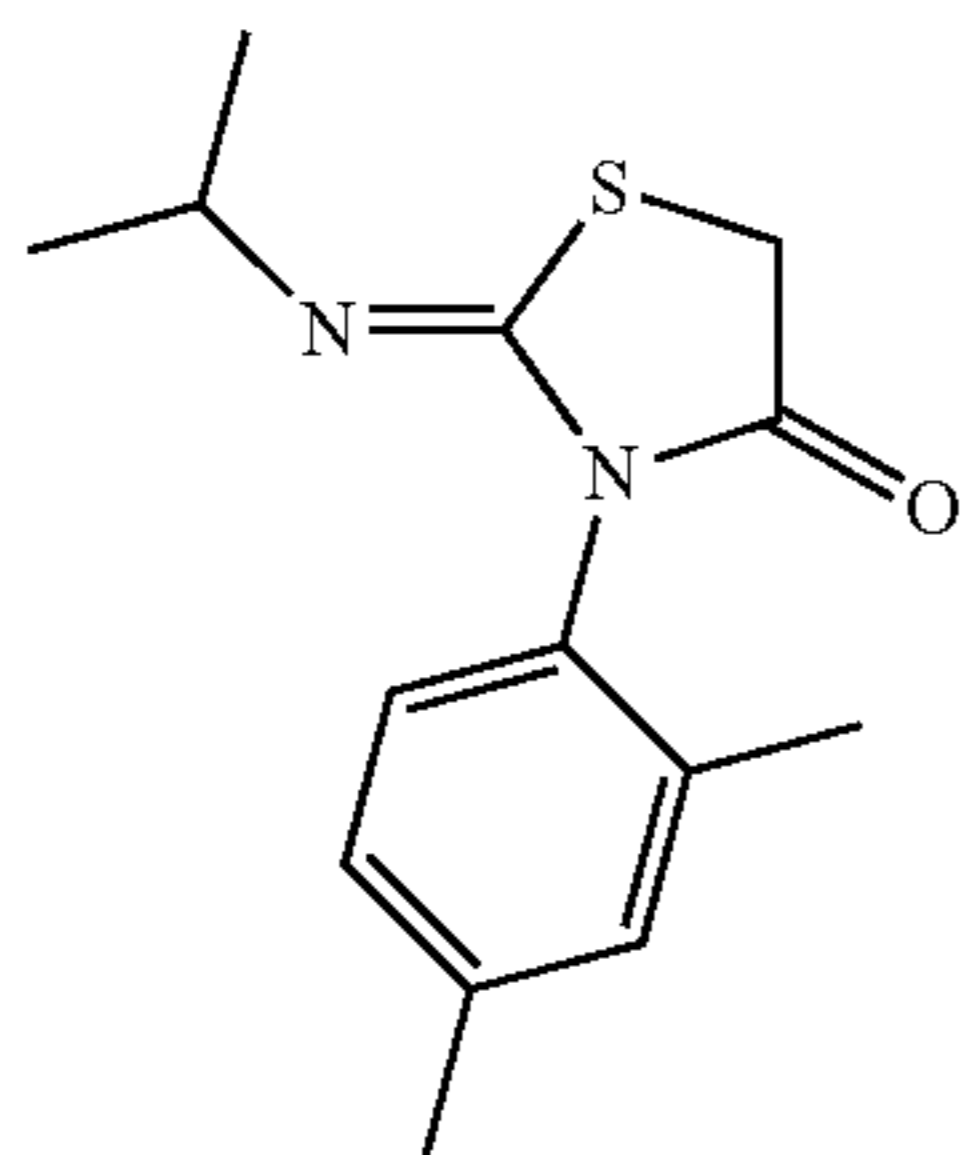


Scaffold 5

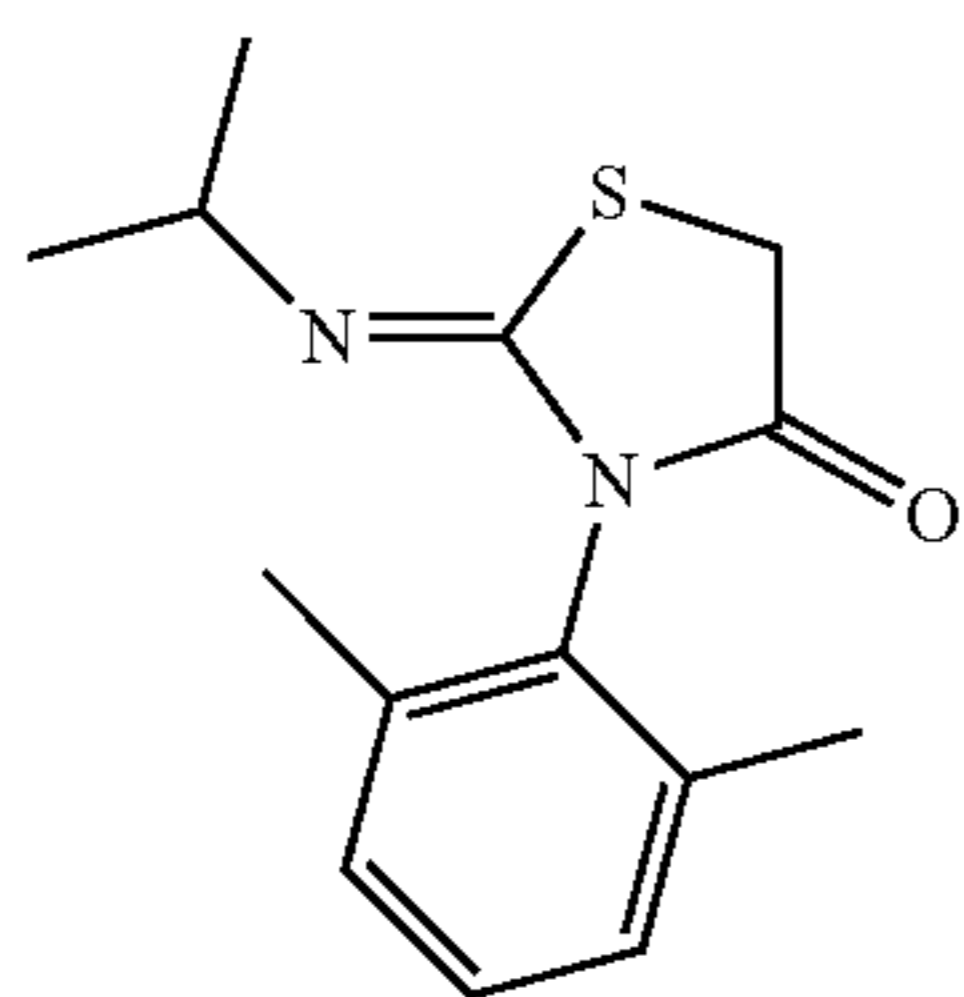
2-[(Z)-Isopropylimino]-3-(2,3-dimethylphenyl)-thiazolidin-4-one is obtained following Method A and starting from 2,3-dimethylphenylisothiocyanate (3.0 g, 18.38 mmol), isopropylamine (1.09 g, 18.38 mmol), and methyl bromoacetate (2.81 g, 18.38 mmol). LC-MS: t_R=0.74 min, [M+1]⁺=263; ¹H

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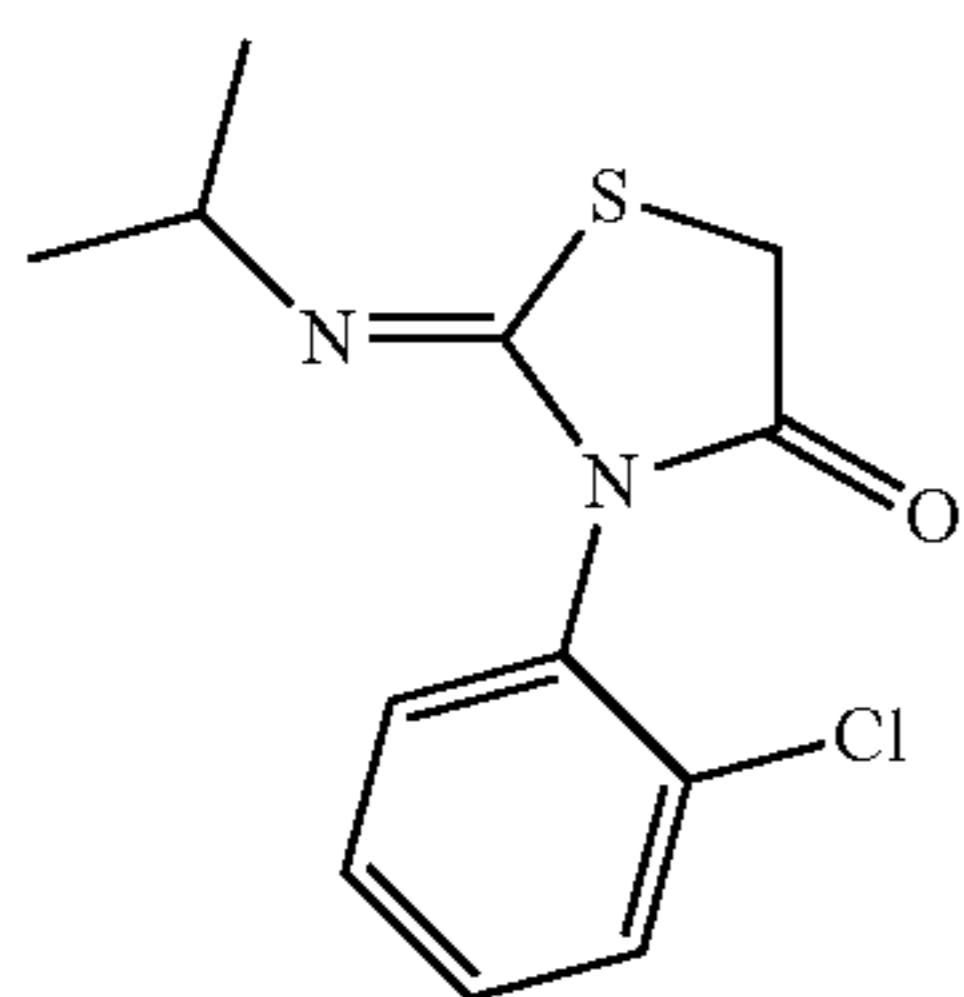
NMR (CDCl₃): 7.22-7.14 (m, 2H), 6.98-6.93 (m, 1H), 3.98 (s, 2H), 3.48 (hept, J=6.4 Hz, 1H), 2.32 (s, 3H), 2.02 (s, 3H), 1.10 (d, J=6.4 Hz, 6H).



2-[(Z)-Isopropylimino]-3-(2,4-dimethylphenyl)-thiazolidin-4-one is obtained following Method A and starting from 2,4-dimethylphenylisothiocyanate (3.0 g, 18.38 mmol), isopropylamine (1.64 g, 27.57 mmol), and methyl bromoacetate (2.81 g, 18.38 mmol). LC-MS: $t_R=0.75$ min, $[M+1]^+=263$; ¹H NMR (CDCl₃): 7.12-7.06 (m, 2H), 6.98 (d, J=8.2 Hz, 1H), 3.98 (s, 2H), 3.49 (hept, J=6.0 Hz, 1H), 2.35 (s, 3H), 2.12 (s, 3H), 1.12 (d, J=5.9 Hz, 3H), 1.11 (d, J=6.4 Hz, 3H).



2-[(Z)-Isopropylimino]-3-(2,6-dimethylphenyl)-thiazolidin-4-one is obtained following Method A and starting from 2,6-dimethylphenylisothiocyanate (3.0 g, 18.38 mmol), isopropylamine (1.09 g, 18.38 mmol), and methyl bromoacetate (2.81 g, 18.38 mmol). LC-MS: $t_R=0.80$ min, $[M+1]^+=263$; ¹H NMR (CDCl₃): 7.24-7.10 (m, 3H), 4.00 (s, 2H), 3.48 (hept, J=6.4 Hz, 1H), 2.14 (s, 6H), 1.10 (d, J=6.4 Hz, 6H).



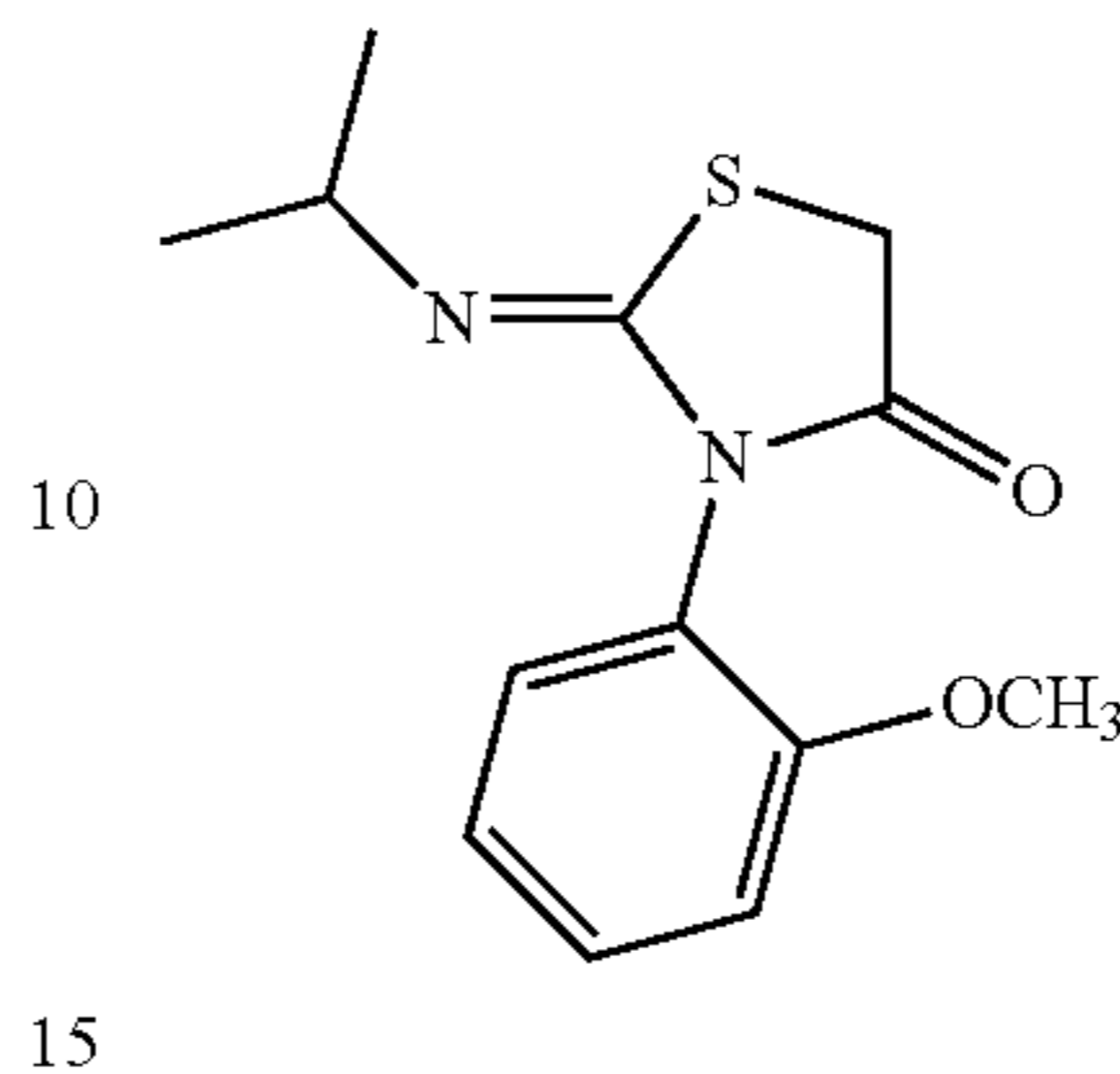
2-[(Z)-Isopropylimino]-3-(2-chlorophenyl)-thiazolidin-4-one is obtained following Method A and starting from 2-chlorophenylisothiocyanate (3.0 g, 17.68 mmol), isopropylamine (1.04 g, 17.68 mmol), and methyl bromoacetate (2.70 g, 17.68 mmol). LC-MS: $t_R=0.81$ min, $[M+1]^+=269$; ¹H NMR (CDCl₃): 7.53-7.48 (m, 1H), 7.40-7.34 (m, 2H), 7.30-7.24

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(m, 1H), 4.07-3.93 (m, 2H), 3.48 (hept, J=6.4 Hz, 1H), 1.11 (d, J=6.4 Hz, 3H), 1.10 (d, J=6.4 Hz, 3H).

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Scaffold 6



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2-[(Z)-Isopropylimino]-3-(2-methoxyphenyl)-thiazolidin-4-one is obtained following Method A and starting from 2-methoxyphenylisothiocyanate (3.0 g, 18.16 mmol), isopropylamine (1.08 g, 18.16 mmol), and methyl bromoacetate (2.78 g, 18.16 mmol). LC-MS: $t_R=0.62$ min, $[M+1]^+=265$; ¹H NMR (CDCl₃): 7.42-7.35 (m, 1H), 7.19-7.14 (m, 1H), 7.06-6.98 (m, 2H), 3.80 (s, 3H), 3.55-3.42 (m, 1H), 1.11 (t, 5.9 Hz, 6H).

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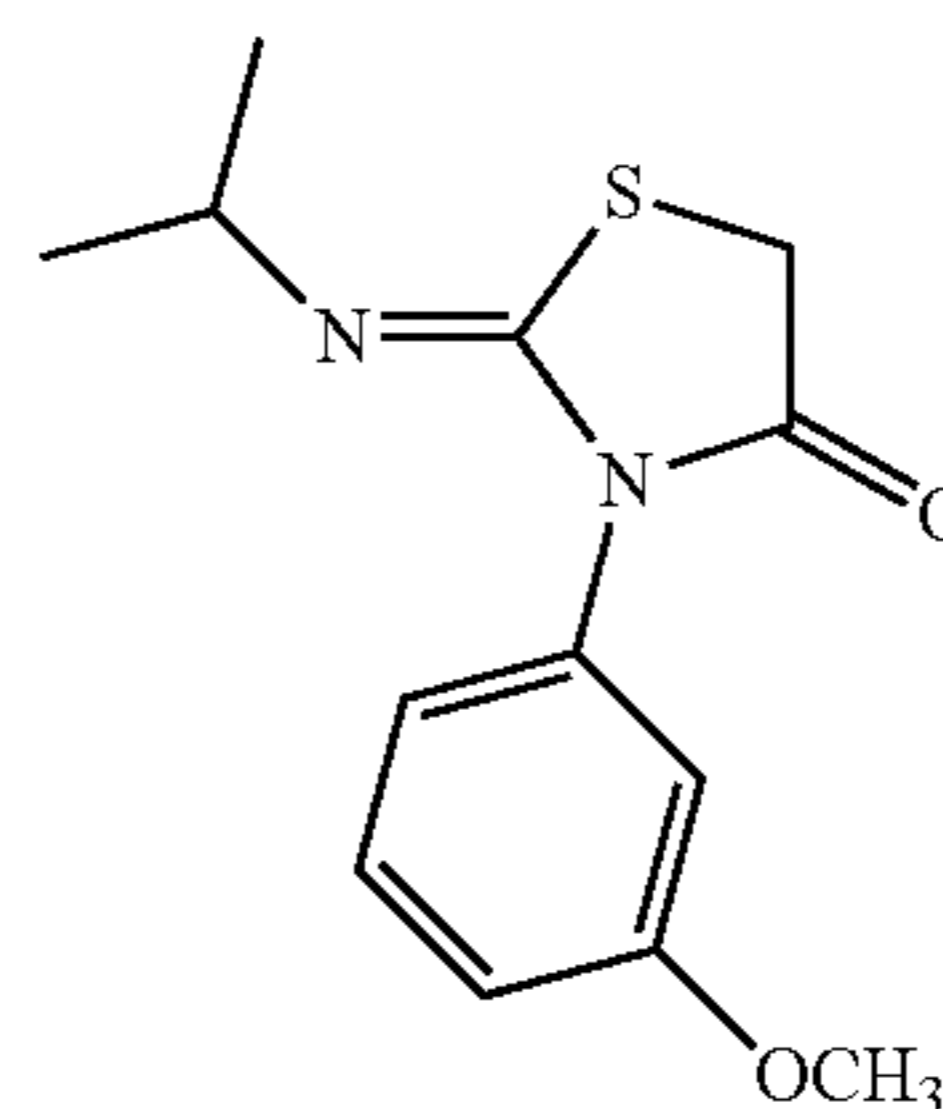
Scaffold 9

Scaffold 10

Scaffold 7

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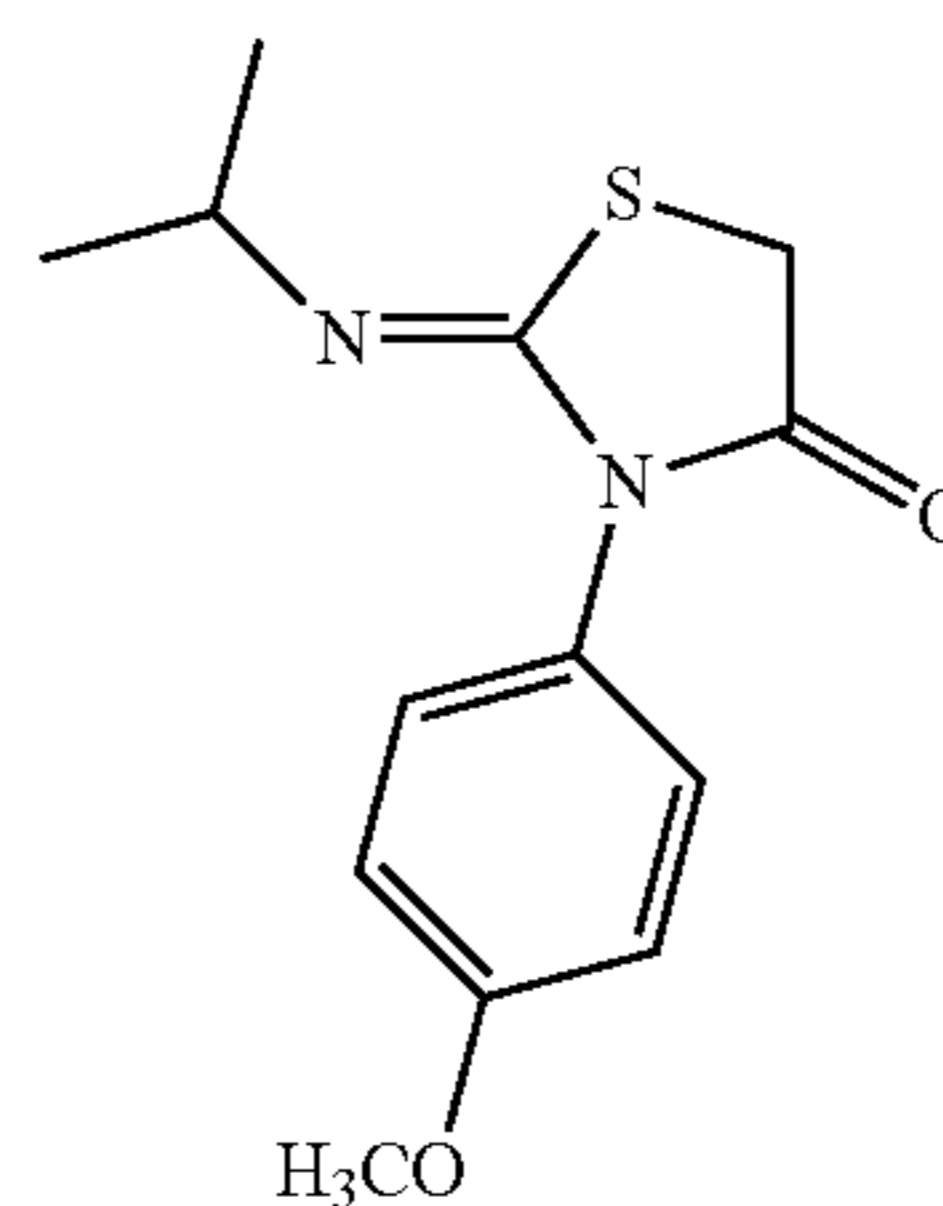
2-[(Z)-Isopropylimino]-3-(3-methoxyphenyl)-thiazolidin-4-one is obtained following Method A and starting from 3-methoxyphenylisothiocyanate (3.0 g, 18.16 mmol), isopropylamine (1.08 g, 18.16 mmol), and methyl bromoacetate (2.78 g, 18.16 mmol). LC-MS: $t_R=0.65$ min, $[M+1]^+=265$; ¹H NMR (CDCl₃): 7.35 (t, J=7.8 Hz, 1H), 6.95-6.90 (m, 1H), 6.87-6.83 (m, 1H), 6.82-6.80 (m, 1H), 3.96 (s, 2H), 3.82 (s, 3H), 3.54-3.45 (m, 1H), 1.13 (d, J=5.9 Hz, 6H).

Scaffold 8

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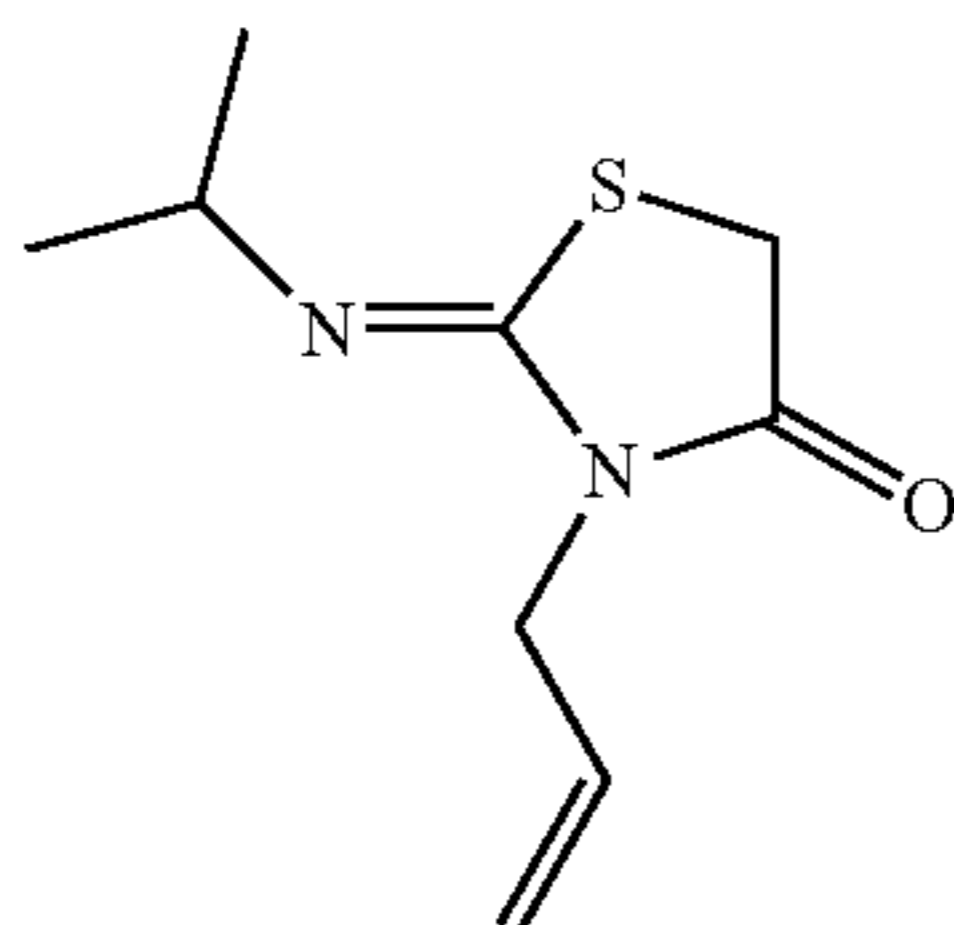
Scaffold 11

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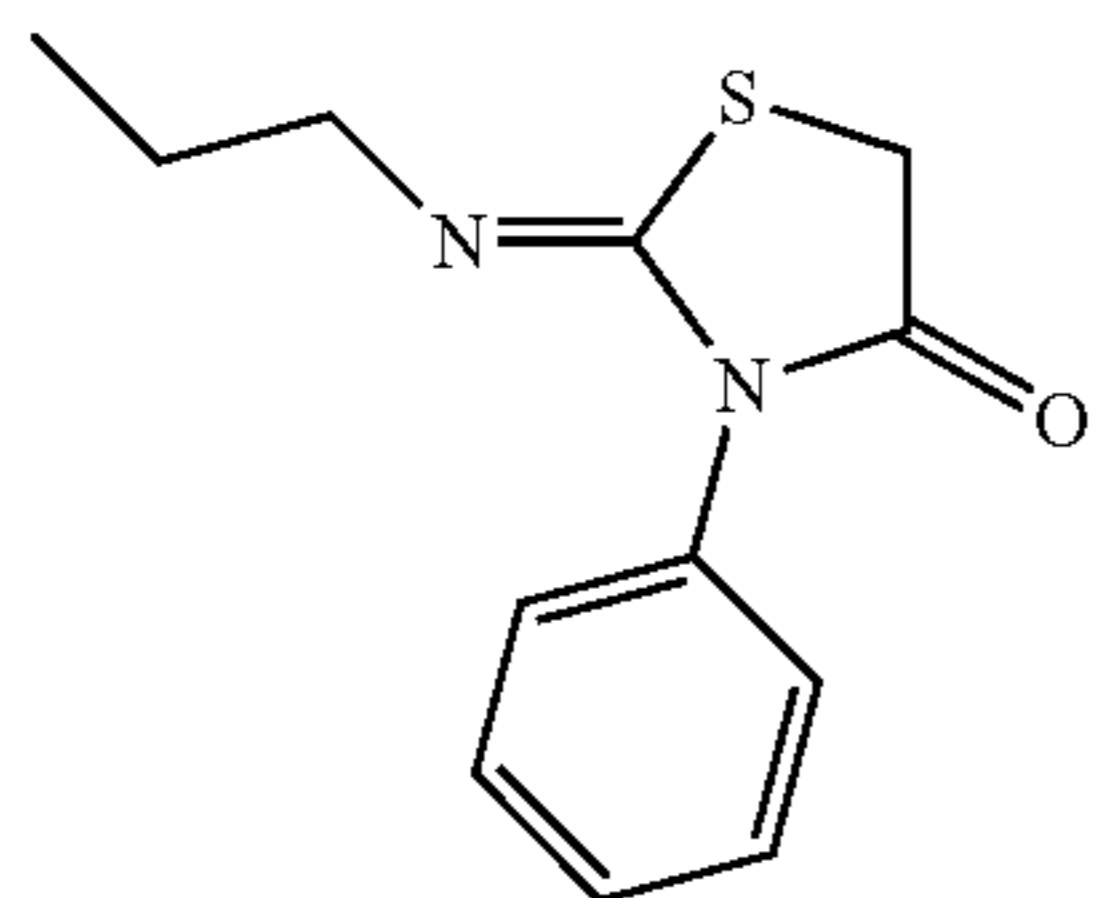
2-[(Z)-Isopropylimino]-3-(4-methoxyphenyl)-thiazolidin-4-one is obtained following Method A and starting from 4-methoxyphenylisothiocyanate (3.0 g, 18.16 mmol), isopropylamine (1.08 g, 18.16 mmol), and methyl bromoacetate

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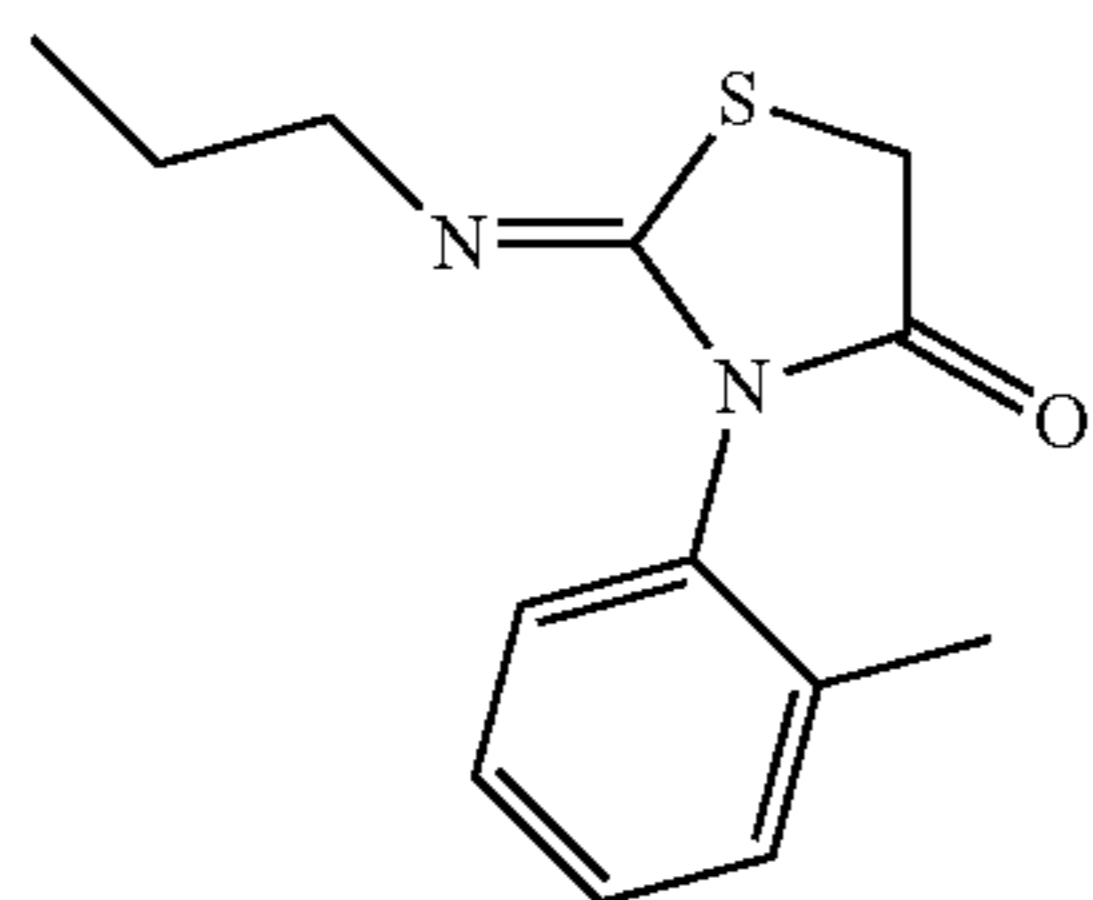
(2.78 g, 18.16 mmol). LC-MS: $t_R=0.62$ min, $[M+1]^+=265$; 1H NMR ($CDCl_3$): δ 7.20-7.14 (m, 2H), 7.00-6.94 (m, 2H), 3.96 (s, 2H), 3.84 (s, 3H), 3.51 (hept, $J=6.4$ Hz, 1H), 1.14 (d, $J=6.4$ Hz, 6H).



2-[(Z)-Isopropylimino]-3-allyl-thiazolidin-4-one is obtained following Method A and starting from allylisothiocyanate (5.95 g, 60 mmol), isopropylamine (3.55 g, 60 mmol), and methyl bromoacetate (9.18 g, 60 mmol). LC-MS: $t_R=0.55$ min, $[M+1]^+=199$; 1H NMR ($CDCl_3$): δ 5.82-5.69 (m, 1H), 5.10-5.02 (m, 2H), 4.17-4.13 (m, 2H), 4.01 (s, 2H), 3.39 (hept, $J=6.1$ Hz, 1H), 1.10 (d, $J=5.9$ Hz, 6H).



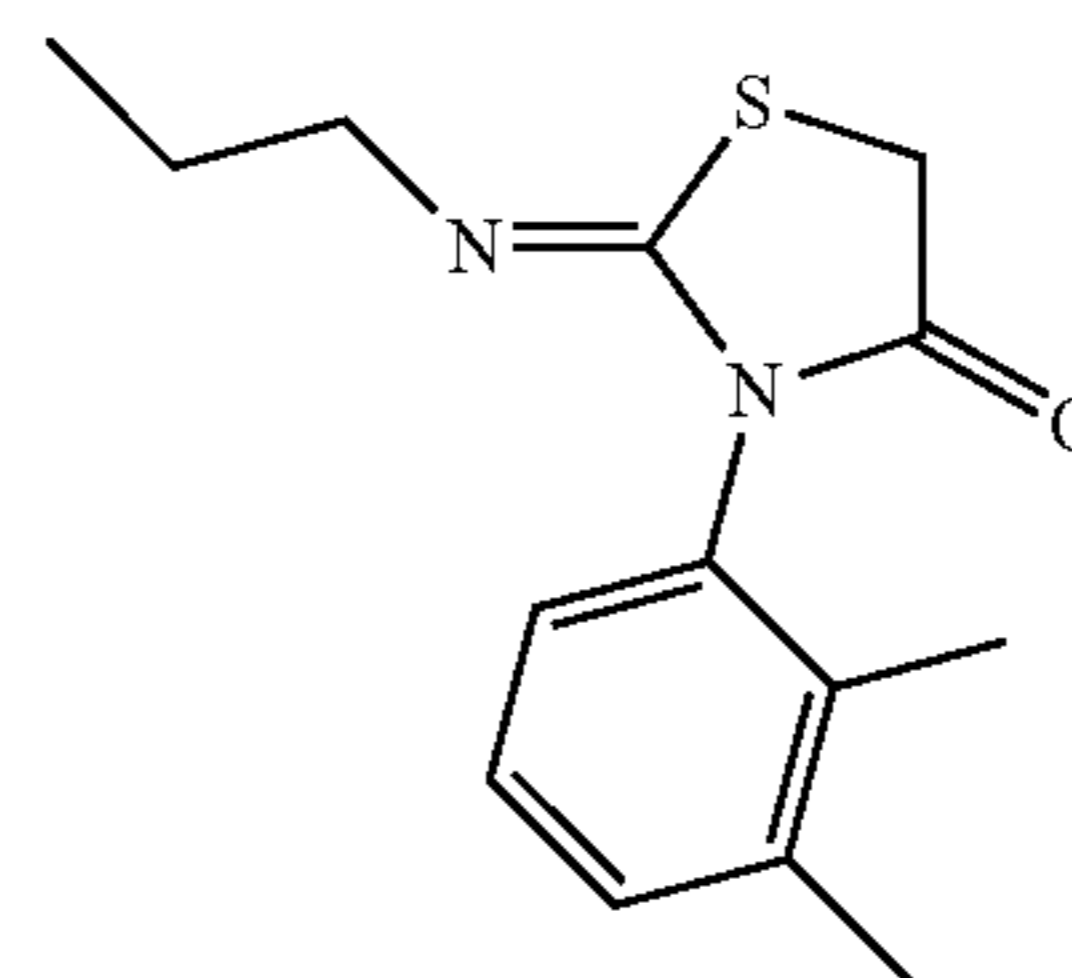
3-Phenyl-2-[(Z)-propylimino]-thiazolidin-4-one is prepared as described in Method B. LC-MS: $t_R=0.60$ min, $[M+1]^+=235$, 1H NMR ($CDCl_3$): δ 7.51-7.36 (m, 3H), 7.28-7.24 (m, 2H), 3.99 (s, 2H), 3.27 (t, $J=7.0$ Hz, 2H), 1.60 (hex, $J=7.0$ Hz, 2H), 0.91 (t, $J=7.6$ Hz, 3H).



2-[(Z)-Propylimino]-3-o-tolyl-thiazolidin-4-one is obtained following Method B and starting from toluidine (2.21 g, 20.6 mmol), chloroacetyl chloride (2.32 g, 20.6 mmol) and n-propylisothiocyanate (1.62 g, 16.0 mmol). LC-MS: $t_R=0.68$ min, $[M+1]^+=249$. 1H NMR ($CDCl_3$): δ 7.34-7.26 (m, 3H), 7.14-7.09 (m, 1H), 4.01 (s, 2H), 3.34-3.18 (m, 2H), 2.18 (s, 3H), 1.58 (hept, $J=7.0$ Hz, 2H), 0.88 (t, $J=7.0$ Hz, 3H).

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Scaffold 15



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Scaffold 12

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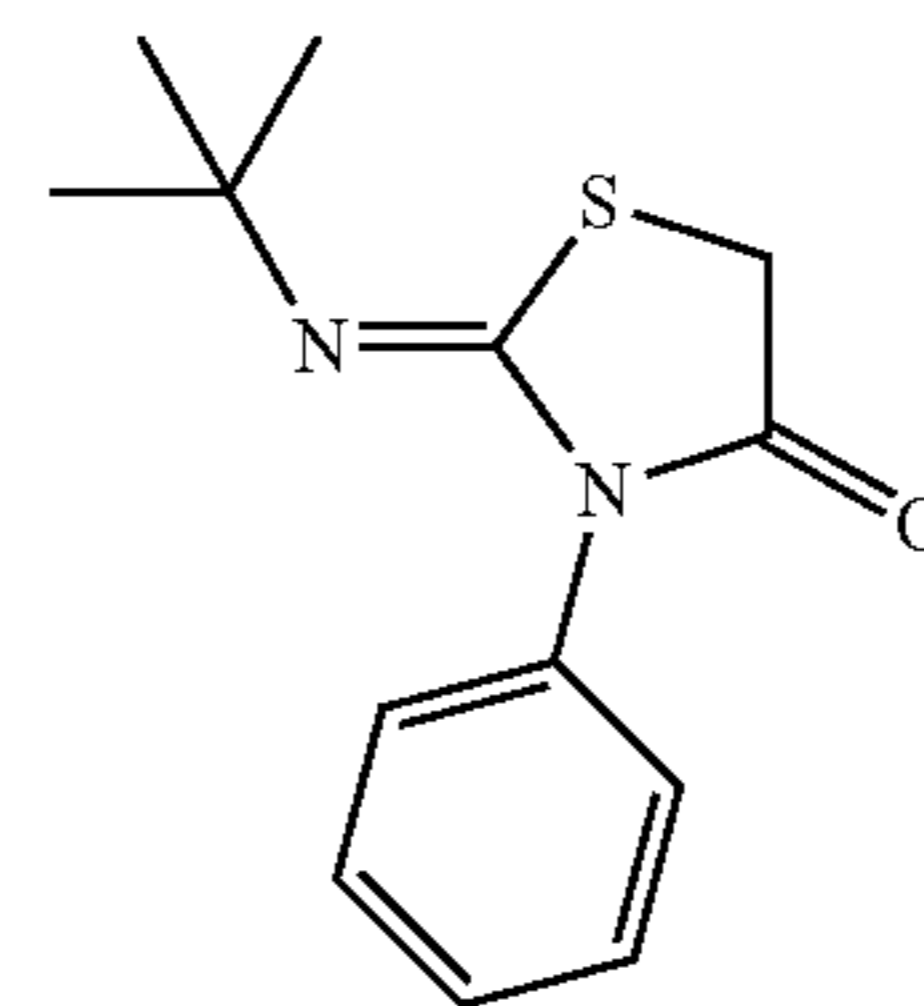
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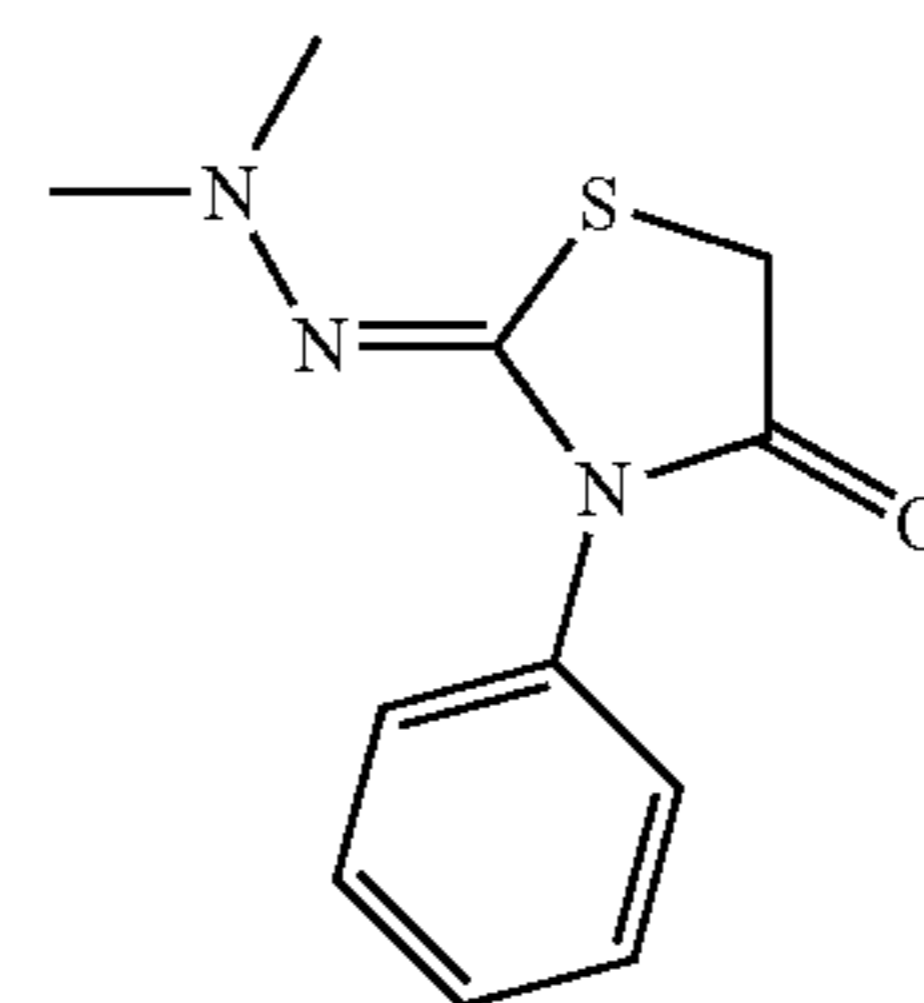
2-[(Z)-Propylimino]-3-(2,3-dimethylphenyl)-thiazolidin-4-one is obtained following Method B and starting from 2,3-dimethylaniline (3.36 g, 27.8 mmol), chloroacetyl chloride (3.14 g, 27.7 mmol) and n-propylisothiocyanate (2.05 g, 20.2 mmol). LC-MS: $t_R=0.71$ min, $[M+1]^+=263$. 1H NMR ($CDCl_3$): δ 7.22-7.16 (m, 2H), 6.98-6.94 (m, 1H), 4.00 (s, 2H), 3.34-3.18 (m, 2H), 2.32 (s, 3H), 2.05 (s, 3H), 1.57 (hex, $J=7.3$ Hz, 2H), 0.88 (t, $J=7.6$ Hz, 3H).

Scaffold 16



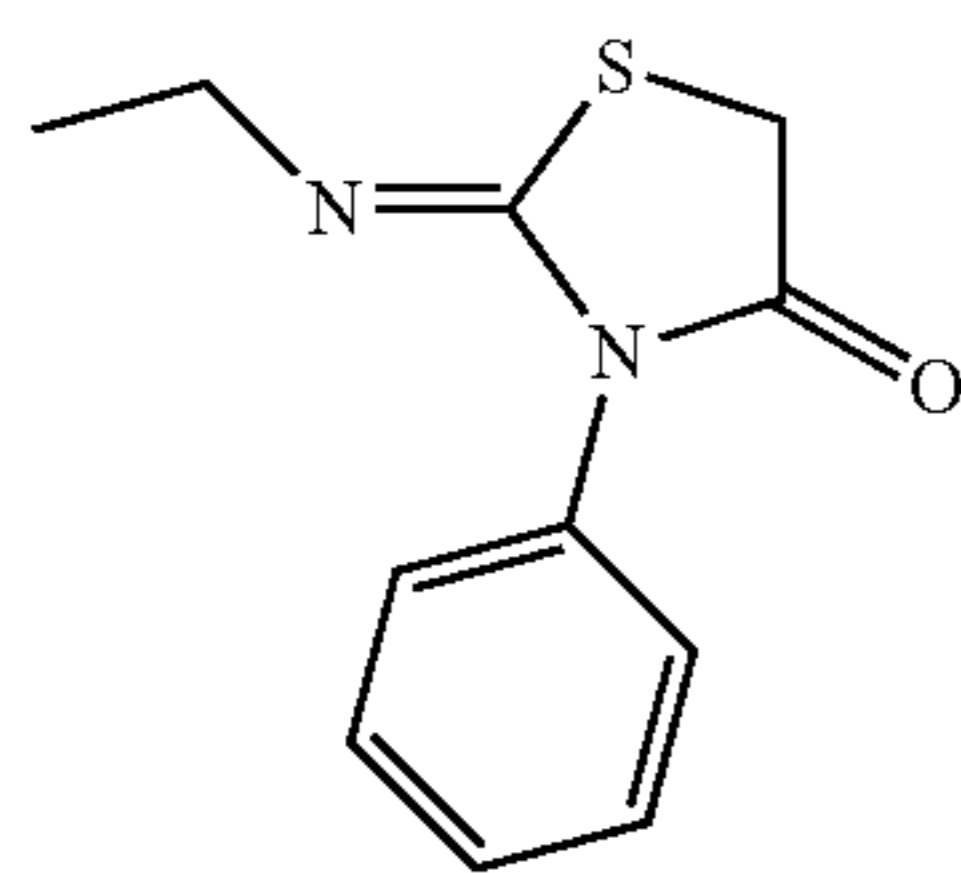
2-[(Z)-tert.-Butylimino]-3-phenyl-thiazolidin-4-one (6.79 g) is obtained as an off-white crystalline powder following Method A and starting from phenylisothiocyanate (5.0 g, 37.0 mmol), tert. butylamine (2.71 g, 37.0 mmol), and methyl bromoacetate (5.66 g, 37.0 mmol). LC-MS: $t_R=0.69$ min, $[M+1]^+=249$, 1H NMR ($CDCl_3$): δ 7.46-7.31 (m, 3H), 7.24-7.19 (m, 2H), 3.98 (s, 2H), 1.26 (s, 9H).

Scaffold 17



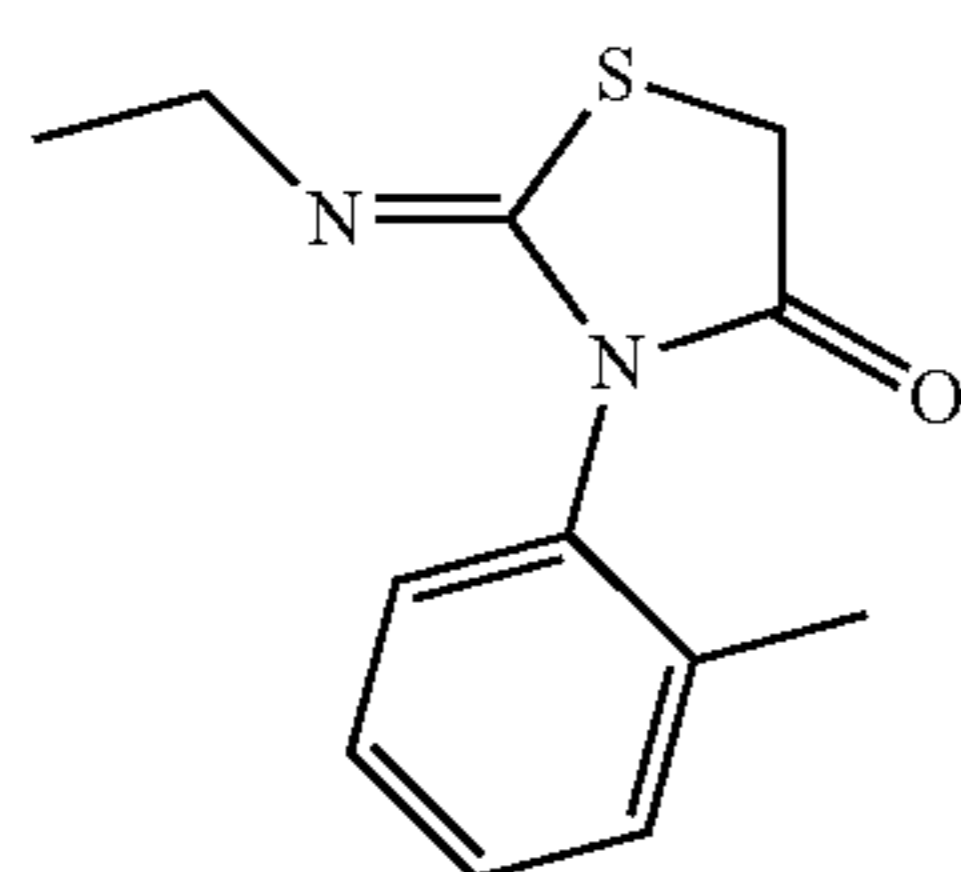
2-[(Z)-(Dimethyl-hydrazono)]-3-phenyl-thiazolidin-4-one is obtained following Method A and starting from phenylisothiocyanate (4.05 g, 30.0 mmol), dimethylhydrazine (asym.) (1.80 g, 30.0 mmol), and methyl bromoacetate (4.59 g, 30.0 mmol). LC-MS: $t_R=0.69$ min, $[M+1]^+=236$, 1H NMR ($CDCl_3$): δ 7.50-7.36 (m, 3H), 7.32-7.28 (m, 2H), 3.82 (s, 2H), 2.48 (s, 6H).

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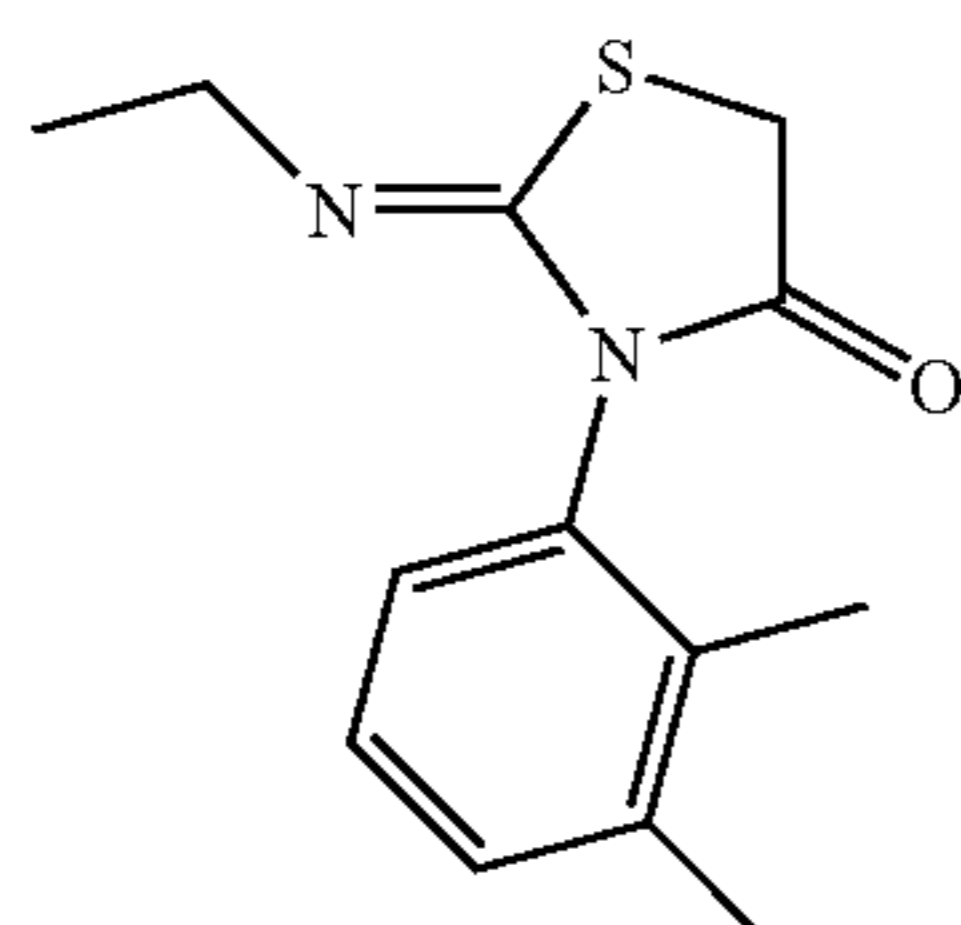
Scaffold 18

2-[(Z)-Ethylimino]-3-phenyl-thiazolidin-4-one (1.02 g) is obtained as an off-white powder following Method B and starting from 2-chloro-N-phenyl-acetamide (7.50 g, 44.2 mmol) and ethylisothiocyanate (3.85 g, 44.2 mmol). LC-MS: $t_R=0.48$ min, $[M+1]^+=221$. $^1\text{H NMR}$ (CDCl_3): δ 7.52-7.37 (m, 3H), 7.29-7.27 (m, 2H), 4.01 (s, 2H), 3.37 (q, $J=7.6$ Hz, 2H), 1.20 (t, $J=7.6$ Hz, 3H).



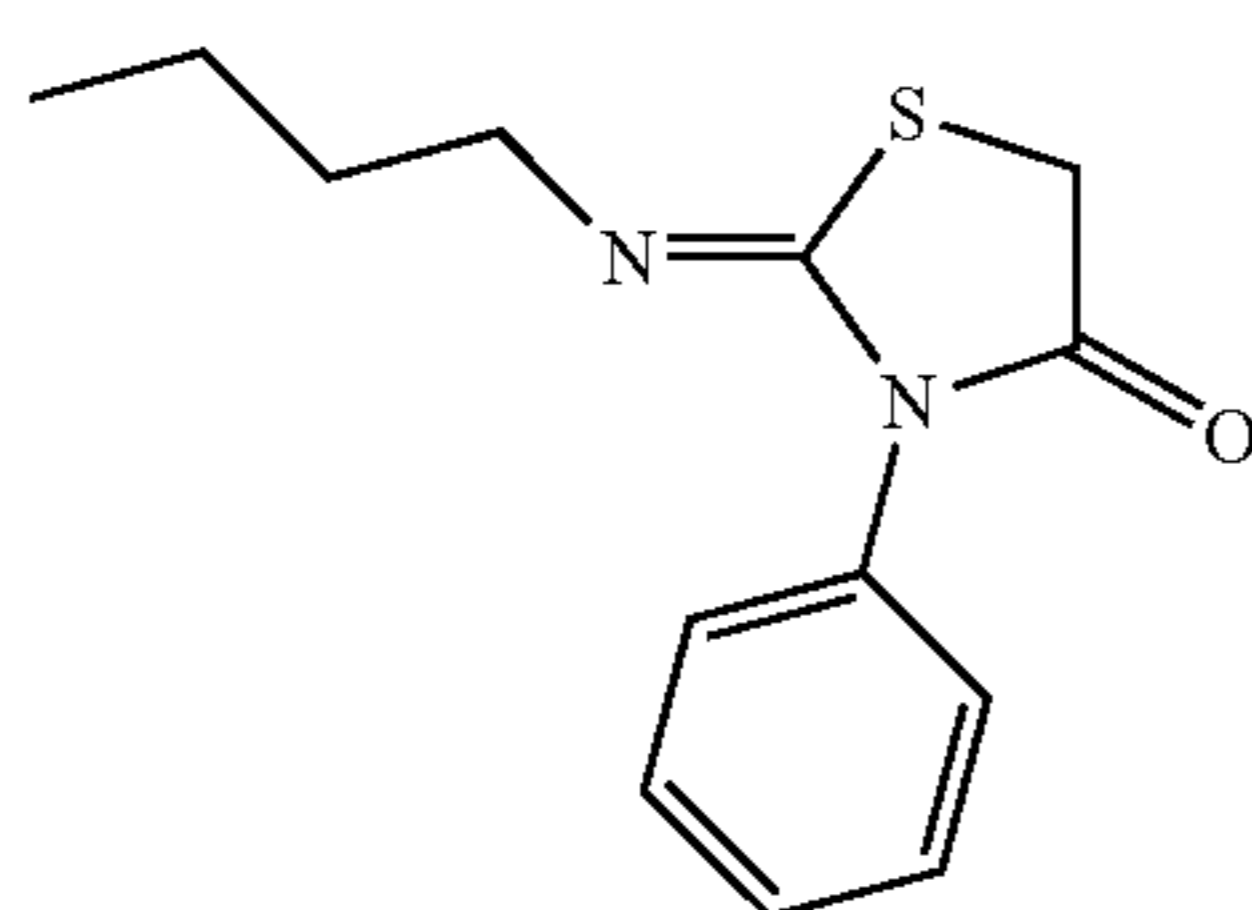
Scaffold 19

2-[(Z)-Ethylimino]-3-(2-methylphenyl)-thiazolidin-4-one is prepared following Method B and starting from o-tolylamine, chloroacetyl chloride and ethylisothiocyanate. LC-MS: $t_R=0.59$ min, $[M+1]^+=235$, $^1\text{H NMR}$ (CDCl_3): δ 7.36-7.28 (m, 3H), 7.15-7.10 (m, 1H), 4.01 (s, 2H), 3.41-3.30 (m, 2H), 2.19 (s, 3H), 1.20-1.13 (m, 3H).



Scaffold 20

2-[(Z)-Ethylimino]-3-(2,3-dimethylphenyl)-thiazolidin-4-one is prepared following Method B and starting from 2,3-dimethylaniline, chloroacetyl chloride and ethylisothiocyanate. LC-MS: $t_R=0.66$ min, $[M+1]^+=249$, $^1\text{H NMR}$ (CDCl_3): δ 7.24-7.19 (m, 2H), 7.00-6.96 (m, 1H), 4.01 (s, 2H), 3.45-3.27 (m, 2H), 2.34 (s, 3H), 2.05 (s, 3H), 1.16 (t, $J=7.0$ Hz, 3H).

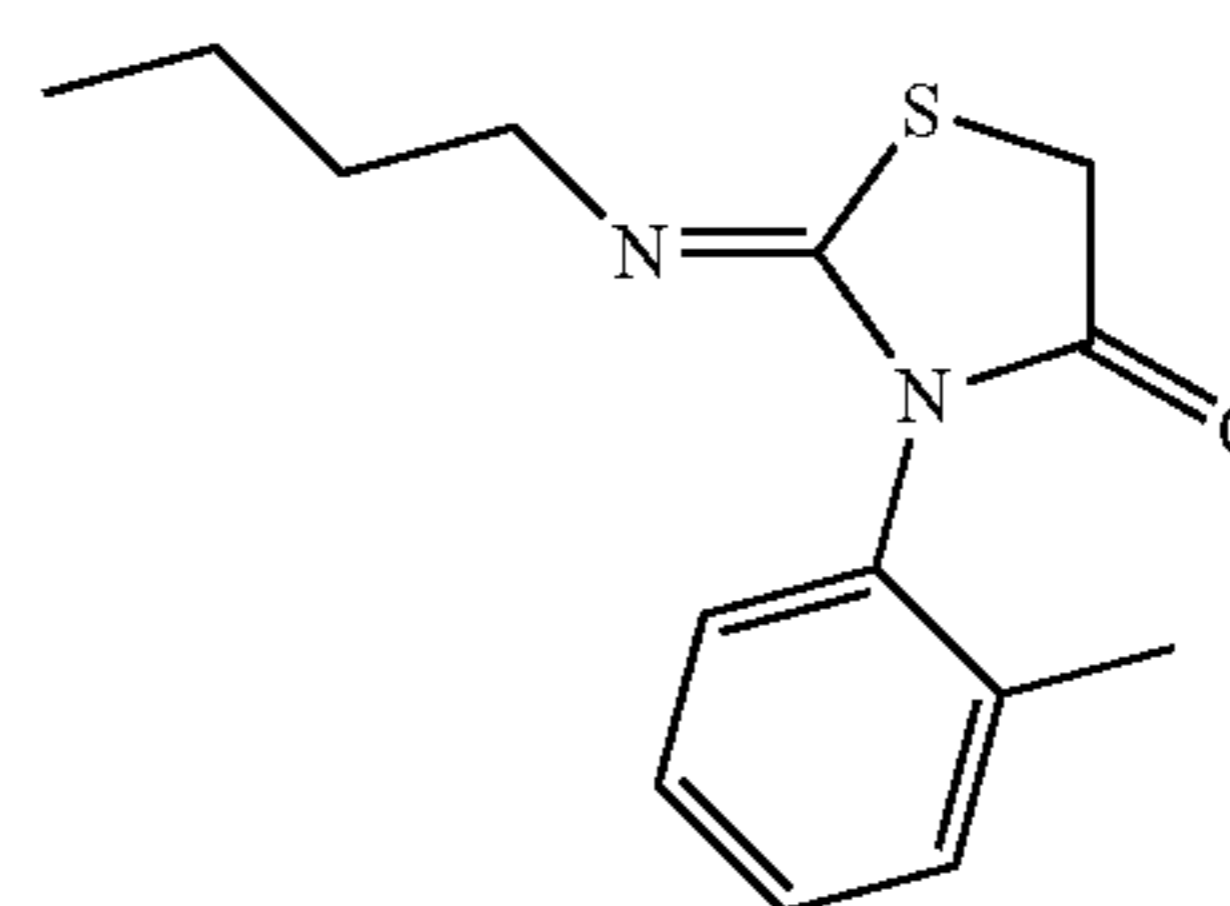


Scaffold 21

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2-[(Z)-n-butylimino]-3-phenyl-thiazolidin-4-one (1.80 g) is obtained as a pale beige powder following Method B and starting from 2-chloro-N-phenyl-acetamide (7.50 g, 44.2 mmol) and n-butylisothiocyanate (5.09 g, 44.2 mmol). LC-MS: $t_R=0.69$ min, $[M+1]^+=249$. $^1\text{H NMR}$ (CDCl_3): δ 7.51-7.37 (m, 3H), 7.29-7.25 (m, 2H), 4.00 (s, 2H), 3.31 (t, $J=7.0$ Hz, 2H), 1.62-1.52 (m, 2H), 1.41-1.28 (m, 2H), 0.92 (t, $J=7.0$ Hz, 3H).

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Scaffold 22

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2-[(Z)-n-butylimino]-3-(2-methylphenyl)-thiazolidin-4-one is prepared following Method B and starting from o-tolylamine, chloroacetyl chloride and n-butylisothiocyanate. LC-MS: $t_R=0.77$ min, $[M+1]^+=263$, $^1\text{H NMR}$ (CDCl_3): δ 7.35-7.28 (m, 3H), 7.14-7.10 (m, 1H), 4.01 (s, 2H), 3.38-3.22 (, 2H), 2.18 (s, 3H), 1.59-1.47 (m, 2H), 1.38-1.25 (m, 2H), 0.90 (t, $J=7.0$ Hz, 3H).

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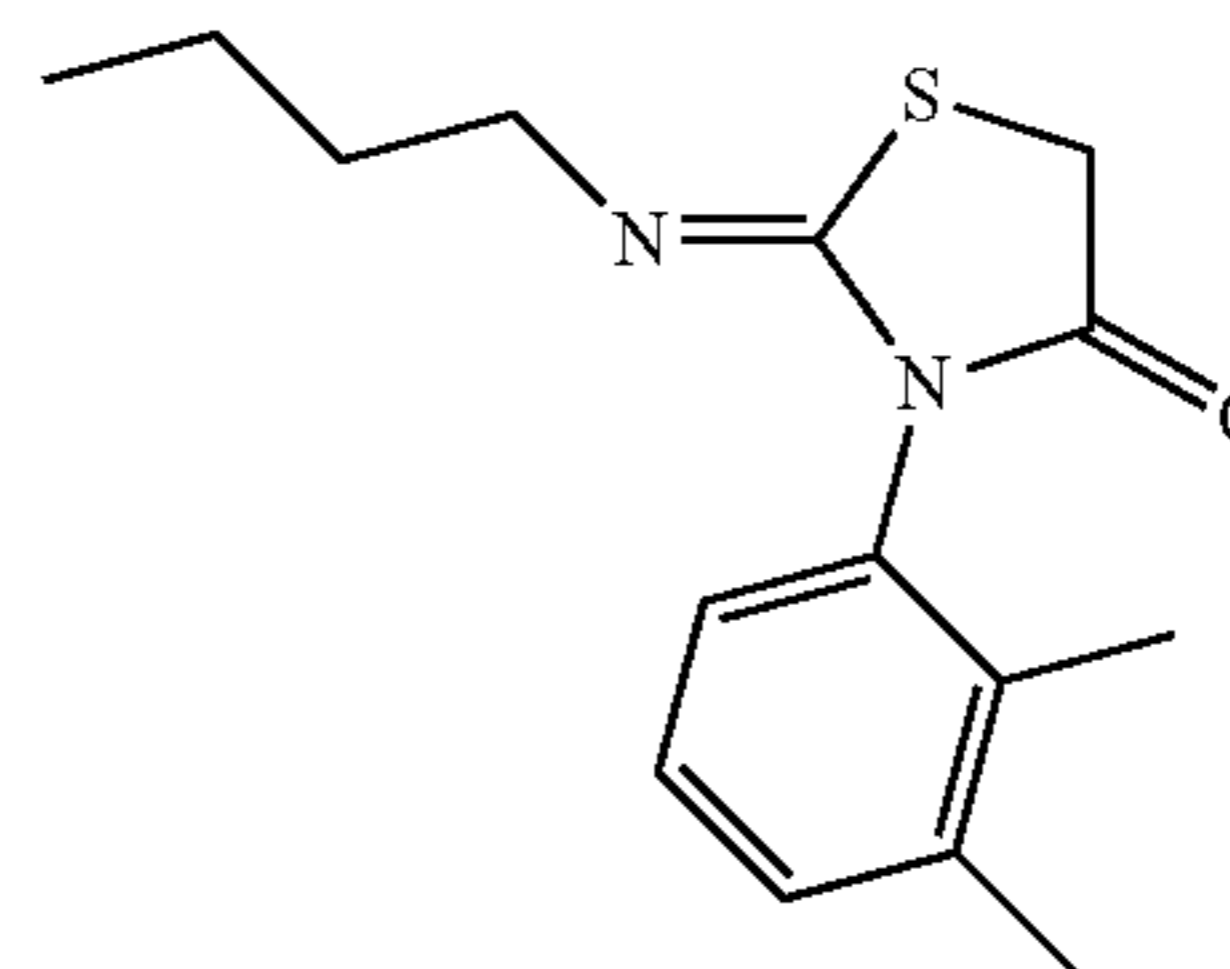
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rac-2-[(Z)-sec-Butylimino]-3-phenyl-thiazolidin-4-one (6.98 g) is obtained as a white powder following Method A and starting from sec-butylamine (2.70 g, 36.98 mmol), phenylisothiocyanate (5.00 g, 36.98 mmol) and methyl bromoacetate (5.66 g, 36.98 mmol). LC-MS: $t_R=0.68$ min, $[M+1]^+=249$, $^1\text{H NMR}$ (CDCl_3): δ 7.48-7.33 (m, 3H), 7.28-

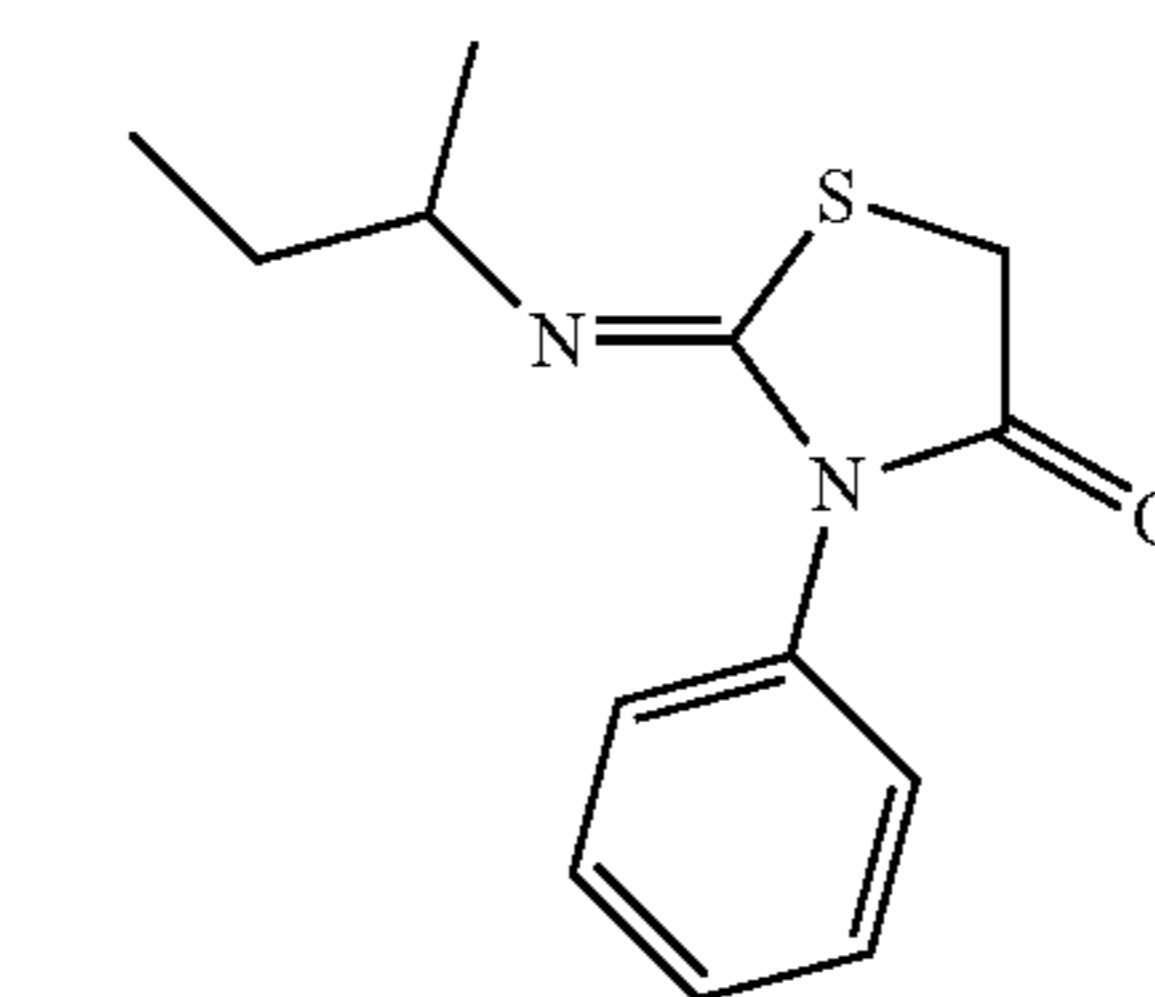
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Scaffold 23

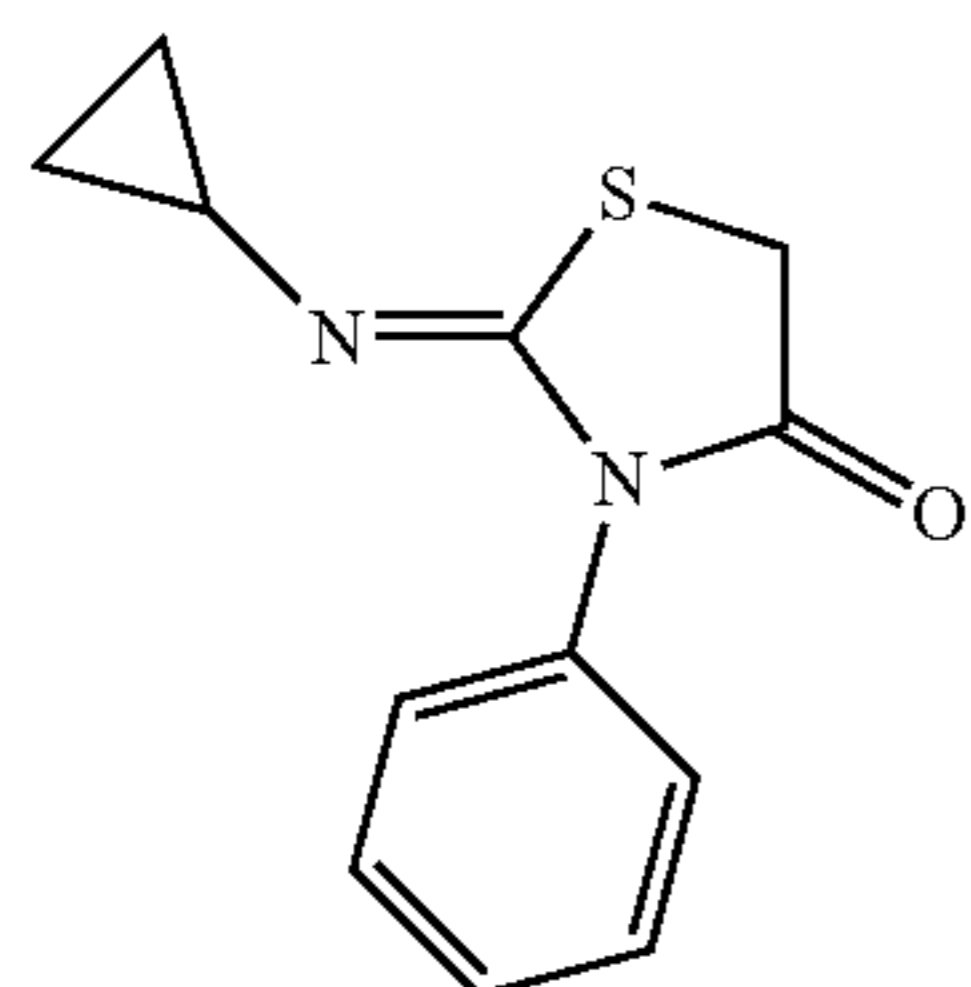
2-[(Z)-n-butylimino]-3-(2,3-dimethylphenyl)-thiazolidin-4-one is prepared following Method B and starting from 2,3-dimethylaniline, chloroacetyl chloride and n-butylisothiocyanate. LC-MS: $t_R=0.80$ min, $[M+1]^+=277$, $^1\text{H NMR}$ (CDCl_3): δ 7.23-7.16 (m, 2H), 6.99-6.94 (m, 1H), 4.01 (s, 2H), 3.38-3.23 (m, 2H), 2.33 (s, 3H), 2.05 (s, 3H), 1.59-1.49 (m, 2H), 1.38-1.25 (m, 2H), 0.91 (t, $J=7.0$ Hz, 3H).

Scaffold 24

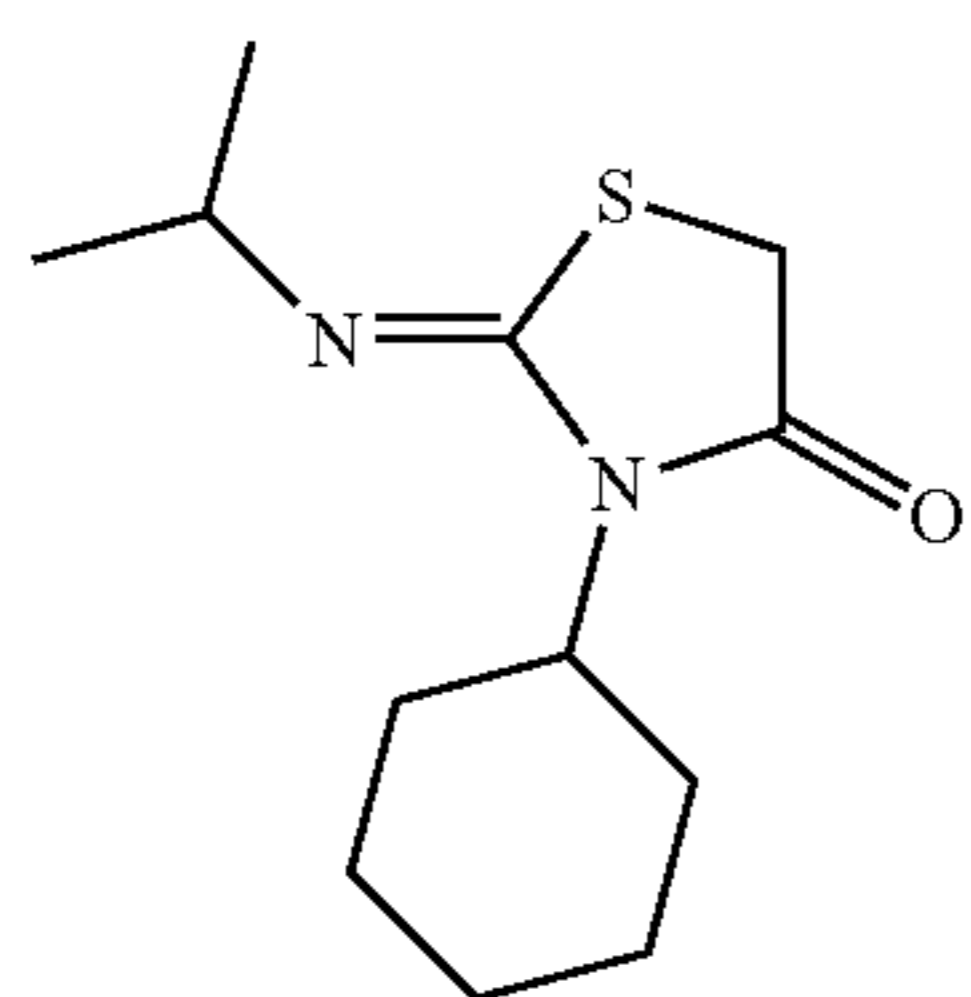


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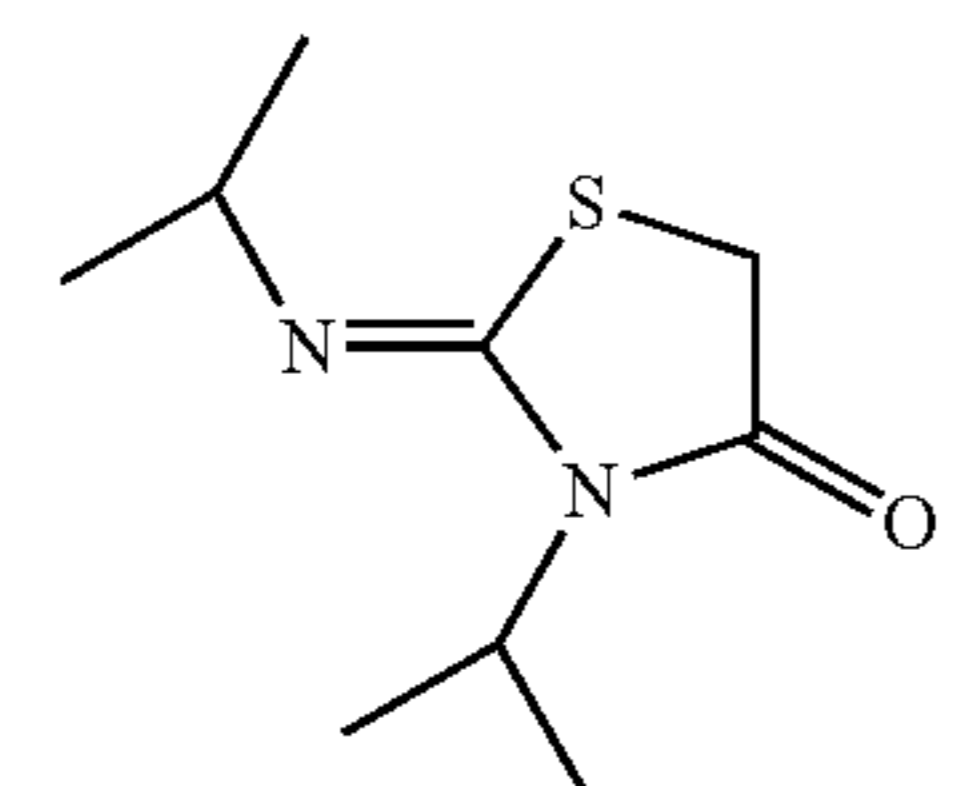
7.23 (m, 2H), 3.96 (s, 2H), 3.21 (hex, J=6.4 Hz, 1H), 1.52-1.39 (m, 2H), 1.09 (d, J=6.4 Hz, 3H), 0.82 (t, J=7.3 Hz, 3H).



2-[(Z)-Cyclopropylimino]-3-phenyl-thiazolidin-4-one (1.62 g) is obtained as a white powder following Method A and starting from cyclopropylamine (0.84 g, 14.8 mmol), phenylisothiocyanate (2.00 g, 14.8 mmol) and methyl bromoacetate (2.26 g, 14.8 mmol). LC-MS: $t_R=0.64$ min, $[M+1]^+=233$, 1H NMR ($CDCl_3$): δ 7.47-7.33 (m, 3H), 7.24-7.20 (m, 2H), 4.00 (s, 2H), 2.67 (hept, J=3.5 Hz, 1H), 0.82-0.75 (m, 2H), 0.64-0.59 (m, 2H).



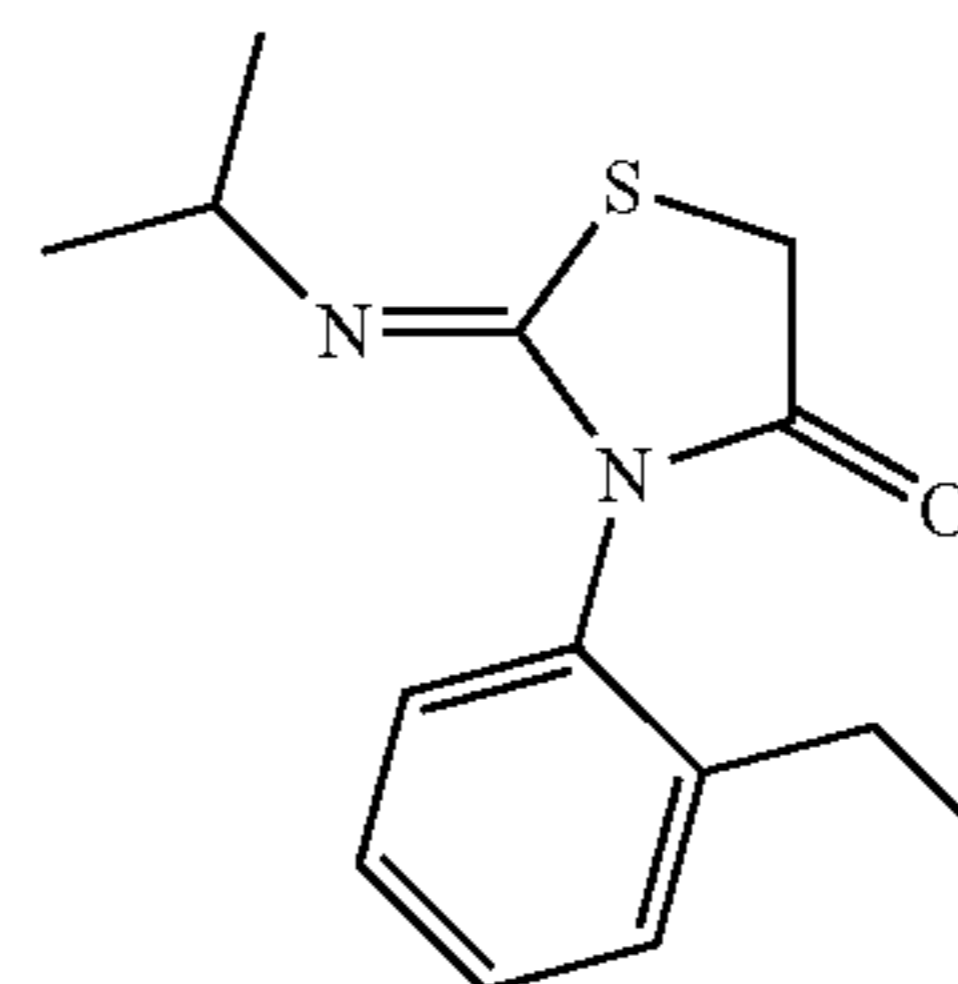
3-Cyclohexyl-2-[(Z)-isopropylimino]-thiazolidin-4-one is prepared starting from cyclohexylamine, chloroacetyl chloride and isopropylisothiocyanate following Method B. LC-MS: $t_R=0.83$ min, $[M+1]^+=241$, 1H NMR ($CDCl_3$): δ 4.30 (tt, J=3.6, 12.0 Hz, 1H), 3.69 (s, 2H), 3.37 (hept, J=6.4 Hz, 1H), 2.40-2.25 (m, 2H), 1.84-1.75 (m, 2H), 1.64-1.50 (m, 2H), 1.40-1.20 (m, 4H), 1.14 (d, J=6.4 Hz, 6H).



2-[(Z)-Isopropylimino]-3-isopropyl-thiazolidin-4-one (2.68 g) is obtained as a colourless oil following Method A and starting from isopropylamine (1.17 g, 19.8 mmol), isopropylisothiocyanate (2.00 g, 19.8 mmol) and methyl bromoacetate (3.02 g, 19.8 mmol). LC-MS: $t_R=0.61$ min, $[M+1]^+=201$, 1H NMR ($CDCl_3$): δ 4.73 (hept, J=7.0 Hz, 1H), 3.71 (s, 2H), 3.40 (hept, J=6.0 Hz, 1H), 1.42 (d, J=7.0 Hz, 6H), 1.17 (d, J=6.0 Hz, 6H).

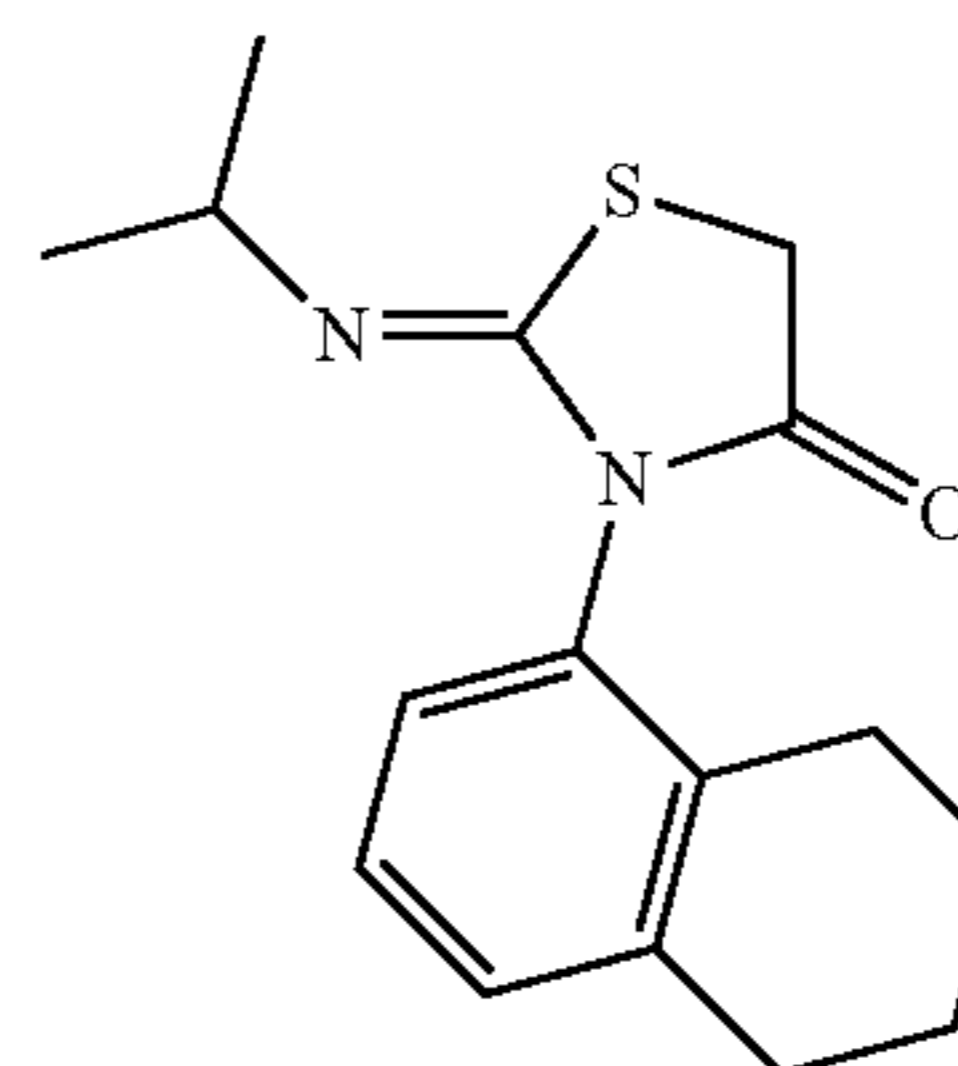
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Scaffold 28



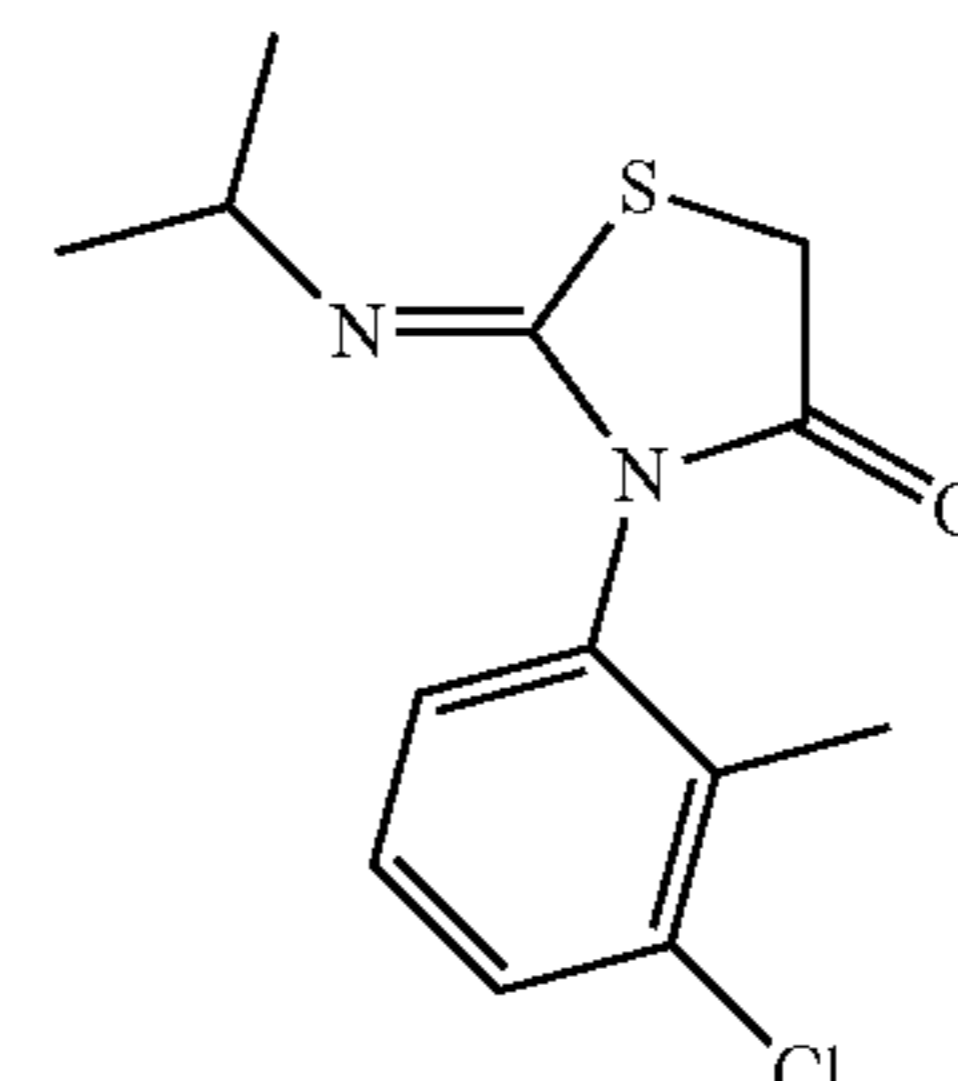
2-[(Z)-Isopropylimino]-3-(2-ethylphenyl)-thiazolidin-4-one (5.07 g) is obtained as an off-white powder following Method A and starting from isopropylamine (1.98 g, 33.5 mmol), 2-ethylphenylisothiocyanate (5.0 g, 30.8 mmol) and methyl bromoacetate (5.12 g, 33.5 mmol). LC-MS: $t_R=0.90$ min, $[M+1]^+=223$, 1H NMR ($CDCl_3$): δ 7.41-7.26 (m, 3H), 7.08 (d, J=7.6 Hz, 1H), 3.99 (s, 2H), 3.48 (hept, J=6.4 Hz, 1H), 2.49 (q, J=7.6 Hz, 2H), 1.19 (t, J=7.6 Hz, 3H), 1.09 (d, J=6.4 Hz, 6H).

Scaffold 29



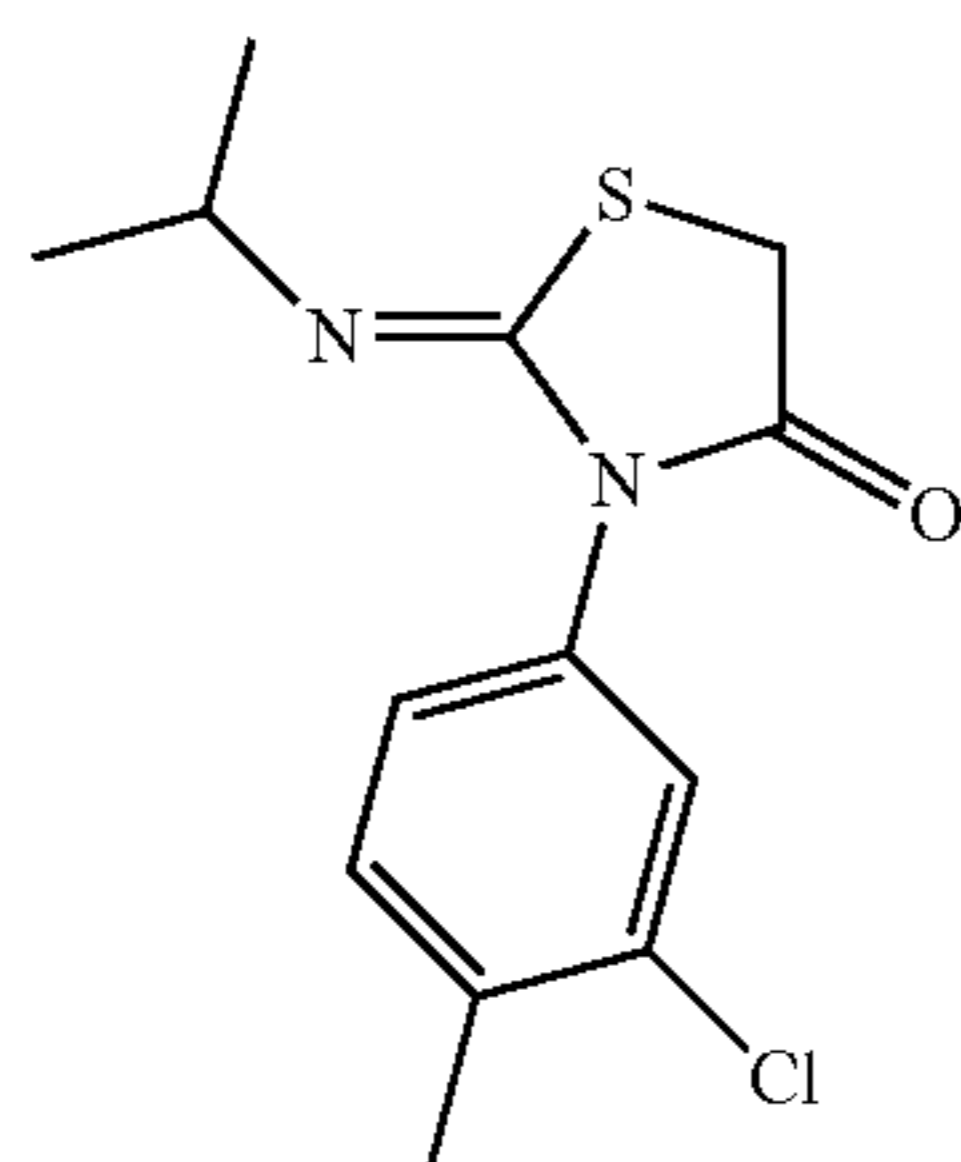
2-[(Z)-Isopropylimino]-3-(5,6,7,8-tetrahydro-naphthalen-1-yl)-thiazolidin-4-one is obtained as a yellow solid following Method B and starting from 5,6,7,8-tetrahydro-naphthalen-1-ylamine, chloroacetyl chloride and isopropylisothiocyanate. LC-MS: $t_R=0.81$ min, $[M+1]^+=289$, 1H NMR ($CDCl_3$): δ 7.23-7.13 (m, 2H), 6.96-6.91 (m, 1H), 3.99 (s, 2H), 3.50 (hept, J=6.4 Hz, 1H), 2.86-2.80 (m, 2H), 2.52-2.45 (m, 2H), 1.84-1.74 (m, 4H), 1.13 (d, J=6.4 Hz, 6H).

Scaffold 30

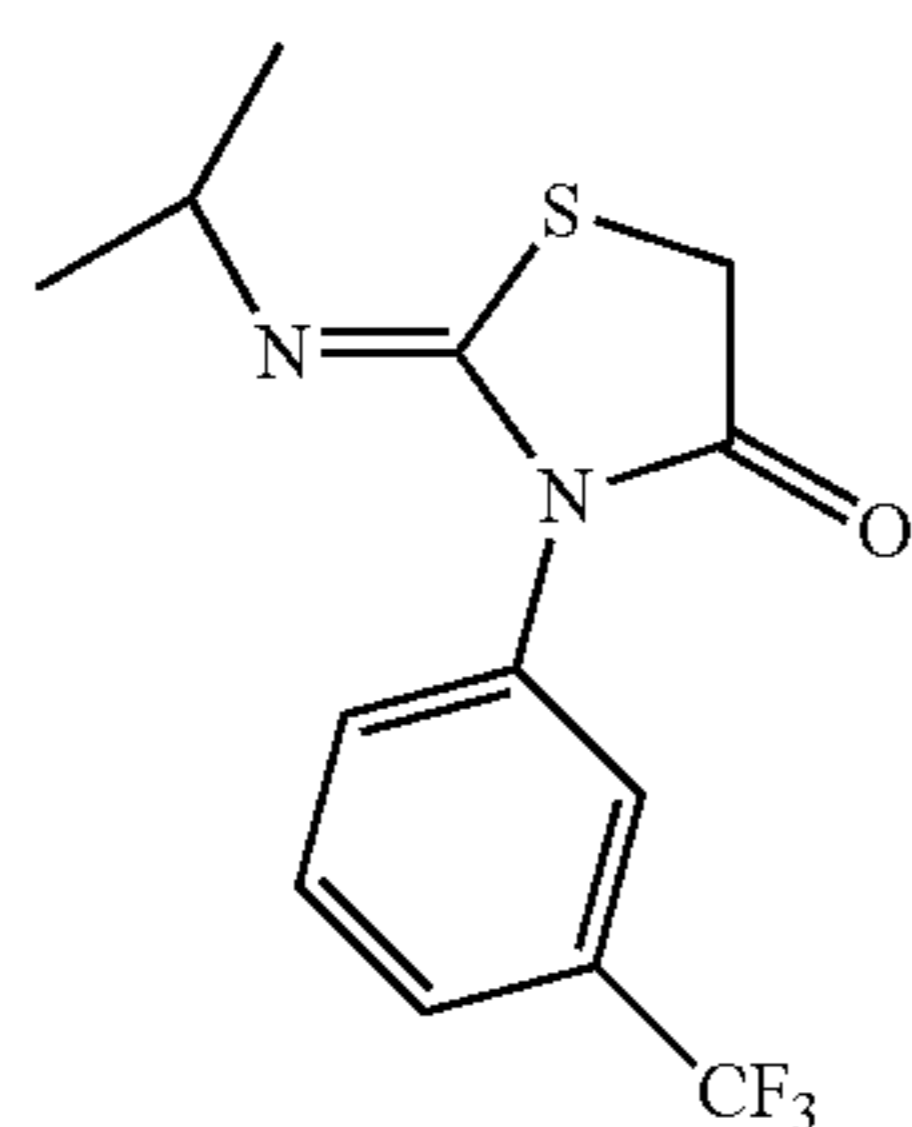


2-[(Z)-Isopropylimino]-3-(3-chloro-2-methylphenyl)-thiazolidin-4-one (2.7 g) is obtained as an oil following Method A and starting from isopropylamine (1.29 g, 21.8 mmol), 3-chloro-2-methylphenylisothiocyanate (4.0 g, 21.8 mmol) and methyl bromoacetate (3.33 g, 21.8 mmol). LC-MS: $t_R=0.86$ min, $[M+1]^+=283$, 1H NMR ($CDCl_3$): δ 7.48-7.44 (m, 1H), 7.30-7.23 (m, 1H), 7.10-7.06 (m, 1H), 3.51 (hept, J=6.2 Hz, 1H), 2.21 (s, 3H), 1.15 (d, J=6.2 Hz, 3H), 1.13 (d, J=6.2 Hz, 3H).

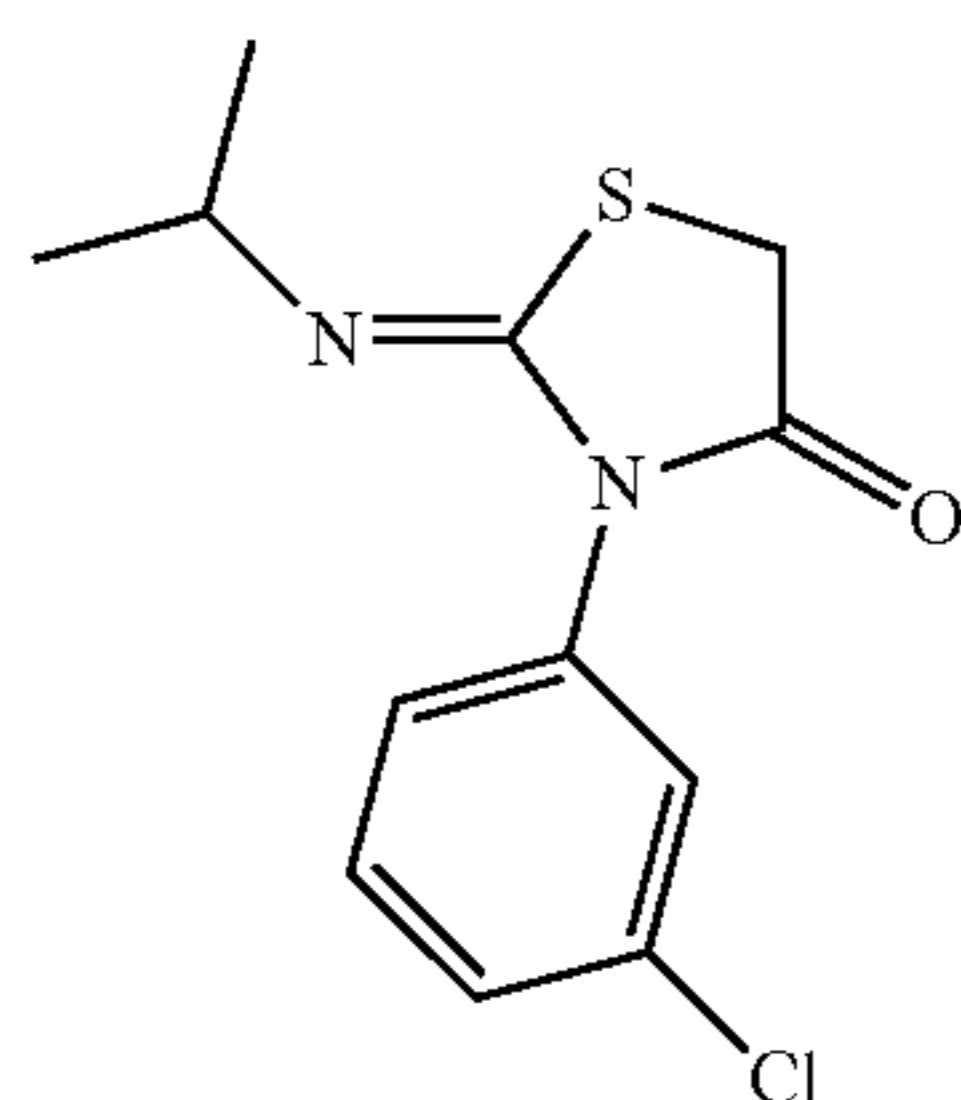
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2-[(Z)-Isopropylimino]-3-(3-chloro-4-methylphenyl)-thiazolidin-4-one (4.0 g) is obtained as pale yellow solid following Method A and starting from isopropylamine (1.72 g, 29.0 mmol), 3-chloro-4-methylphenylisothiocyanate (5.33 g, 29.0 mmol) and methyl bromoacetate (4.44 g, 29.0 mmol). LC-MS: $t_R=0.80$ min, $[M+1]^+=283$, 1H NMR ($CDCl_3$): δ 7.33 (s, 1H), 7.30-7.27 (m, 2H), 3.96 (s, 2H), 3.49 (hept, $J=6.4$ Hz, 1H), 2.40 (s, 3H), 1.14 (d, $J=6.4$ Hz, 6H).



2-[(Z)-Isopropylimino]-3-(3-trifluoromethylphenyl)-thiazolidin-4-one (2.77 g) is obtained as an oil following Method A and starting from isopropylamine (1.50 g, 25.4 mmol), 3-trifluoromethylphenylisothiocyanate (5.17 g, 25.4 mmol) and methyl bromoacetate (3.89 g, 25.4 mmol). LC-MS: $t_R=0.88$ min, $[M+1]^+=303$, 1H NMR ($CDCl_3$): δ 7.65-7.46 (m, 4H), 3.98 (s, 2H), 3.50 (hept, $J=6.4$ Hz, 1H), 1.13 (d, $J=6.4$ Hz, 6H).



2-[(Z)-Isopropylimino]-3-(3-chlorophenyl)-thiazolidin-4-one (1.0 g) is obtained as an oil following Method A and starting from isopropylamine (1.67 g, 28.3 mmol), 3-chlorophenylisothiocyanate (4.80 g, 28.3 mmol) and methyl bromoacetate (4.33 g, 28.3 mmol). LC-MS: $t_R=0.77$ min, $[M+1]^+=269$, 1H NMR ($CDCl_3$): δ 7.41-7.28 (m, 3H), 7.20-7.15 (m, 1H), 3.96 (s, 2H), 3.53-3.44 (m, 1H), 1.13 (d, 5.9 Hz, 6H).

Scaffold 31

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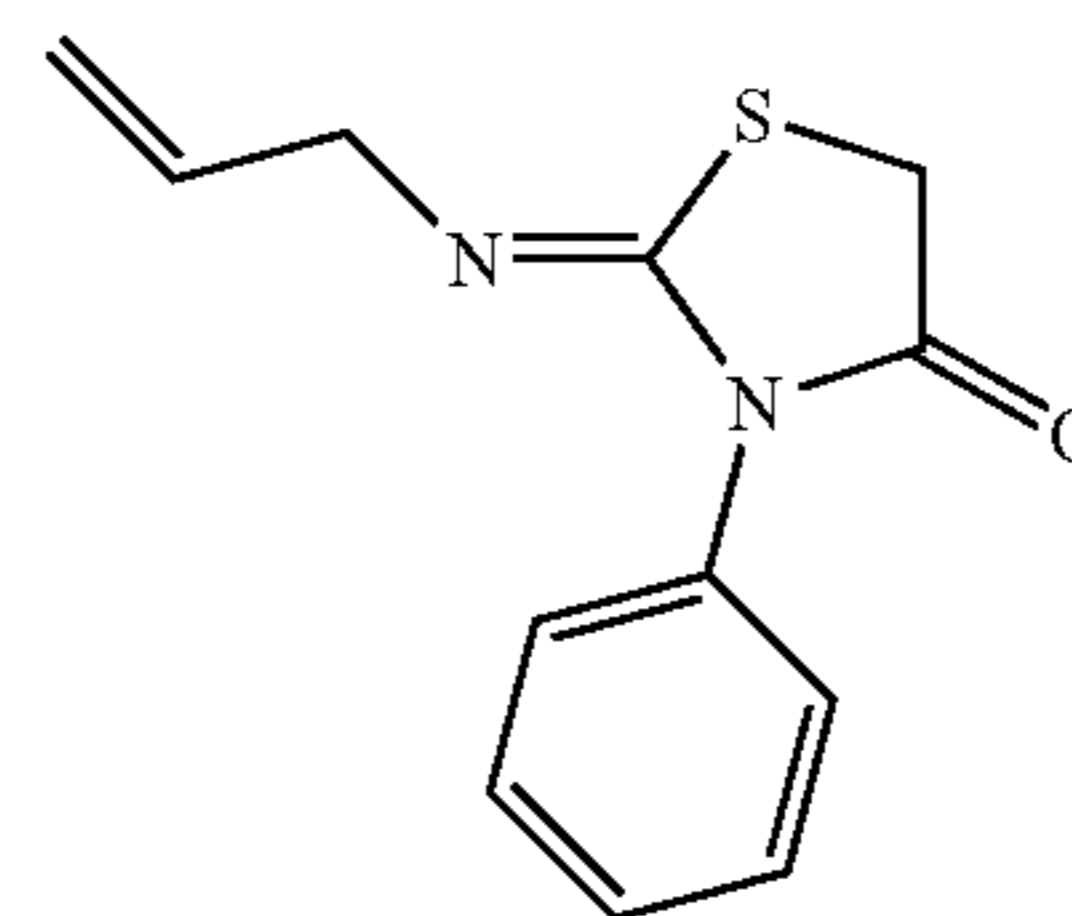
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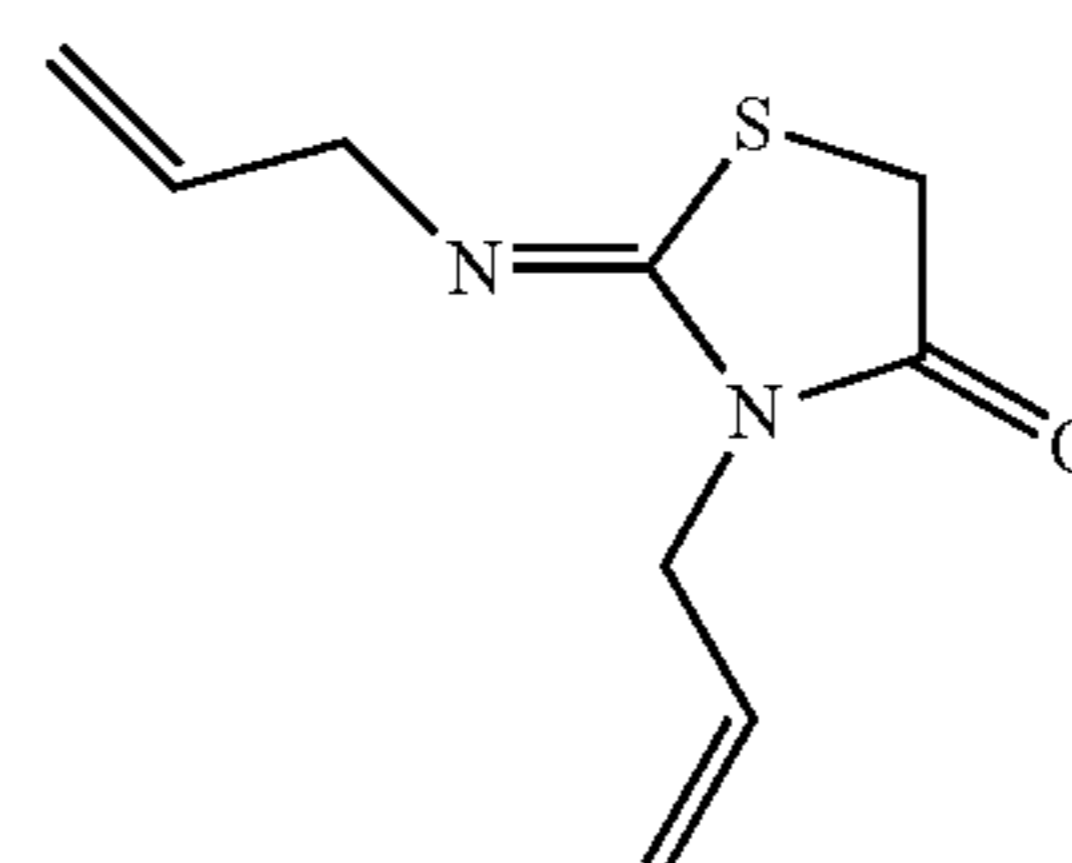
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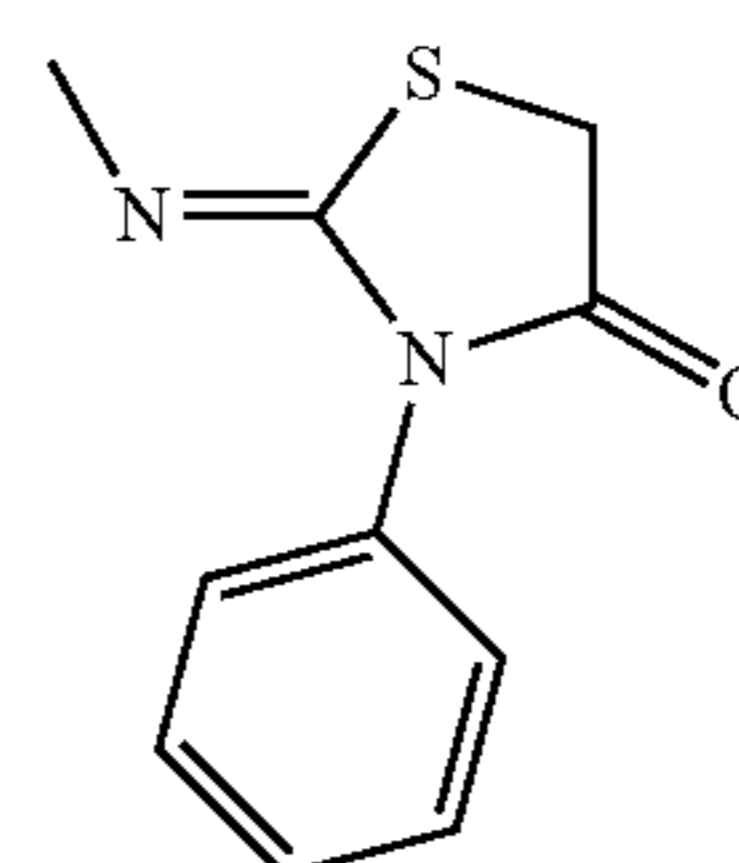
Scaffold 34

2-[(Z)-allyl]-3-phenyl-thiazolidin-4-one is obtained as a yellow powder following Method B and starting from aniline, chloroacetyl chloride and allylisothiocyanate. LC-MS: $t_R=0.63$ min, $[M+1]^+=233$, 1H NMR ($CDCl_3$): δ 7.52-7.38 (m, 3H), 7.31-7.25 (m, 2H), 5.96-5.82 (m, 1H), 5.20-5.06 (m, 2H), 4.01 (s, 2H), 3.99-3.95 (m, 2H).



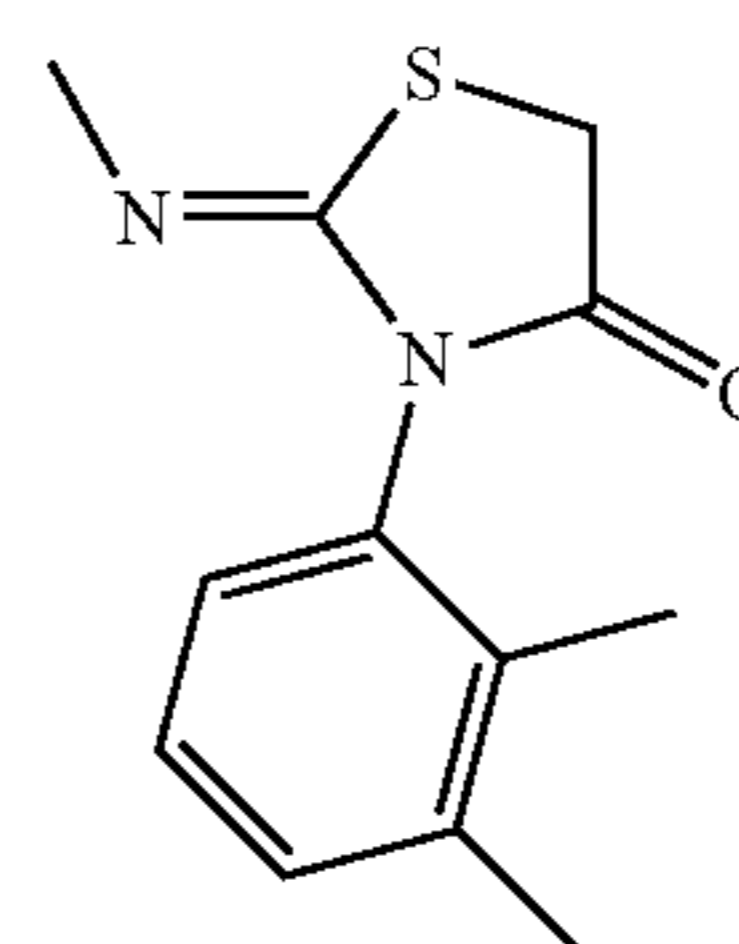
Scaffold 35

2-[(Z)-allylimino]-3-allyl-thiazolidin-4-one (3.12 g) is obtained as a pale yellow oil following Method A and starting from allylamine (1.15 g, 20.2 mmol), allylisothiocyanate (2.0 g, 20.2 mmol) and methyl bromoacetate (3.08 g, 20.2 mmol). LC-MS: $t_R=0.66$ min, $[M+1]^+=197$; 1H NMR ($CDCl_3$): δ 6.02-5.79 (m, 2H), 5.29-5.25 (m, 1H), 5.22-5.18 (m, 1H), 5.17-5.09 (m, 2H), 4.38-4.35 (m, 2H), 3.95 (dt, $J_d=5.3$ Hz, $J_t=1.7$ Hz, 2H), 3.83 (s, 2H).



Scaffold 36

2-[(Z)-Methylimino]-3-phenyl-thiazolidin-4-one is obtained as a beige solid following Method B and starting from aniline, chloroacetyl chloride and methylisothiocyanate. LC-MS: $t_R=0.37$ min, $[M+1]^+=207$, 1H NMR ($CDCl_3$): δ 7.52-7.38 (m, 3H), 7.28-7.24 (m, 2H), 4.01 (s, 2H), 3.13 (s, 3H).

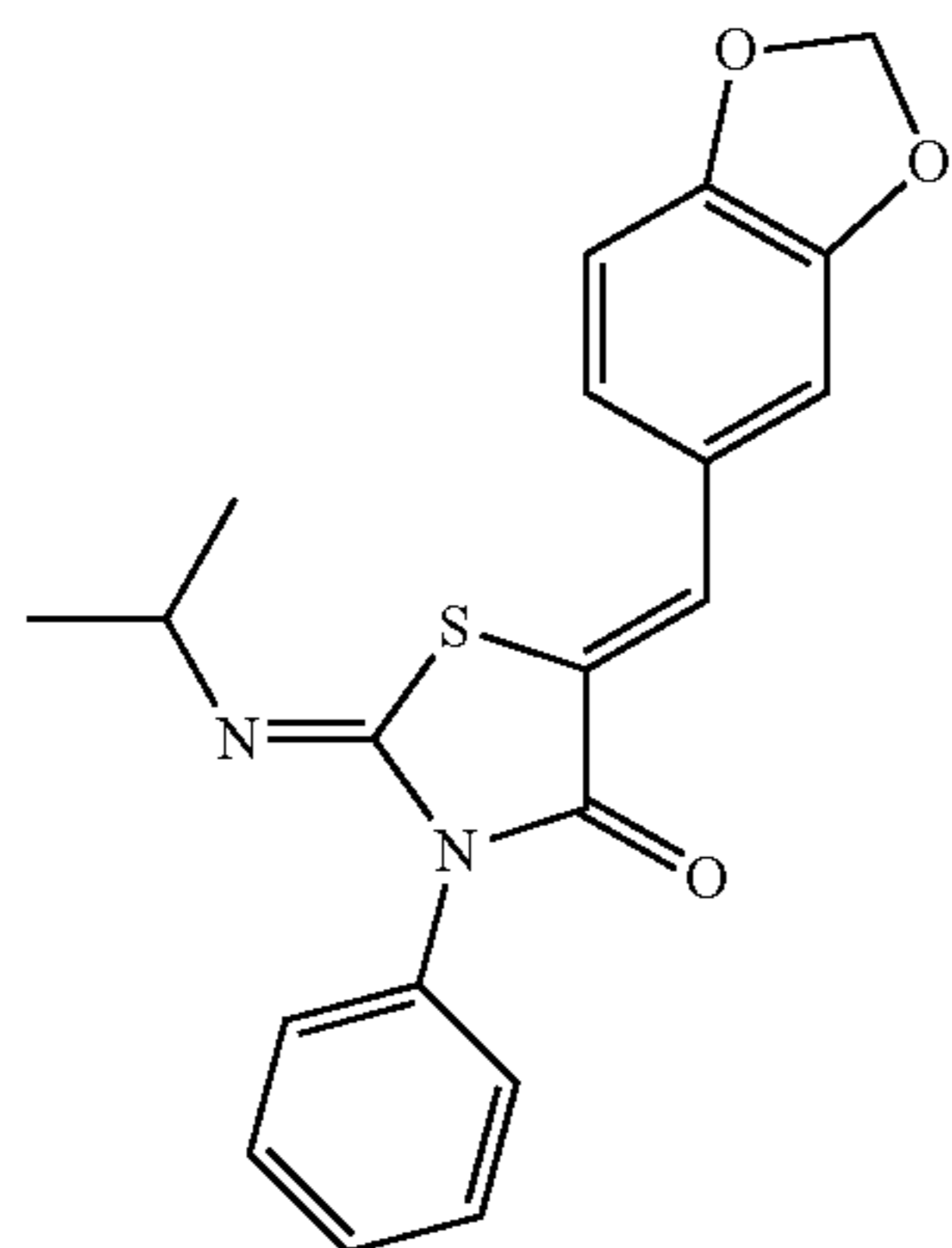


Scaffold 37

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2-[(Z)-Methylimino]-3-(2,3-dimethylphenyl)-thiazolidin-4-one is obtained as a pale orange solid following Method B and starting from 2,3-dimethylaniline, chloroacetyl chloride and methylisothiocyanate. LC-MS: $t_R=0.59$ min, $[M+1]^+=235$, 1H NMR ($CDCl_3$): δ 7.24-7.19 (m, 2H), 7.00-6.95 (m, 1H), 4.04 (s, 2H), 3.12 (s, 3H), 2.33 (s, 3H), 2.06 (s, 3H).

Example 1

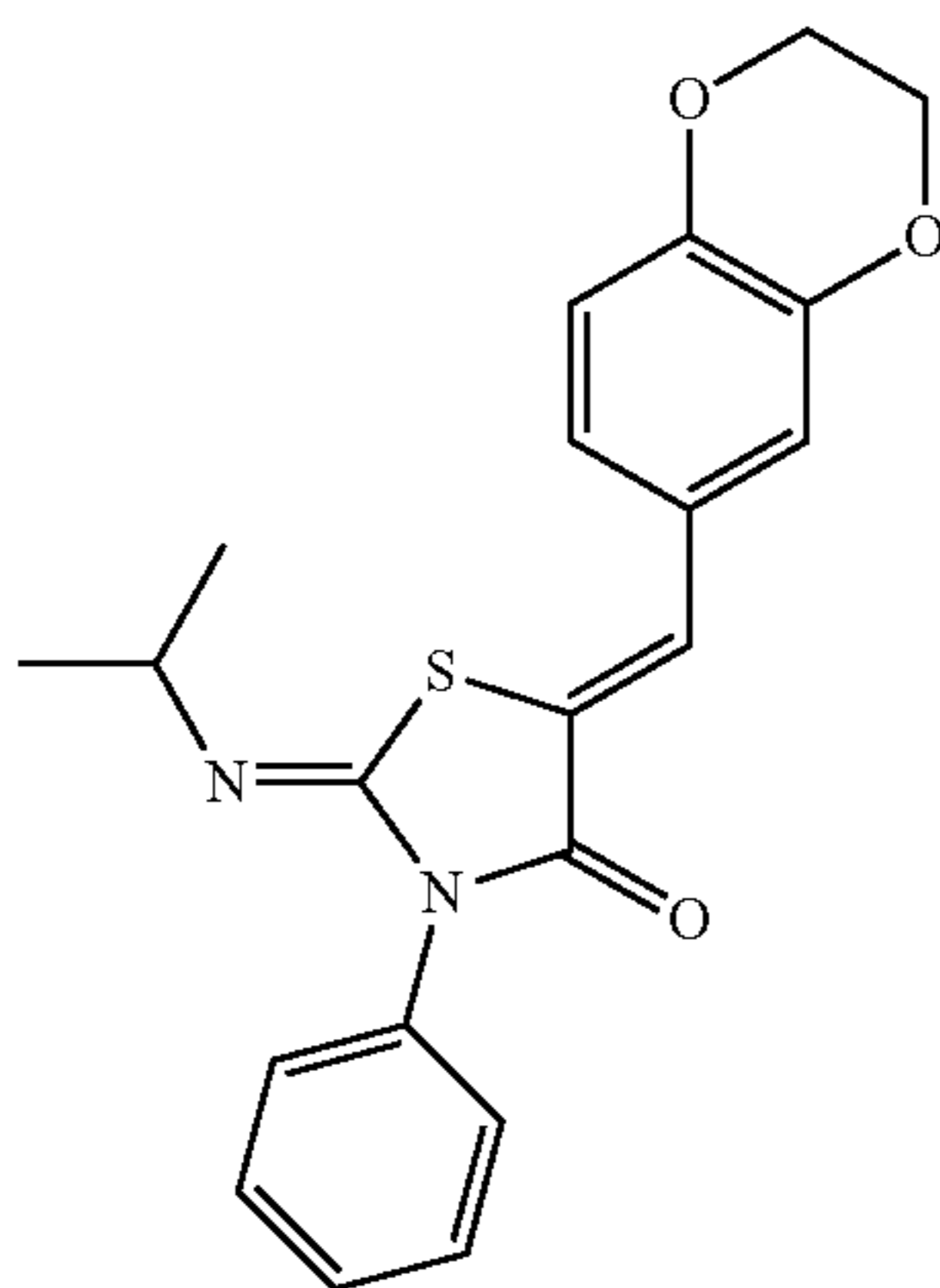


5-Benzo[1,3]dioxol-5-ylmeth-(Z)-ylidene-2-[(Z)-isopropylimino]-3-phenyl-thiazolidin-4-one is prepared as described in Method C.

LC-MS: $t_R=1.06$ min, $[M+1]^+=367$.

1H NMR ($CDCl_3$): δ 7.70 (s, 1H), 7.52-7.32 (m, 5H), 7.12-7.07 (m, 2H), 6.92 (d, $J=7.6$ Hz, 1H), 6.06 (s, 2H), 3.61 (hept, $J=6.1$ Hz, 1H), 1.21 (d, $J=6.4$ Hz, 6H).

Example 2

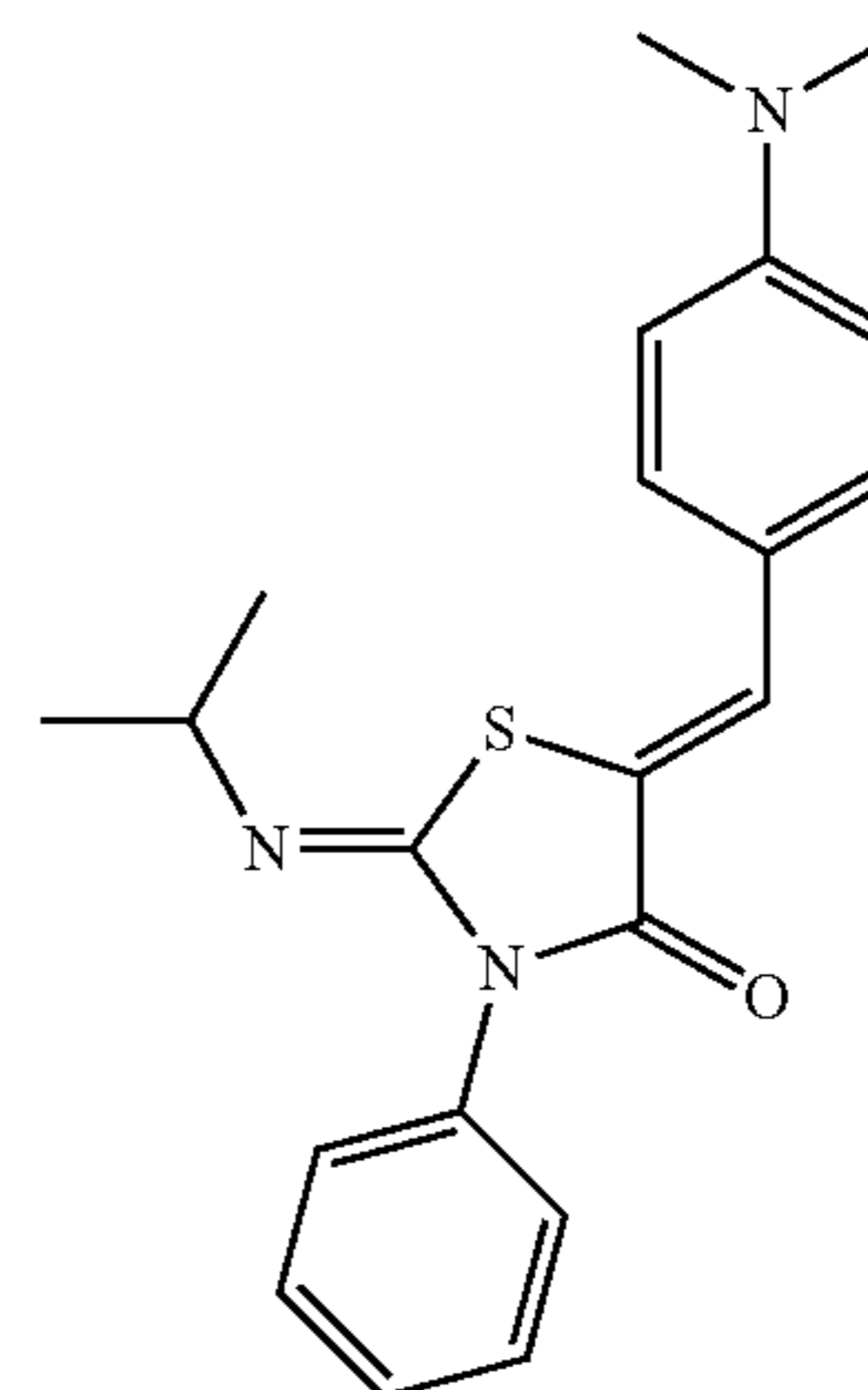


5-(2,3-Dihydro-benzo[1,4]dioxin-6-ylmeth-(Z)-ylidene)-2-[(Z)-isopropylimino]-3-phenyl-thiazolidin-4-one is obtained starting from Scaffold 1 (19 mg, 0.08 mmol) and 2,3-dihydro-benzo[1,4]dioxine-6-carbaldehyde (26 mg, 0.16 mmol) following Method E.

LC-MS: $t_R=1.05$ min, $[M+1]^+=381$.

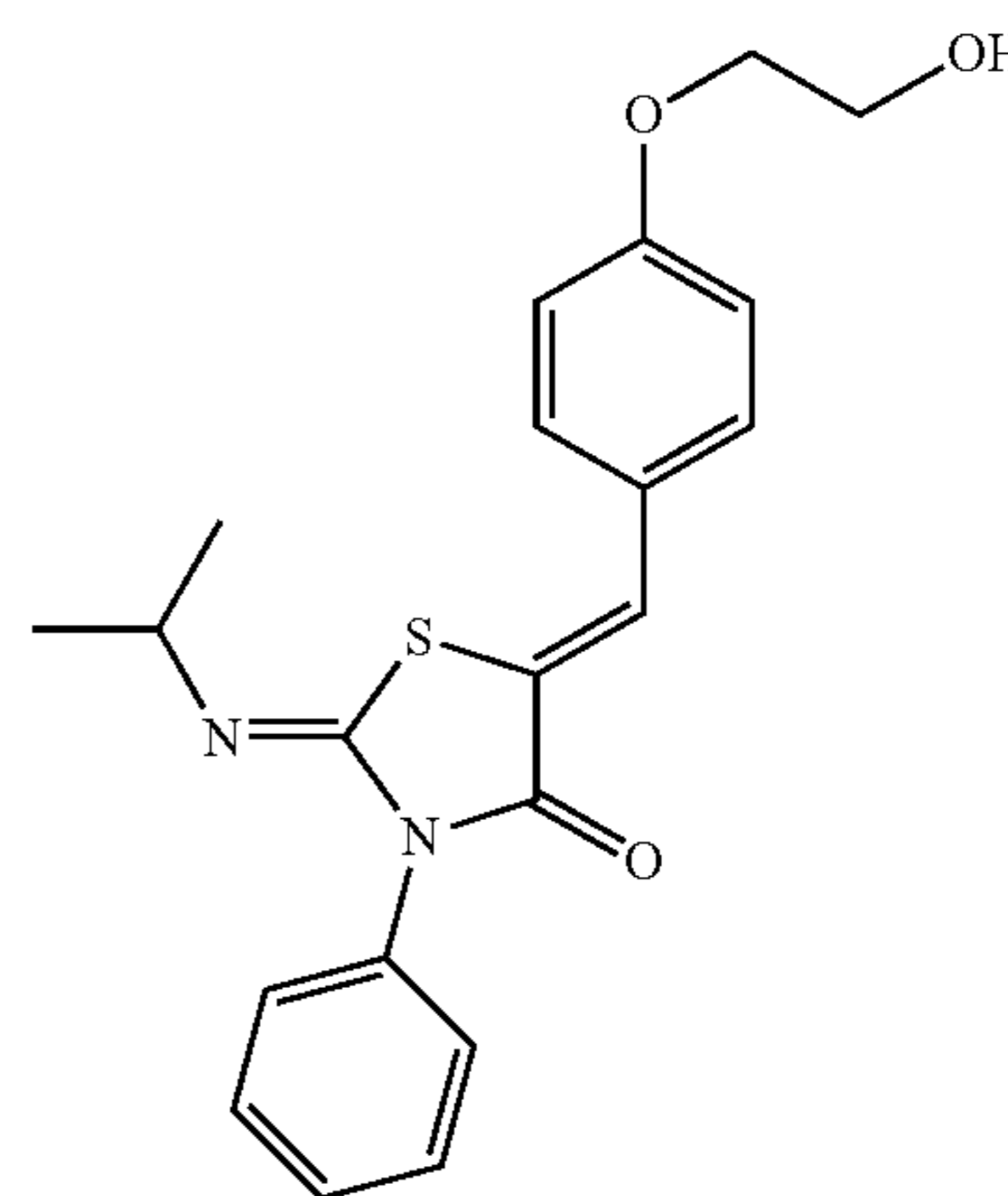
34

Example 3



5-(4-Dimethylamino-benz-(Z)-ylidene)-2-[(Z)-isopropylimino]-3-phenyl-thiazolidin-4-one is obtained starting from Scaffold 1 (19 mg, 0.08 mmol) and 4-dimethylamino-benzaldehyde (24 mg, 0.16 mmol) following Method E. LC-MS: $t_R=1.09$ min, $[M+1]^+=379$.

Example 4



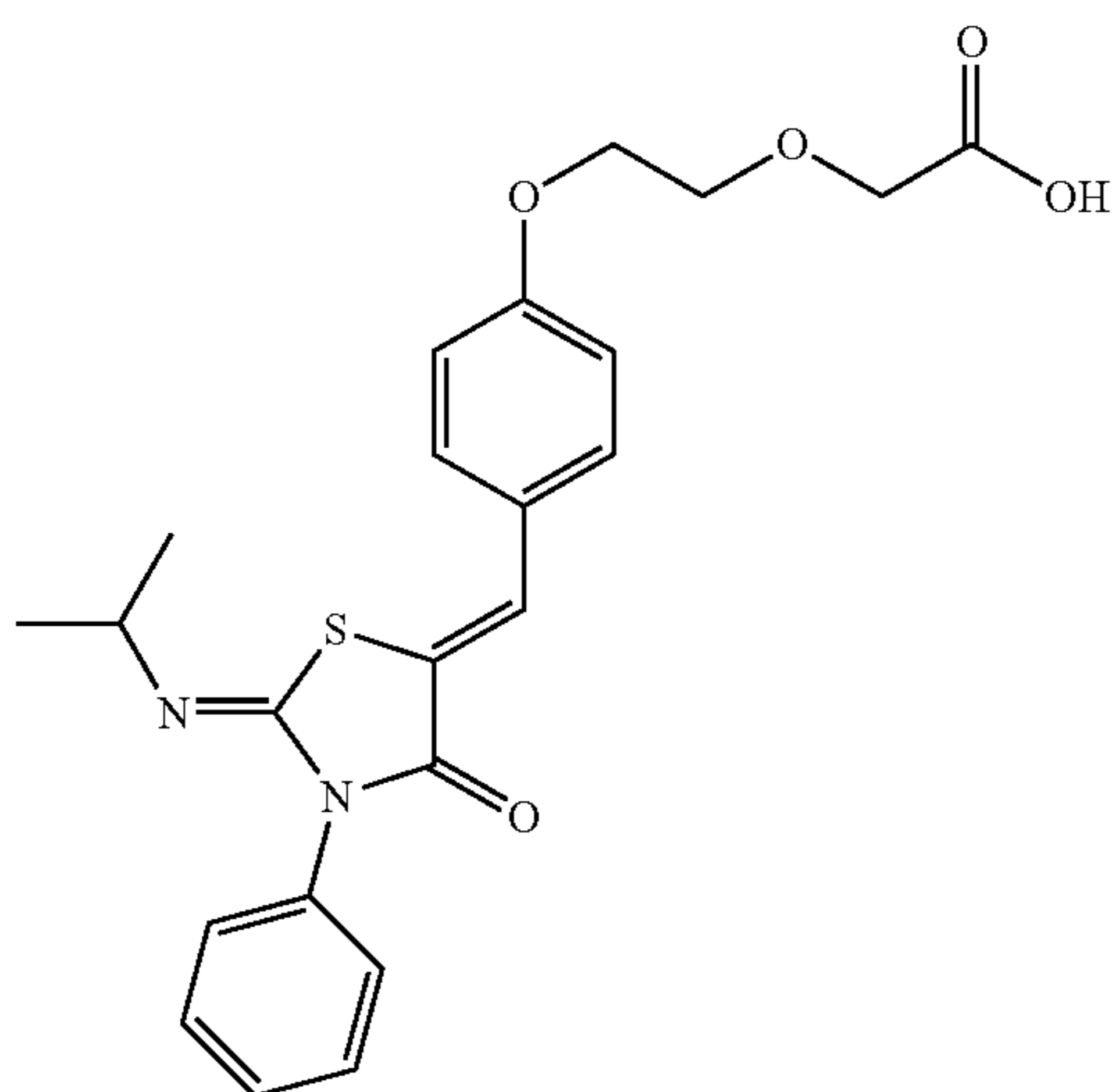
5-[4-(2-Hydroxy-ethoxy)-benz-(Z)-ylidene]-2-[(Z)-isopropylimino]-3-phenyl-thiazolidin-4-one is prepared as described in Method D.

LC-MS: $t_R=0.94$ min, $[M+1]^+=383$.

1H NMR ($CDCl_3$): δ 7.74 (s, 1H), 7.56-7.44 (m, 4H), 7.42-7.32 (m, 3H), 7.04-6.99 (m, 2H), 4.17-4.13 (m, 2H), 4.03-3.97 (m, 2H), 3.60 (hept, $J=6.4$ Hz, 1H), 2.01 (s br, 1H), 1.19 (d, $J=6.4$ Hz, 6H).

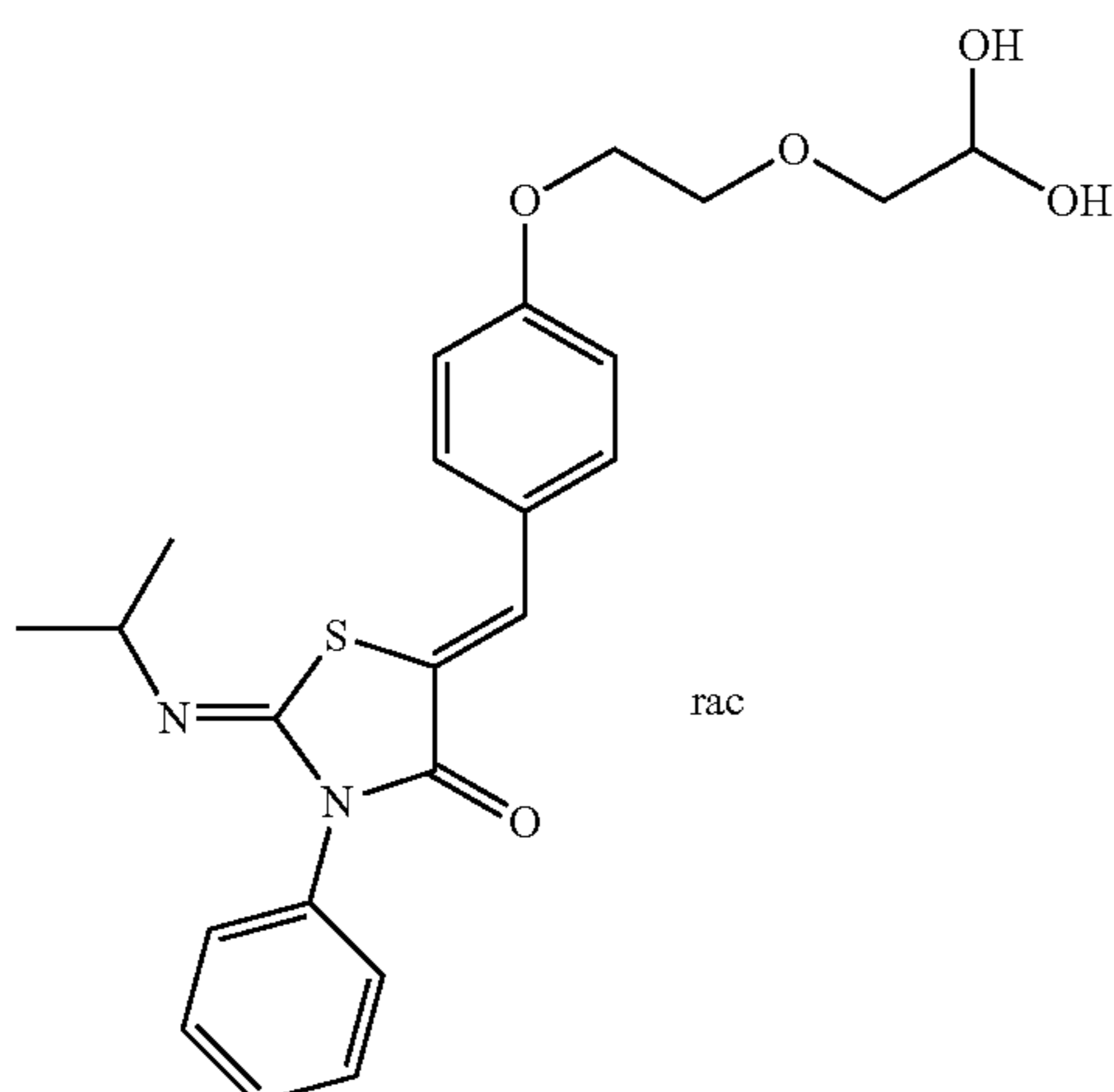
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Example 5



A mixture of 5-[4-(2-Hydroxy-ethoxy)-benz-(Z)-ylidene]-2-[(Z)-isopropylimino]-3-phenyl-thiazolidin-4-one (75 mg, 0.196 mmol, Example 4), K_2CO_3 (81 mg, 0.588 mmol), and methyl chloroacetate (250 L) in DMF (2 mL) is stirred at 60° C. for 96 h before it is diluted with EA (75 mL) and washed with 10% aq. citric acid (50 mL) and water (2x50 mL). The organic layer is evaporated and the resulting residue is purified by prep. TLC (heptane/EA 1:1) followed by crystallisation from a small amount of methanol to give {2-[4-(2-[(Z)-isopropylimino]-4-oxo-3-phenyl-thiazolidin-5-ylidene-methyl)-phenoxy]-ethoxy}-acetic acid. LC-MS: $t_R=1.06$ min, $[M+1]^+=441$. 1H NMR ($CDCl_3$): δ 7.73 (s, 1H), 7.55-7.44 (m, 4H), 7.42-7.32 (m, 3H), 7.03-6.98 (m, 2H), 4.55-4.50 (m, 2H), 4.29-4.25 (m, 2H), 3.83 (s, 2H), 3.60 (hept, J=6.4 Hz, 1H), 1.19 (d, J=6.4 Hz, 6H).

Example 6

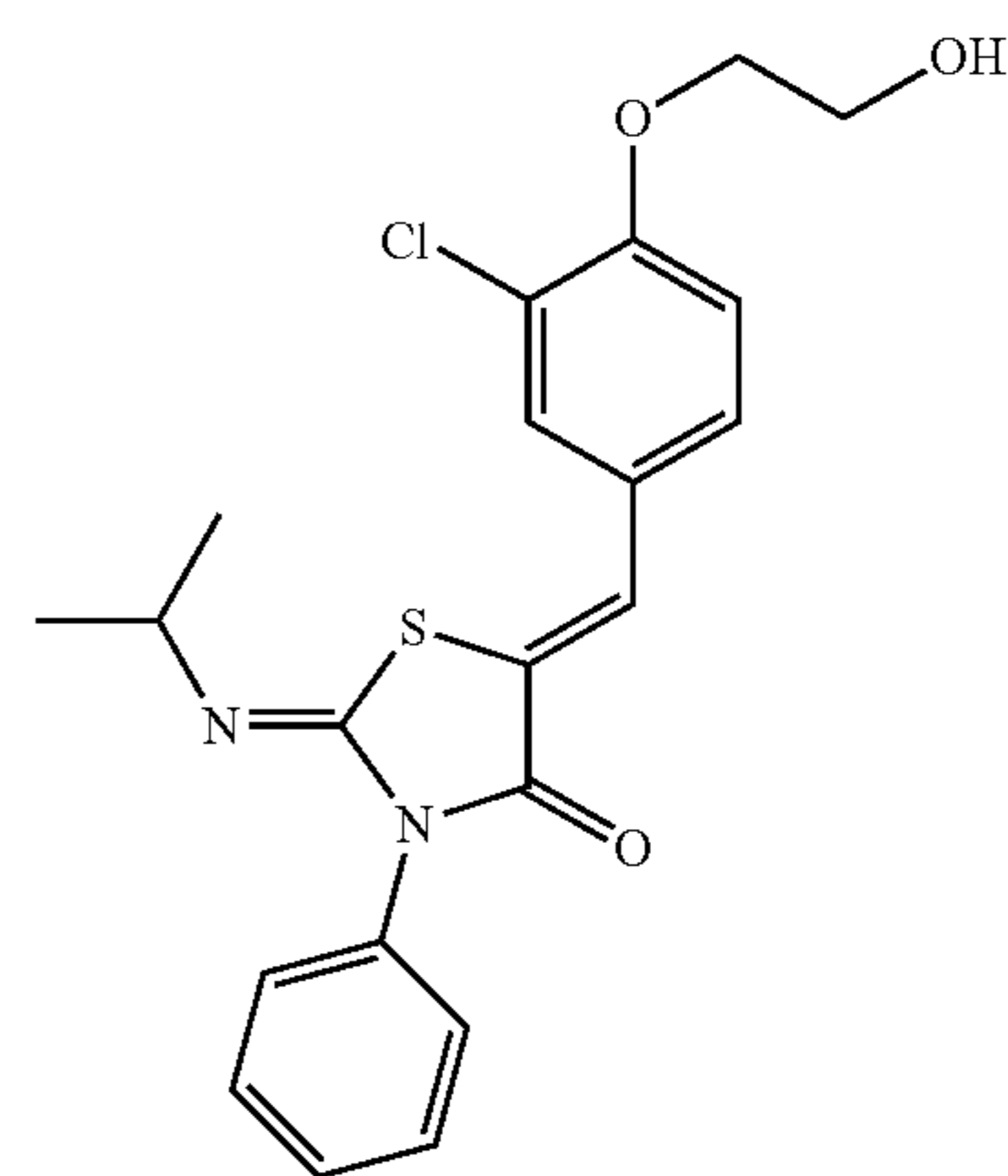


After purification on prep. TLC plates, rac-5-[4-(2-(2,3-dihydroxy-propoxy)-ethoxy)-benz-(Z)-ylidene]-2-[(Z)-iso-

36

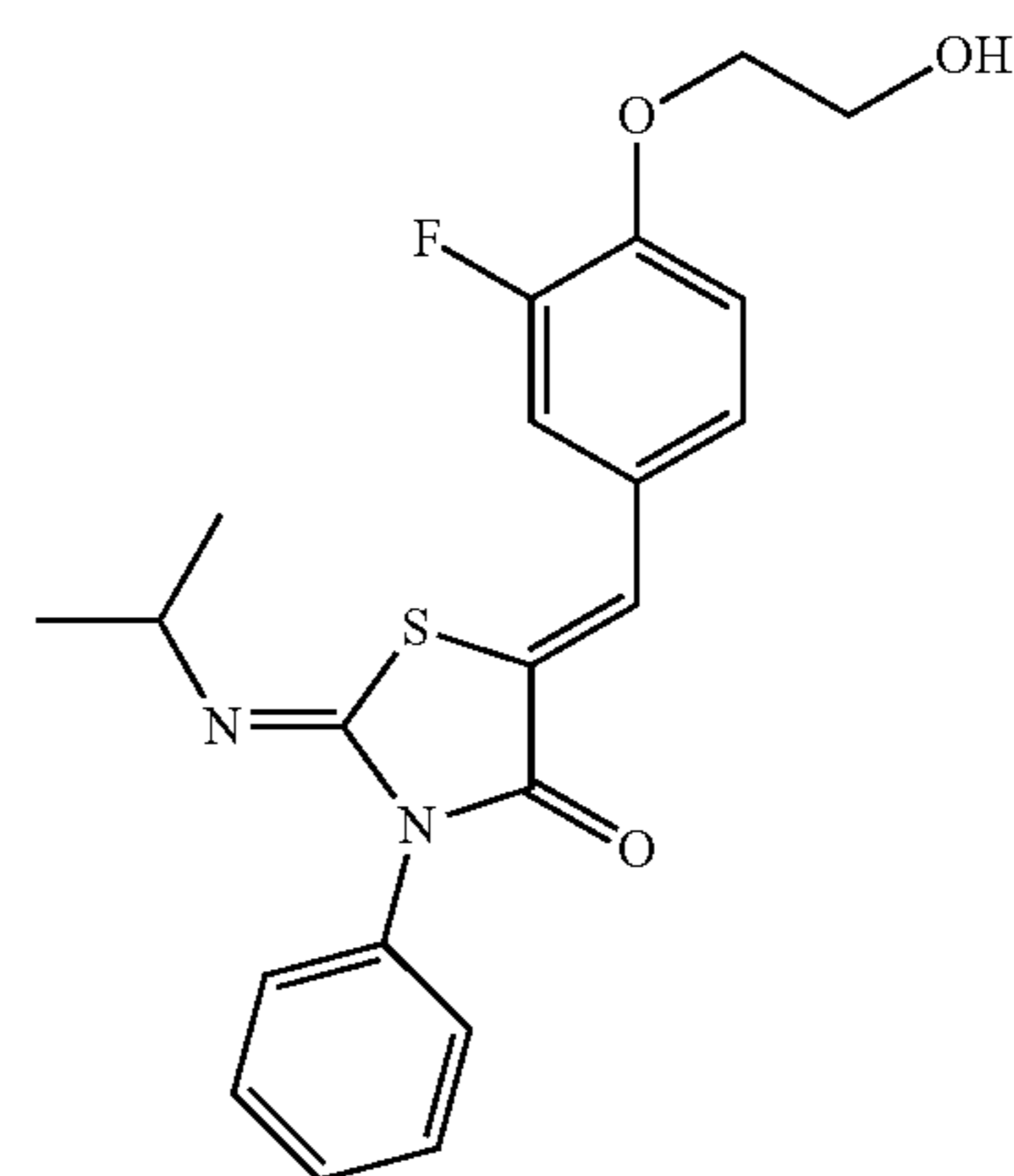
propylimino]-3-phenyl-thiazolidin-4-one is obtained as a pale beige foam starting from Scaffold 1 (150 mg, 0.604 mmol) and rac-4-[2-(2,3-dihydroxy-propoxy)-ethoxy]-benzaldehyde (290 mg, 1.208 mmol) following Method D. LC-MS: $t_R=0.99$ min, $[M+1]^+=471$; 1H NMR ($CDCl_3$): δ 7.73 (s, 1H), 7.55-7.51 (m, 2H), 7.35-7.28 (m, 3H), 7.20-7.15 (m, 1H), 7.04-6.98 (m, 2H), 4.20 (t, J=4.7 Hz, 2H), 3.94-3.88 (m, 3H), 3.77-3.55 (m, 5H), 2.65 (s br, 1H), 2.19 (s, 3H), 2.08 (s br, 1H), 1.17 (d, J=6.4 Hz, 3H), 1.16 (d, J=6.4 Hz, 3H).

Example 7



5-[3-Chloro-4-(2-hydroxy-ethoxy)-benz-(Z)-ylidene]-2-[(Z)-isopropylimino]-3-phenyl-thiazolidin-4-one is obtained as pale yellow powder starting from 3-chloro-4-(2-acetoxy-ethoxy)-benzaldehyde (311 mg, 1.28 mmol) and Scaffold 1 (150 mg, 0.64 mmol) following Method D. LC-MS: $t_R=1.01$ min, $[M+1]^+=417$; 1H NMR ($CDCl_3$): δ 7.654 (s, 1H), 7.61 (d, J=2.3 Hz, 1H), 7.51-7.32 (m, 6H), 7.03 (d, J=8.8 Hz, 1H), 4.24-4.20 (m, 2H), 4.06-4.01 (m, 2H), 3.60 (hept, J=6.4 Hz, 1H), 2.15 (s br, 1H), 1.19 (d, J=6.4 Hz, 6H).

Example 8

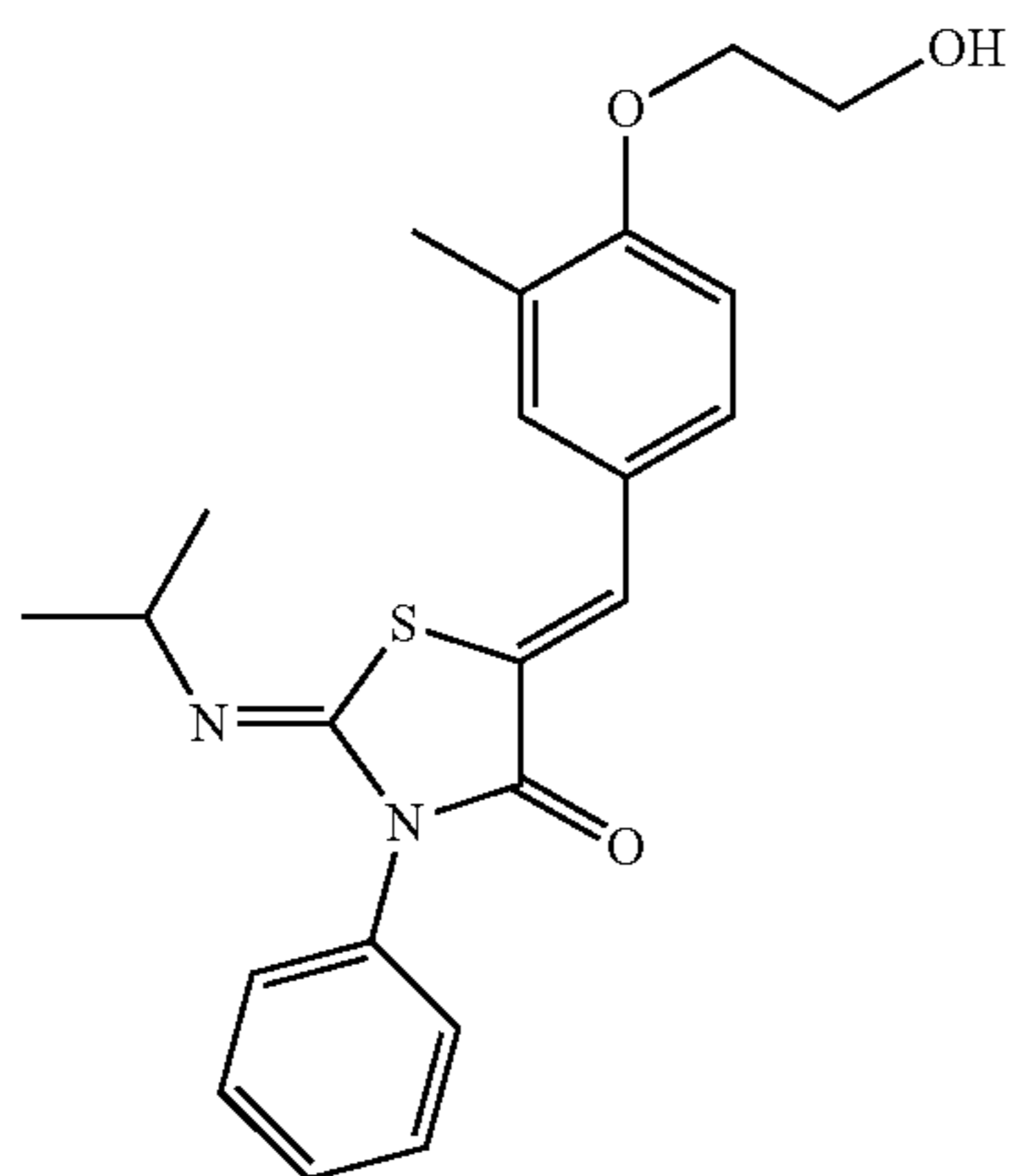


5-[3-Fluoro-4-(2-hydroxy-ethoxy)-benz-(Z)-ylidene]-2-[(Z)-isopropylimino]-3-phenyl-thiazolidin-4-one is prepared following Method D and starting from 4-(2-acetoxy-ethoxy)-3-fluoro-benzaldehyde (390 mg, 1.7 mmol) and Scaffold 1 (200 mg, 0.85 mmol). LC-MS: $t_R=0.98$ min, $[M+1]^+=401$; 1H

37

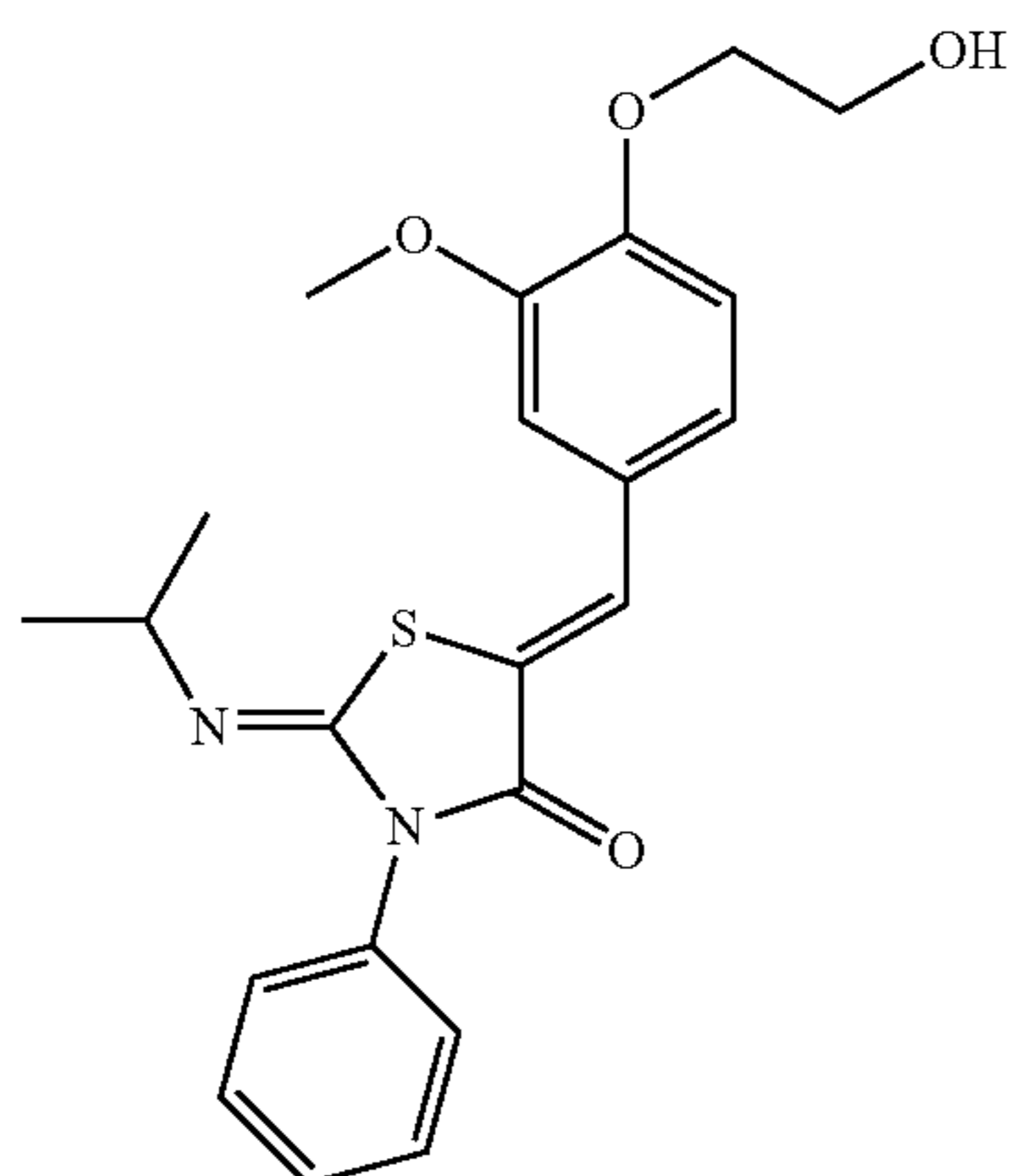
NMR (CDCl₃): δ 7.66 (s, 1H), 7.51-7.28 (m, 7H), 7.06 (t, J=8.2 Hz, 1H), 4.24-4.20 (m, 2H), 4.06-4.00 (m, 2H), 3.60 (hept, J=6.4 Hz, 1H), 2.11 (t br, 1H), 1.19 (d, J=6.4 Hz, 6H).

Example 9



5-[4-(2-Hydroxy-ethoxy)-3-methyl-benz-(Z)-ylidene]-2-[(Z)-isopropylimino]-3-phenyl-thiazolidin-4-one is obtained as an off-white powder starting from 4-(2-acetoxy-ethoxy)-3-methylbenzaldehyde (284 mg, 1.28 mmol) and Scaffold 1 (150 mg, 0.64 mmol) following Method D. LC-MS: t_R =0.98 min, $[M+1]^+$ =397; ¹H NMR (CDCl₃): δ 7.69 (s, 1H), 7.49-7.30 (m, 7H), 6.90 (d, J=8.2 Hz, 1H), 4.17-4.12 (m, 2H), 4.03-3.98 (m, 2H), 3.59 (hept, J=6.4 Hz, 1H), 2.30 (s, 3H), 1.95 (s br, 1H), 1.17 (d, J=6.4 Hz, 6H).

Example 10

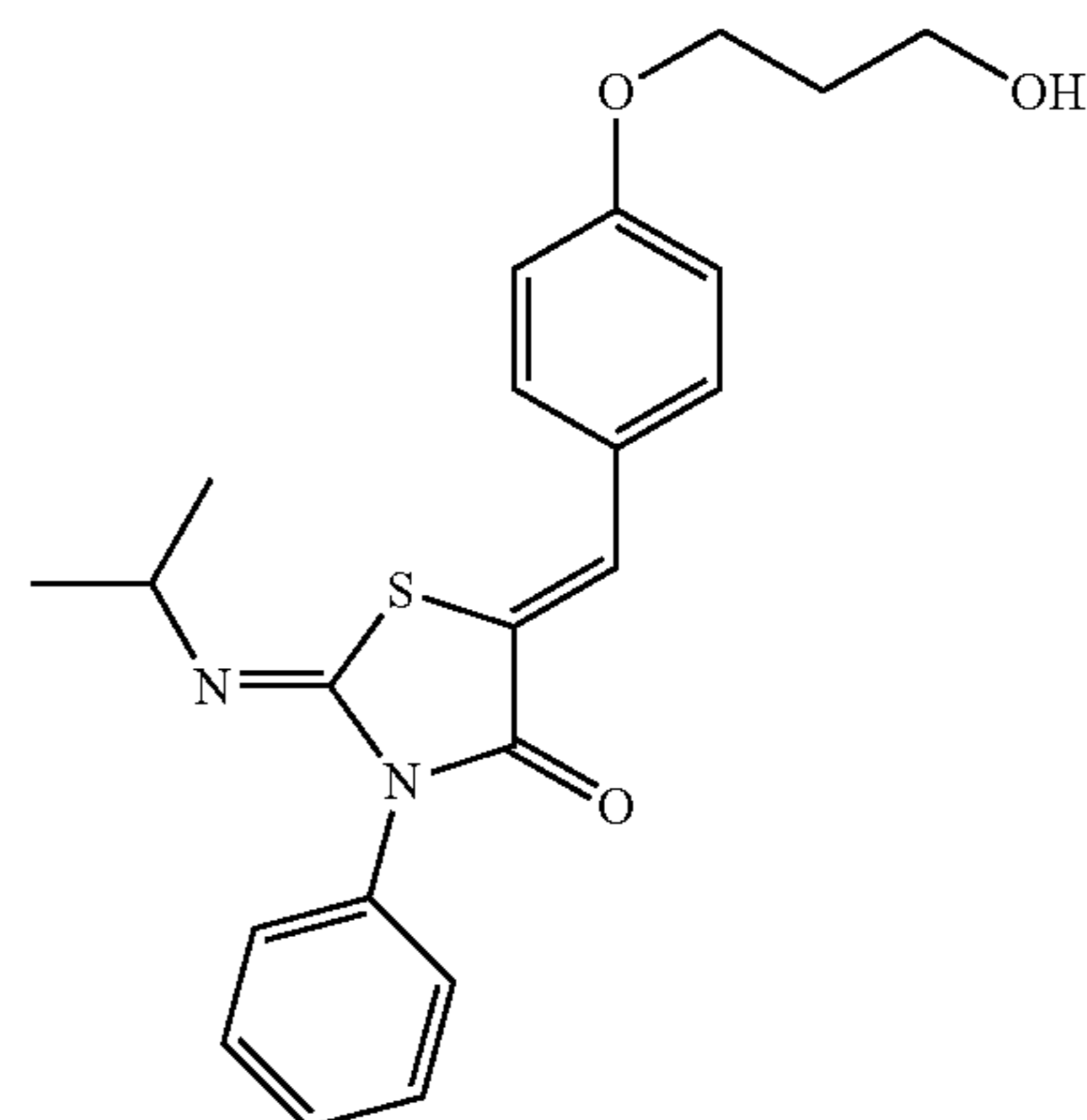


5-[4-(2-Hydroxy-ethoxy)-3-methoxy-benz-(Z)-ylidene]-2-[(Z)-isopropylimino]-3-phenyl-thiazolidin-4-one is obtained as a pale yellow powder starting from 4-(2-acetoxy-ethoxy)-3-methoxy-benzaldehyde (305 mg, 1.28 mmol) and Scaffold 1 (150 mg, 0.64 mmol) following Method D. LC-MS: t_R =0.95 min, $[M+1]^+$ =413; ¹H NMR (CDCl₃): δ 7.72 (s, 1H), 7.51-7.45 (m, 2H), 7.42-7.39 (m, 1H), 7.37-7.32 (m, 2H), 7.18 (dd, J=2.3, 8.2 Hz, 1H), 7.08 (d, J=2.3 Hz, 1H), 7.00

38

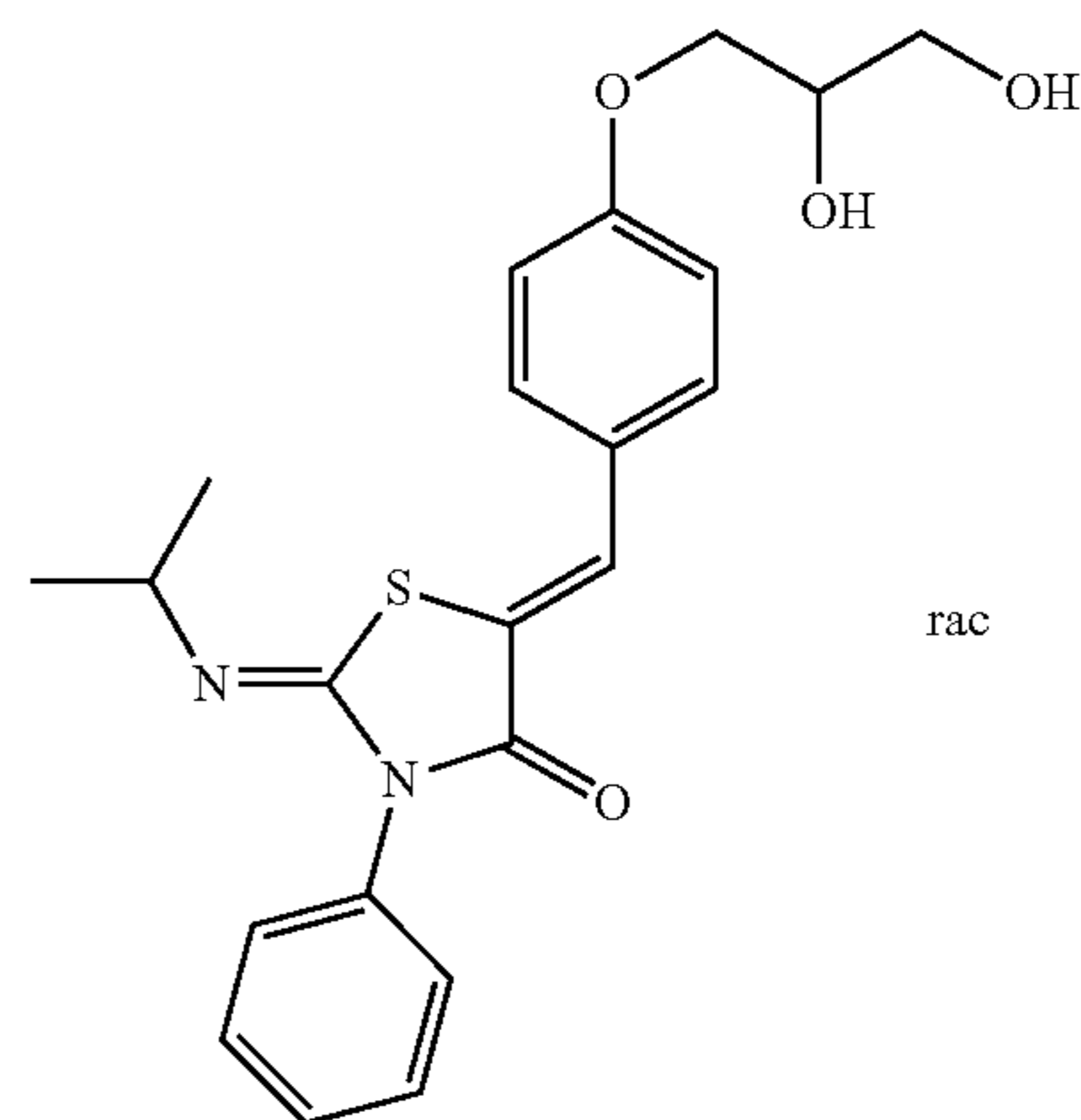
(d, J=8.2 Hz, 1H), 4.22-4.17 (m, 2H), 4.06-3.98 (m, 3H), 3.95 (s, 3H), 3.60 (hept, J=6.4 Hz, 1H), 1.22 (d, J=6.4 Hz, 3H), 1.19 (d, J=6.4 Hz, 3H).

Example 11



5-[4-(3-Hydroxy-propoxy)-benz-(Z)-ylidene]-2-[(Z)-isopropylimino]-3-phenyl-thiazolidin-4-one is obtained starting from Scaffold 1 (150 mg, 0.640 mmol) and 4-(3-hydroxy-propoxy)-benzaldehyde (173 mg, 0.960 mmol) following Method D. LC-MS: t_R =0.97 min, $[M+1]^+$ =397. ¹H NMR (CDCl₃): δ 7.73 (s, 1H), 7.55-7.33 (m, 7H), 7.02-6.97 (m, 2H), 4.19 (t, J=5.9 Hz, 2H), 3.89 (t, J=5.9 Hz, 2H), 3.60 (hept, J=6.4 Hz, 1H), 2.09 (p, J=5.9 Hz, 2H), 1.19 (d, J=6.4 Hz, 6H).

Example 12

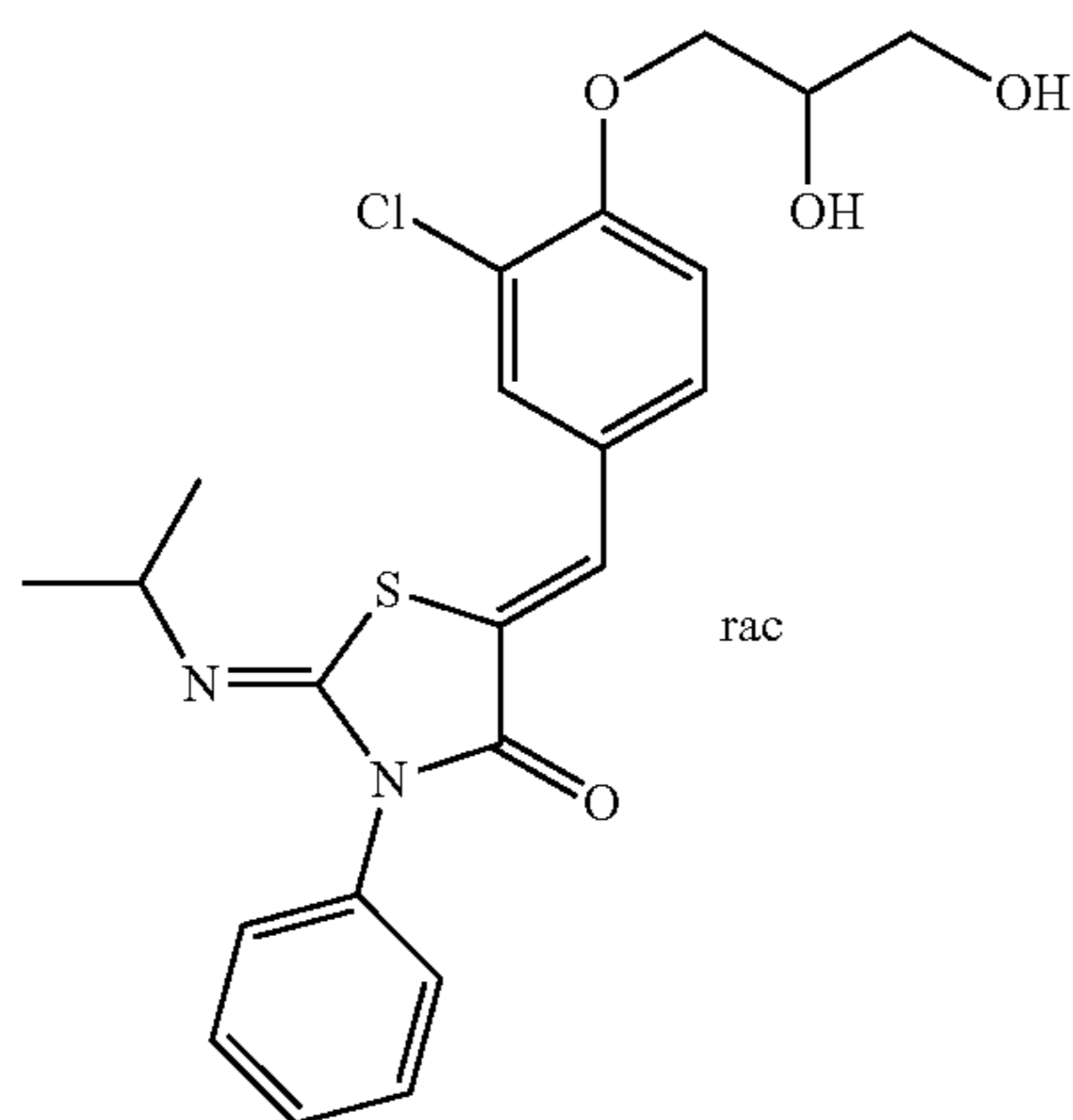


rac-5-[4-(2,3-Dihydroxy-propoxy)-benz-(Z)-ylidene]-2-[(Z)-isopropylimino]-3-o-tolyl-thiazolidin-4-one is obtained as an off-white powder starting from rac-4-(2,3-dihydroxy-propoxy)-benzaldehyde (335 mg, 1.70 mmol) and Scaffold 1 (200 mg, 0.85 mmol) following Method D. LC-MS: t_R =0.86 min, $[M+1]^+$ =413. ¹H NMR (CDCl₃): δ 7.73 (s, 1H), 7.55-7.45 (m, 4H), 7.43-7.32 (m, 3H), 7.03-6.99 (m, 2H), 4.16-

39

4.10 (m, 3H), 3.91-3.84 (m, 1H), 3.81-3.74 (m, 1H), 3.60 (hept, J=6.4 Hz, 1H), 2.56 (s br, 1H), 1.95 (s br, 1H); 1.19 (d, J=6.4 Hz, 6H).

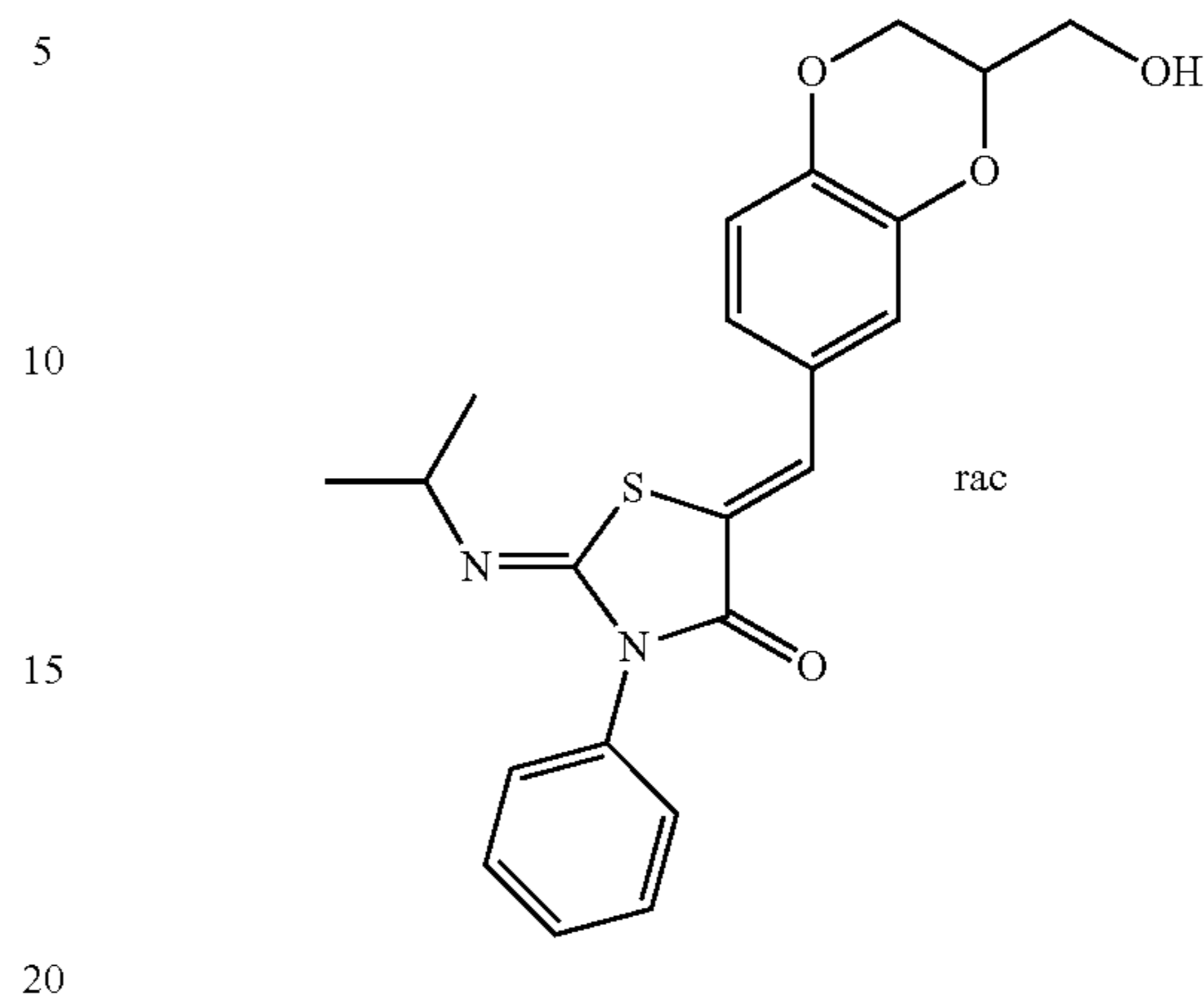
Example 13



rac-5-[3-Chloro-4-(2,3-dihydroxy-propoxy)-benz-(Z)-ylidene]-2-[(Z)-isopropylimino]-3-phenyl-thiazolidin-4-one is obtained as pale olive powder starting from rac-4-(2,3-dihydroxy-propoxy)-3-chloro-benzaldehyde (295 mg, 1.28 mmol) and Scaffold 1 (150 mg, 0.64 mmol) following Method D. LC-MS: $t_R=0.94$ min, $[M+1]^+=447$. 1H NMR ($CDCl_3$): δ 7.64 (s, 1H), 7.59 (d, J=2.3 Hz, 1H), 7.50-7.30 (m, 6H), 7.01 (d, J=8.2 Hz, 1H), 4.25-4.13 (m, 3H), 3.92-3.80 (m, 2H), 3.59 (hept, J=6.4 Hz, 1H), 2.70 (s br, 1H), 2.05 (s br, 1H), 1.18 (d, J=6.4 Hz, 6H).

40

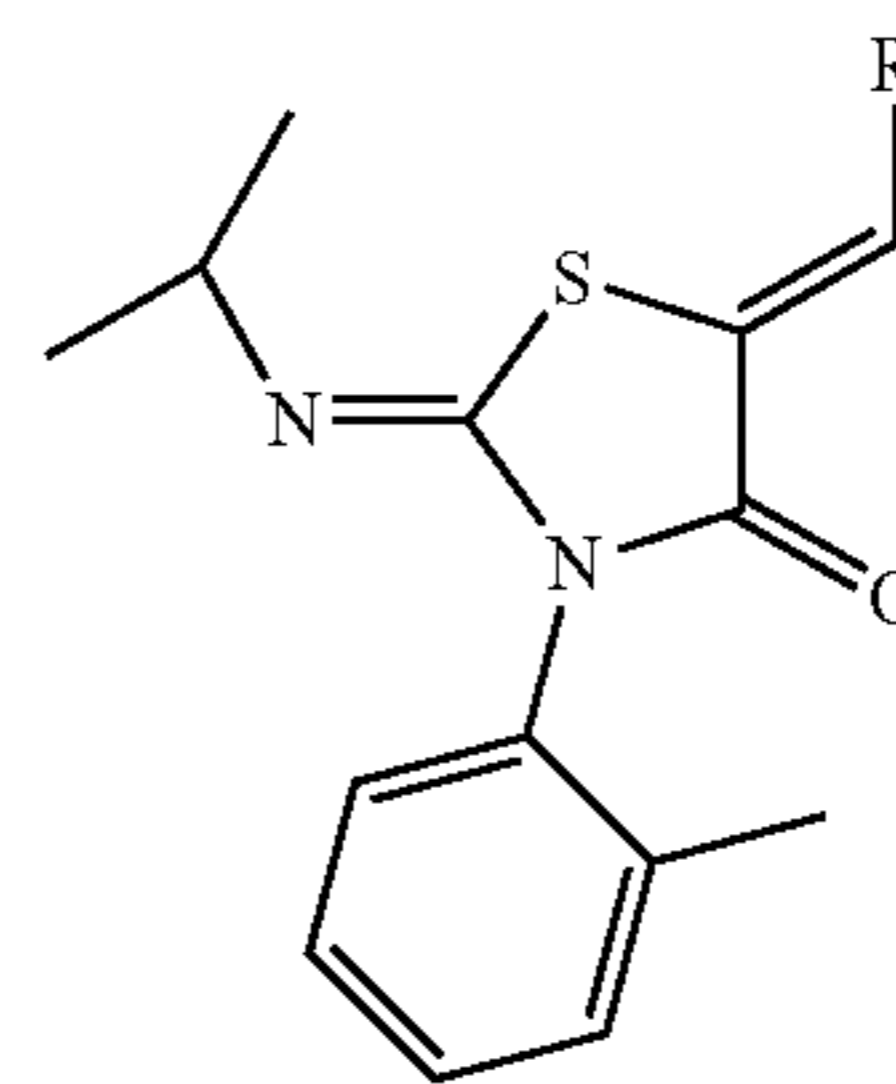
Example 14

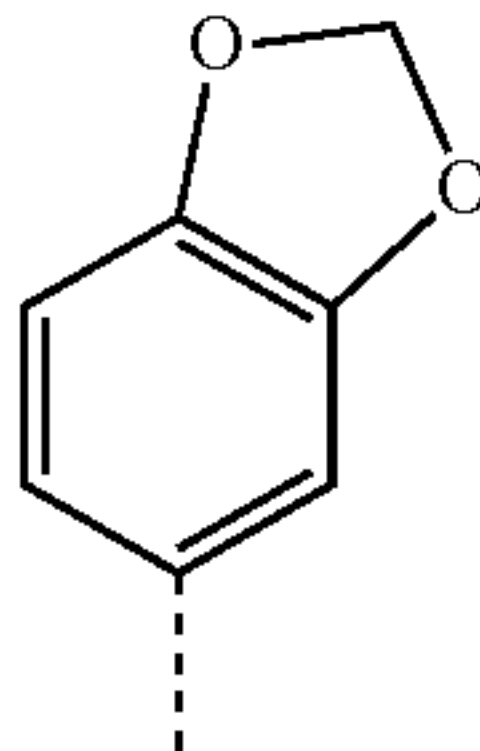


rac-5-(3-Hydroxymethyl-2,3-dihydro-benzo[1,4]dioxin-6-ylmeth-(Z)-ylene)-2-[(Z)-isopropylimino]-3-phenyl-thiazolidin-4-one is obtained as almost colourless crystals (EA/methanol) starting from rac-2-hydroxymethyl-2,3-dihydro-benzo[1,4]dioxine-6-carbaldehyde (210 mg, 1.08 mmol) and Scaffold 1 (150 mg, 0.64 mmol) following Method D. LC-MS: $t_R=0.97$ min, $[M+1]^+=411$. 1H NMR ($CDCl_3$): δ 7.58 (s, 1H), 7.42-7.35 (m, 2H), 7.33-7.24 (m, 3H), 7.06-7.01 (m, 2H), 6.92-6.89 (m, 1H), 4.42-4.35 (m, 1H), 4.30-4.23 (m, 3H), 4.03 (dd, J=7.0, 11.1, 1H), 3.51 (hept, J=6.4 Hz, 1H), 1.10 (d, J=6.4 Hz, 6H).

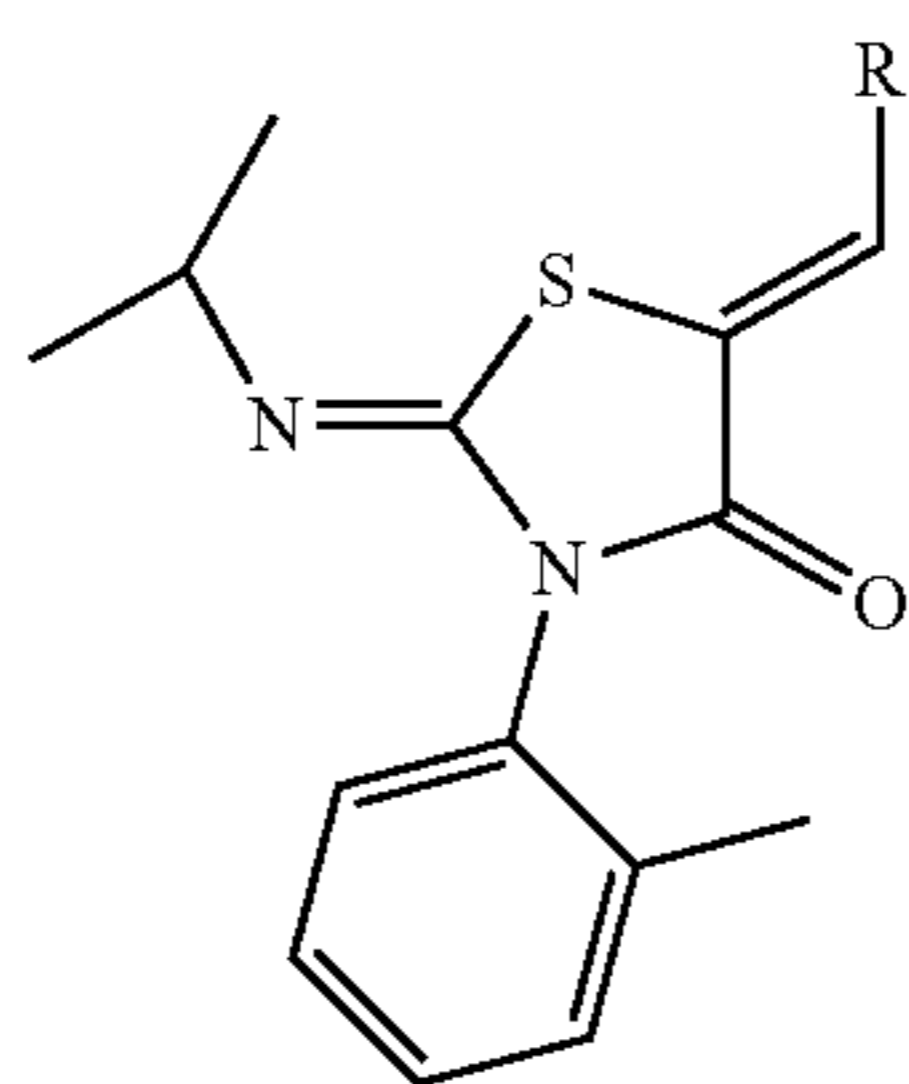
Examples 15 to 25

Starting from Scaffold 2, the following examples are prepared:



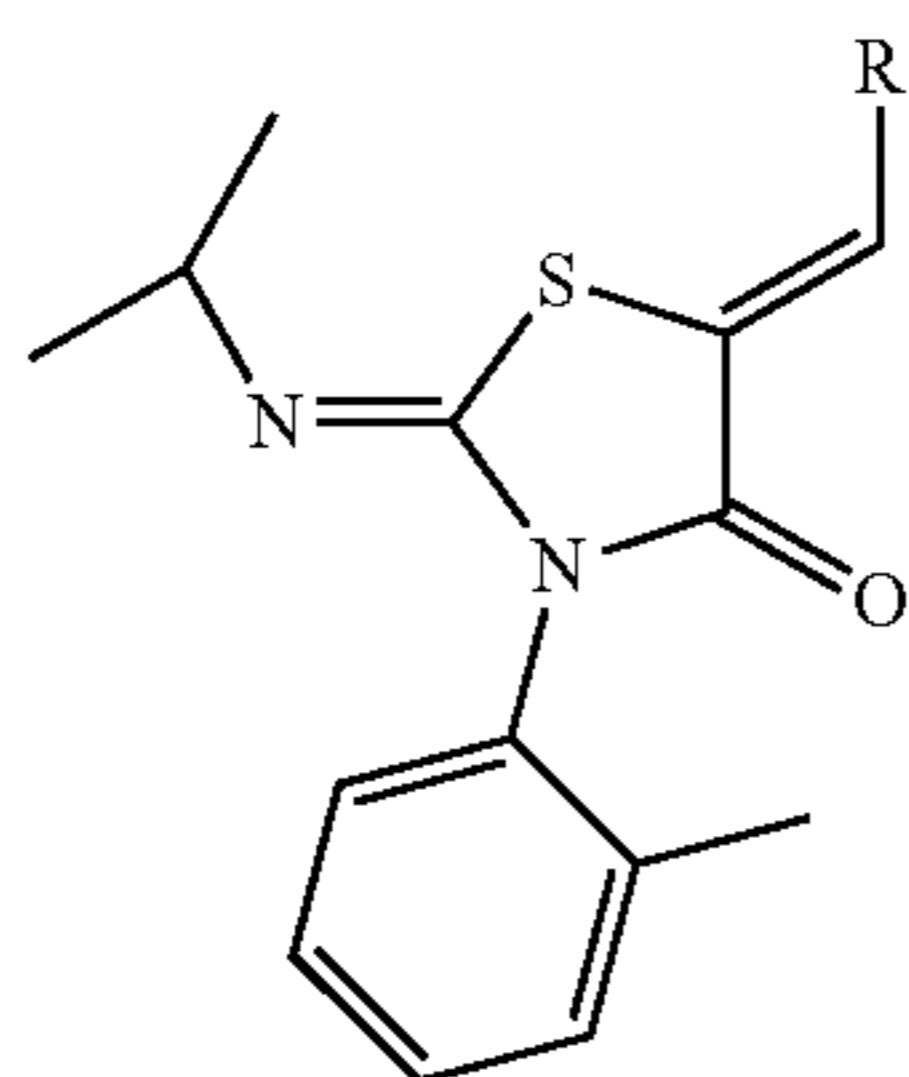
Example	R	Method	Scale	LC-MS	
			(mmol)	t_R	$[M+1]^+$
15		C	0.604	1.10	381

-continued



Example	R	Method	Scale	LC-MS	
			(mmol)	t_R	$[M + 1]^+$
16		E	0.200	1.09	395
17		C	0.604	1.03	380
18		D	0.400	0.98	397
19		D	0.604	0.91	471
20		D	0.604	1.04	431

-continued



Example	R	Method	Scale	LC-MS	
			(mmol)	t_R	$[M + 1]^+$
21		D	0.604	1.02	411
22		D	0.604	0.98	427
23		D	0.604	1.01	411
24		D	0.604	0.96	461
25		D	0.650	1.01	425

45

Example 15

$^1\text{H NMR}$ (CDCl_3): δ 7.69 (s, 1H), 7.34-7.27 (m, 3H), 7.20-7.14 (m, 1H), 7.12-7.07 (m, 2H), 6.91 (d, $J=7.6$ Hz, 1H), 6.06 (s, 2H), 3.58 (hept, $J=6.4$ Hz, 1H), 2.19 (s, 3H), 1.18 (d, $J=5.9$ Hz, 3H), 1.17 (d, $J=5.9$ Hz, 3H).

Example 20

$^1\text{H NMR}$ (CDCl_3): δ 7.65 (s, 1H), 7.62 (d, $J=2.3$ Hz, 1H), 7.45 (dd, $J=2.3, 8.2$ Hz, 1H), 7.36-7.29 (m, 3H), 7.20-7.15 (m, 1H), 7.03 (d, $J=8.8$ Hz, 1H), 4.24-4.20 (m, 2H), 4.07-4.01 (m, 2H), 3.59 (hept, $J=5.9$ Hz, 1H), 2.18 (s, 3H), 2.14 (s br, 1H), 1.18 (d, $J=5.9$ Hz, 3H), 1.16 (d, $J=5.9$ Hz, 3H).

Example 23

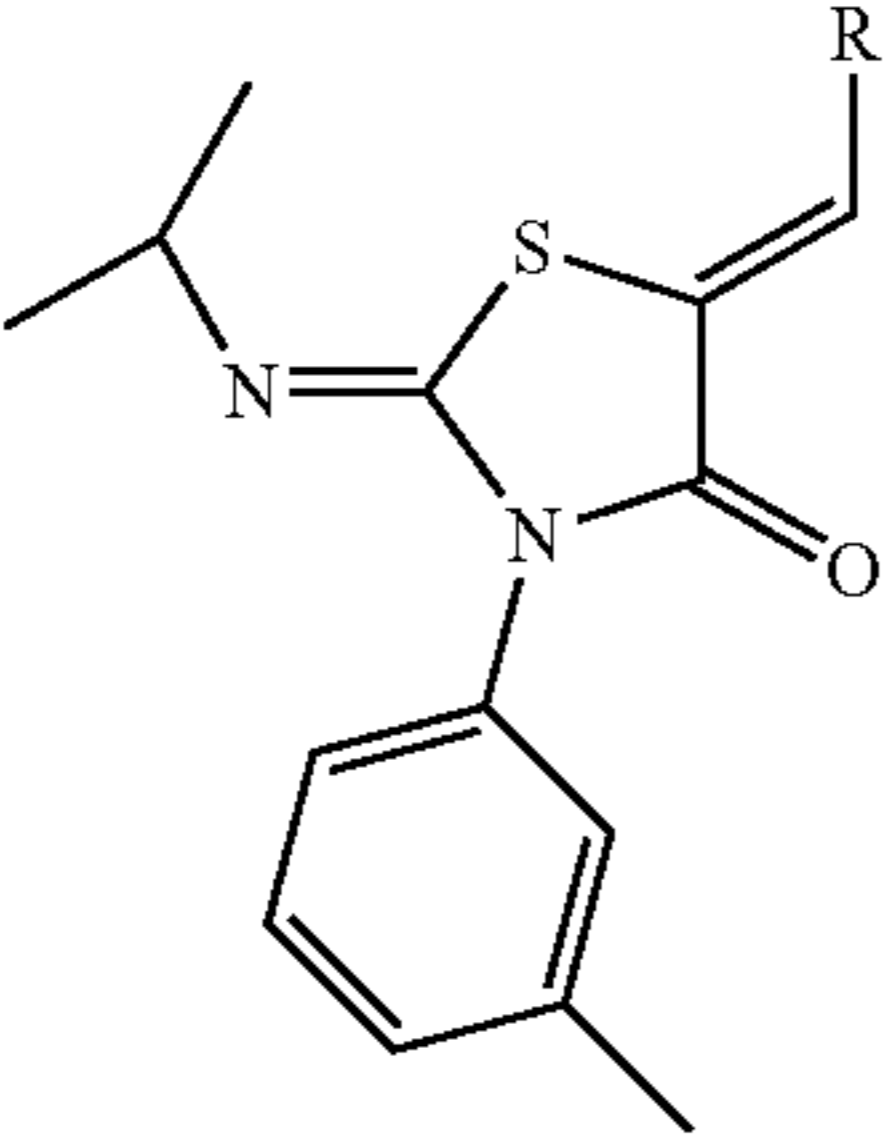
$^1\text{H NMR}$ (CDCl_3): δ 7.73 (s, 1H), 7.55-7.50 (m, 2H), 7.35-7.27 (m, 3H), 7.20-7.15 (m, 1H), 7.02-6.98 (m, 2H), 4.20 (t, $J=5.9$ Hz, 2H), 3.88 (t, $J=5.9$ Hz, 2H), 3.58 (hept, $J=6.4$ Hz, 1H), 2.18 (s, 3H), 2.09 (p, $J=5.9$ Hz, 2H), 1.17 (d, $J=6.4$ Hz, 3H), 1.16 (d, $J=6.4$ Hz, 3H).

Example 24

$^1\text{H NMR}$ (CDCl_3): δ 7.63 8s, 1H), 7.59 8d, $J=2.3$ Hz, 1H), 7.43 (dd, $J=2.3, 8.8$ Hz, 1H), 7.35-7.26 (m, 3H), 7.17-7.13 (m, 1H), 7.01 (d, $J=8.8$ Hz, 1H), 4.24-4.13 (m, 3H), 3.91-3.79 (m, 2H), 3.57 (hept, $J=5.9$ Hz, 1H), 2.74 (s br, 1H), 2.16 (s, 3H), 1.17 (d, $J=5.9$ Hz, 3H), 2.15 (d, $J=5.9$ Hz, 3H).

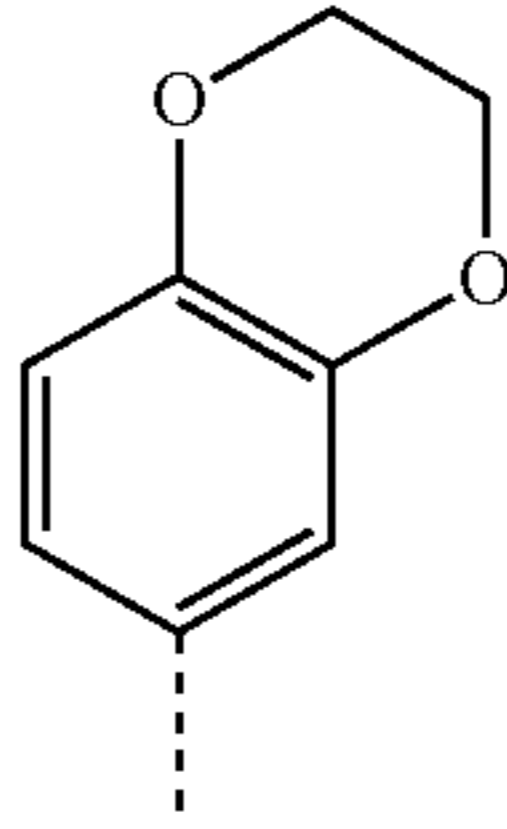
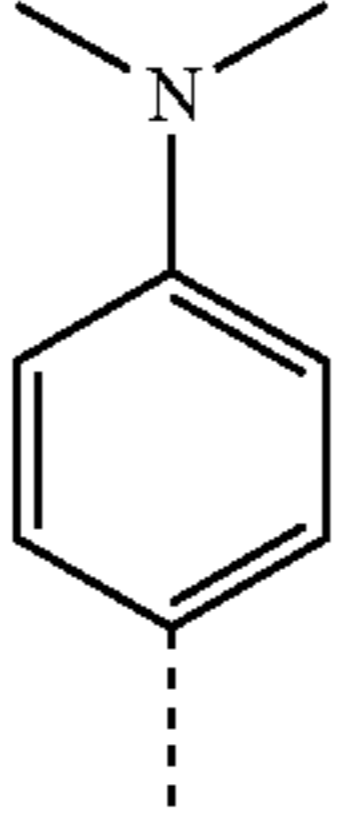
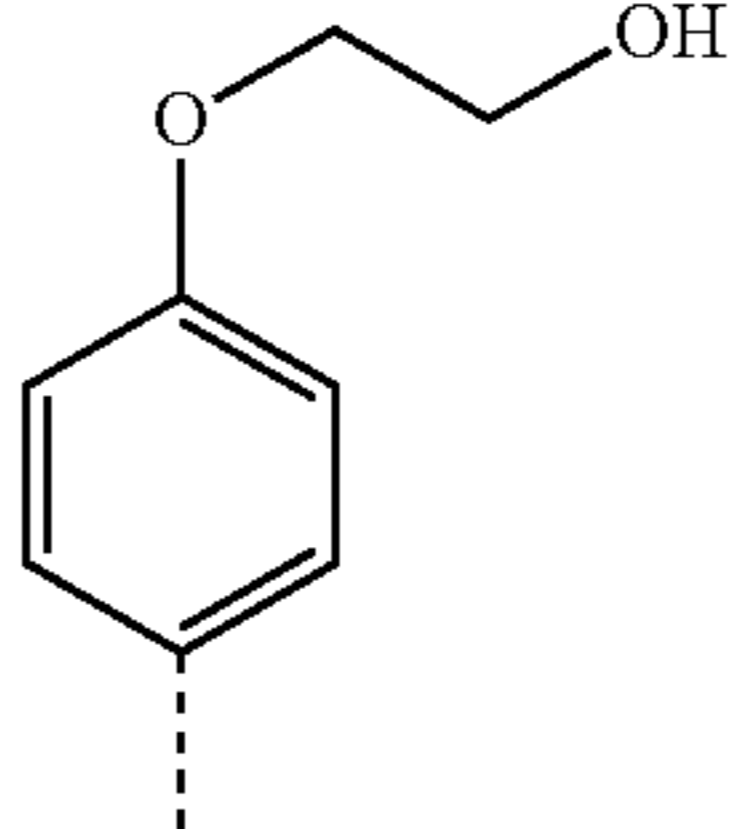
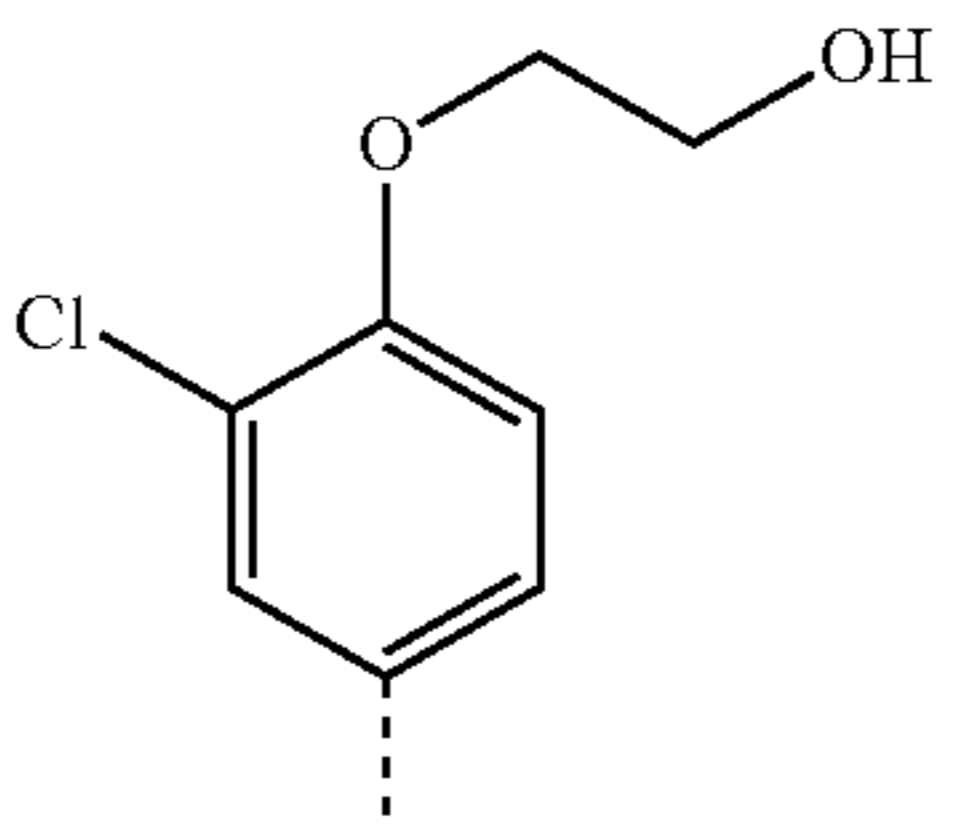
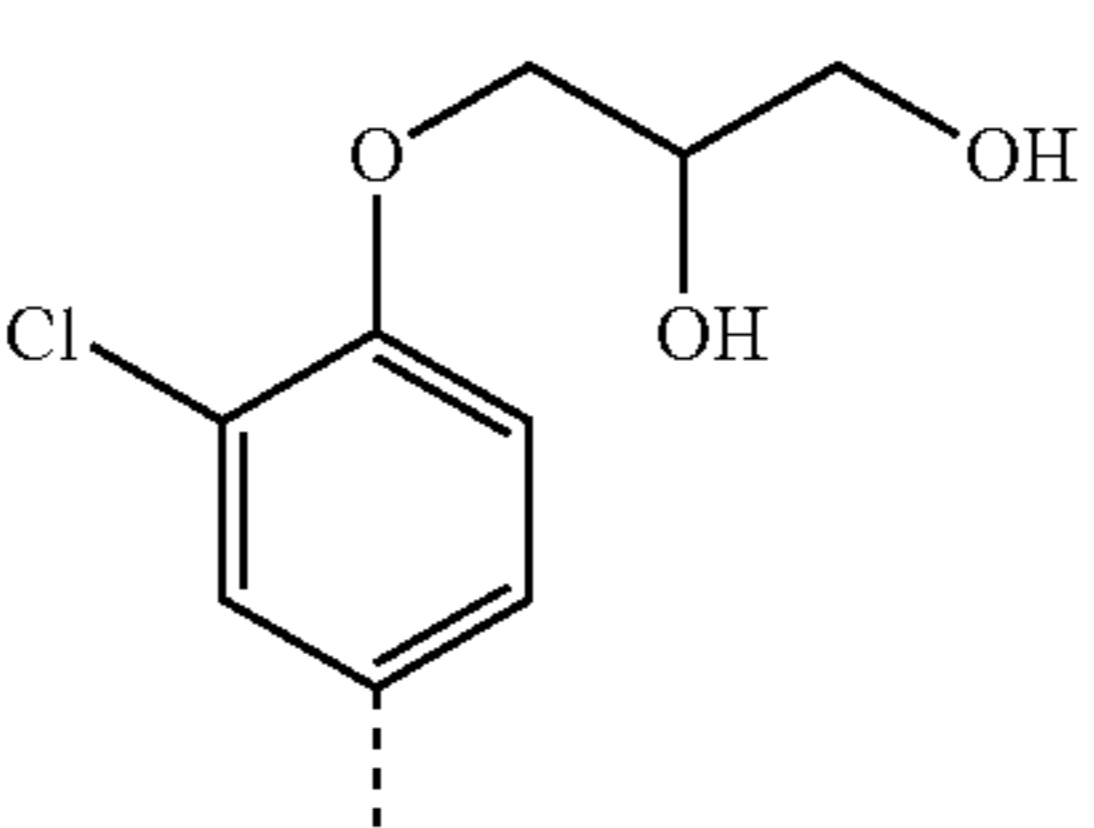
Examples 26 to 31

Starting from Scaffold 3, the following examples are prepared:

Ex- am- ple	R	LC-MS			
		Meth- od	Scale (mmol)	t_R	$[\text{M} + 1]^+$
26		E	0.200	1.08	381

46

-continued

Ex- am- ple	R	Meth- od	Scale (mmol)	t_R	LC-MS
					$[\text{M} + 1]^+$
27		E	0.200	1.08	395
28		E	0.200	1.01	380
29		D	0.400	0.97	397
30		D	0.604	1.04	431
31		D	0.604	0.97	461

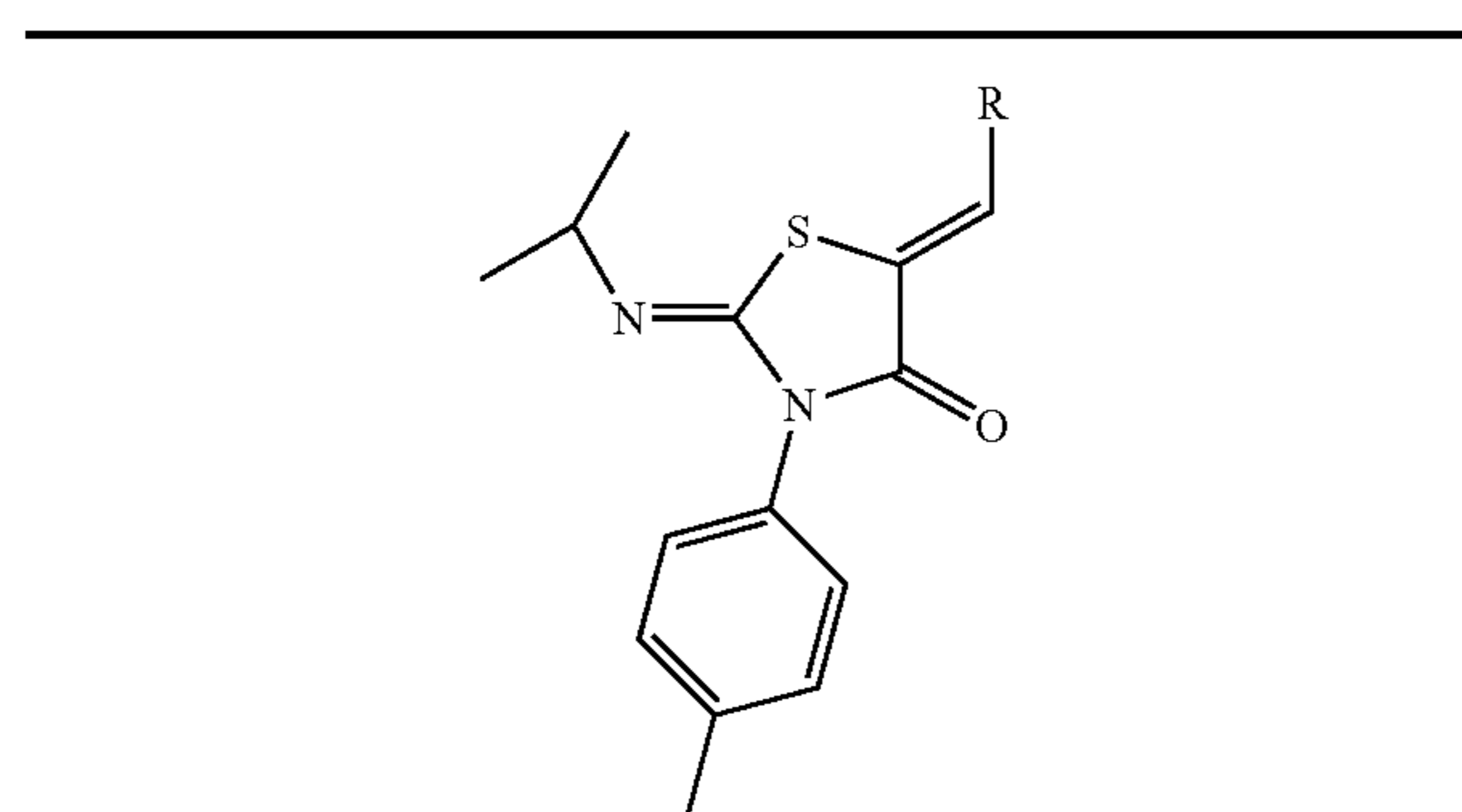
47

Example 31

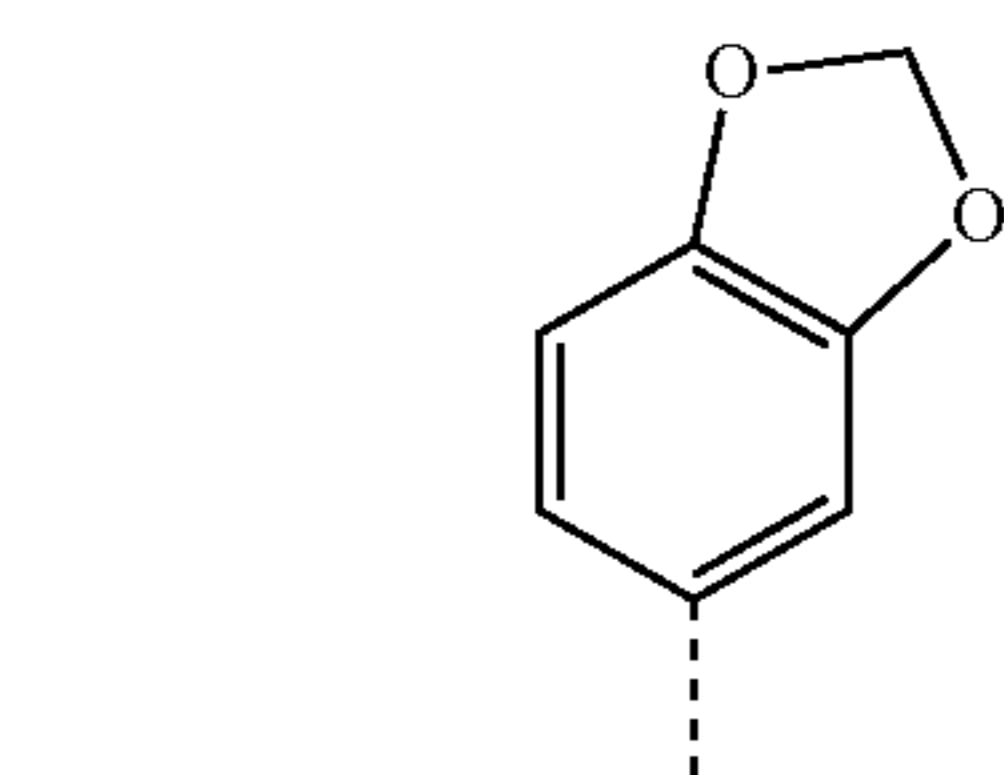
$^1\text{H NMR}$ (CDCl_3) δ 7.64 (s, 1H), 7.60 (d, $J=2.3$ Hz, 1H), 7.44 (dd, $J=2.3, 8.8$ Hz, 1H), 7.39-7.33 (m, 1H), 7.23-7.19 (m, 1H), 7.15-7.10 (m, 2H), 7.02 (d, $J=8.8$ Hz, 1H), 4.25-4.15 (m, 3H), 3.93-3.80 (m, 2H), 3.60 (hept, $J=6.4$ Hz, 1H), 2.75 (s br, 1H), 2.41 (s, 3H), 1.85 (s br, 1H), 1.21 (d, $J=6.4$ Hz, 6H).

Examples 32 to 36

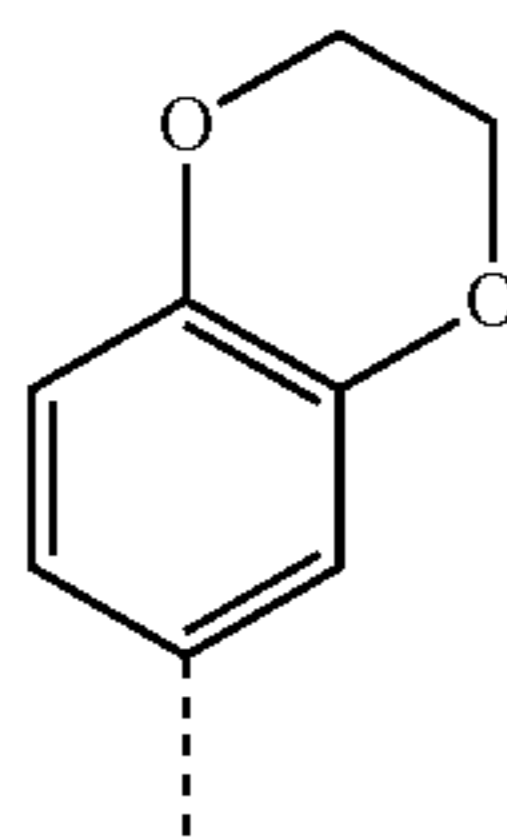
Starting from Scaffold 4, the following examples have been prepared:



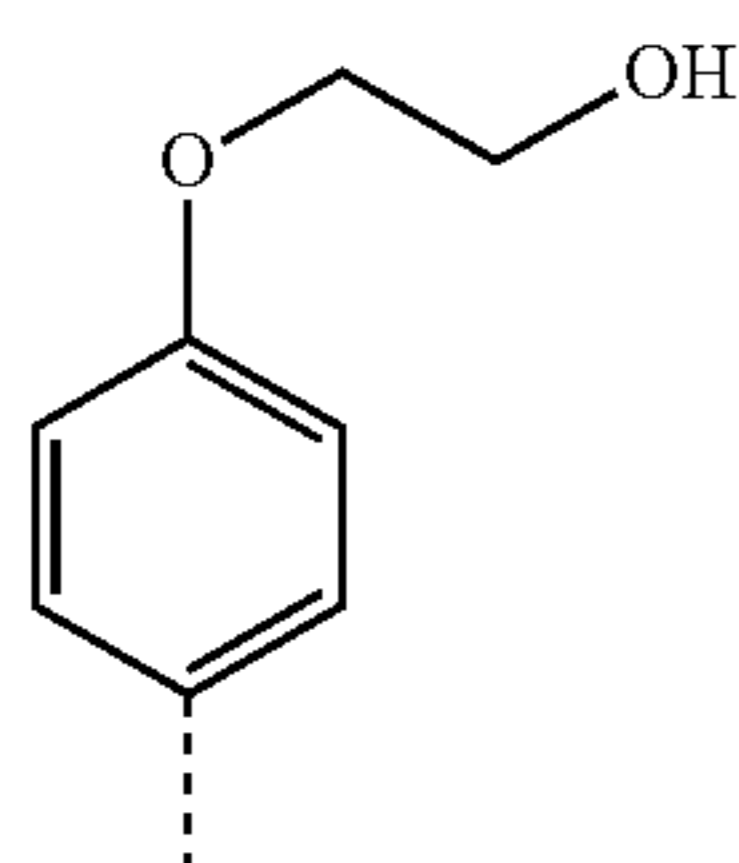
Ex- am- ple	R	LC-MS		
		Meth- od	Scale (mmol)	t_R [M + 1] ⁺
32		E	0.200	1.09 381



33		E	0.200	1.09 395
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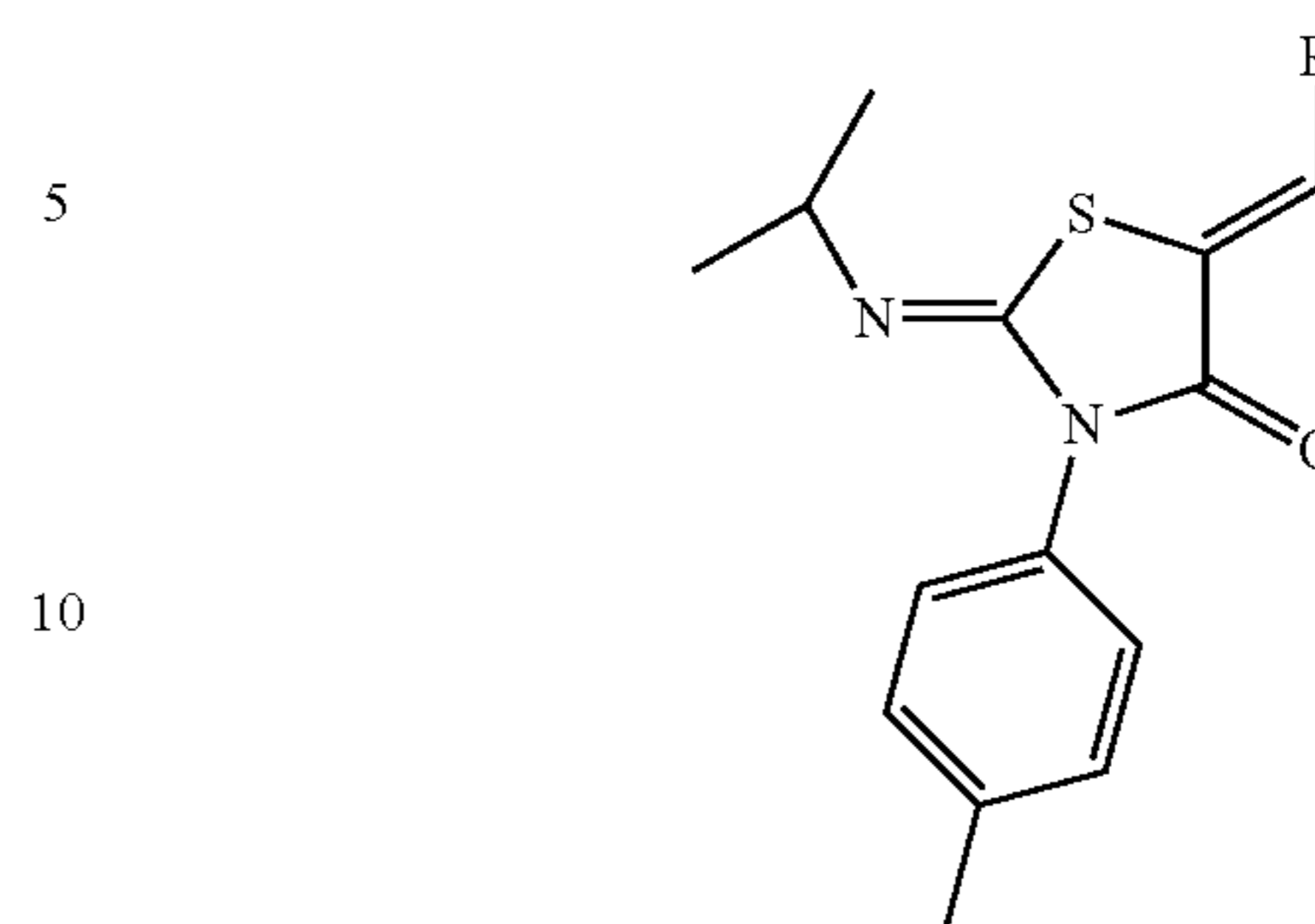


34		D	0.400	0.97 397
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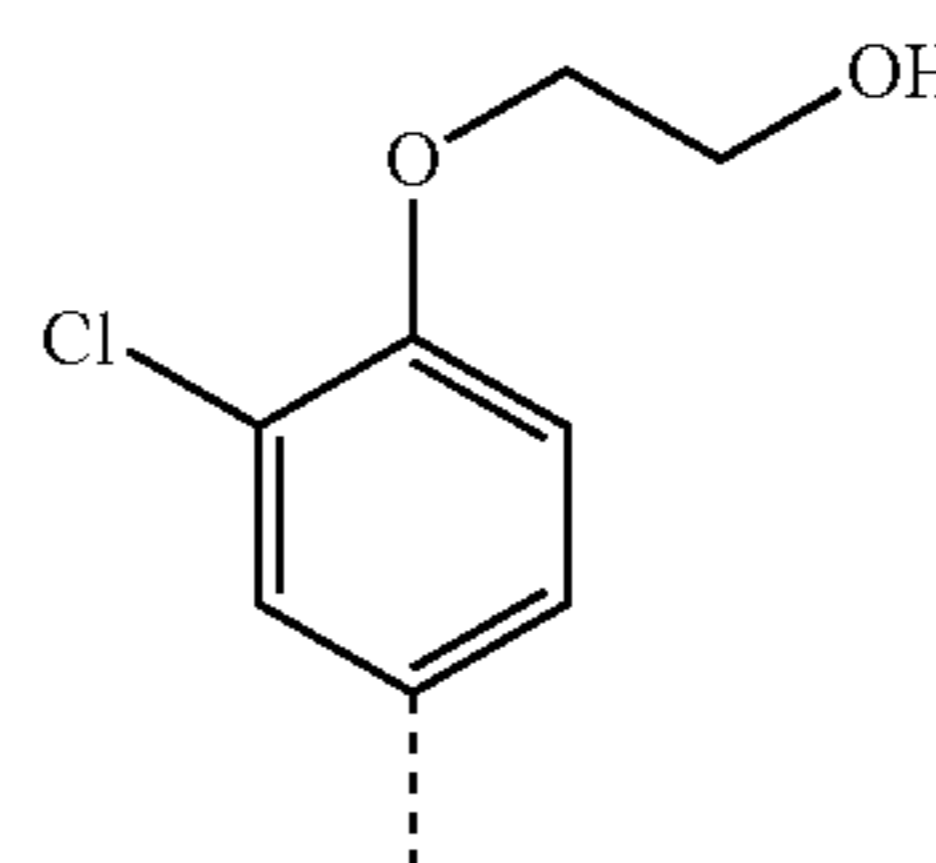
48

-continued



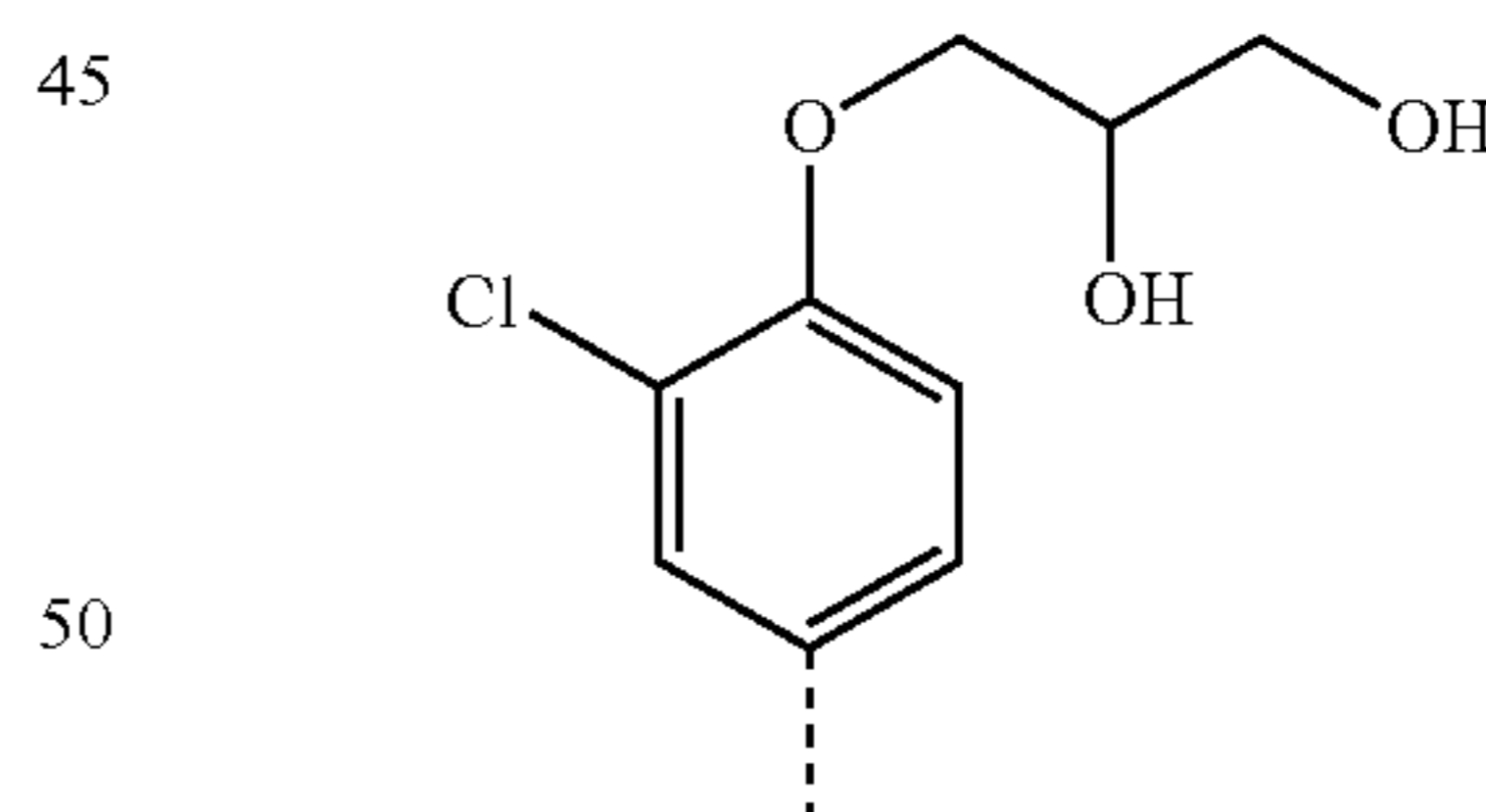
Ex- am- ple	R	LC-MS		
		Meth- od	Scale (mmol)	t_R [M + 1] ⁺
35		D	0.604	1.05 431

25



36		D	0.604	0.98 461
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40



55

Example 35

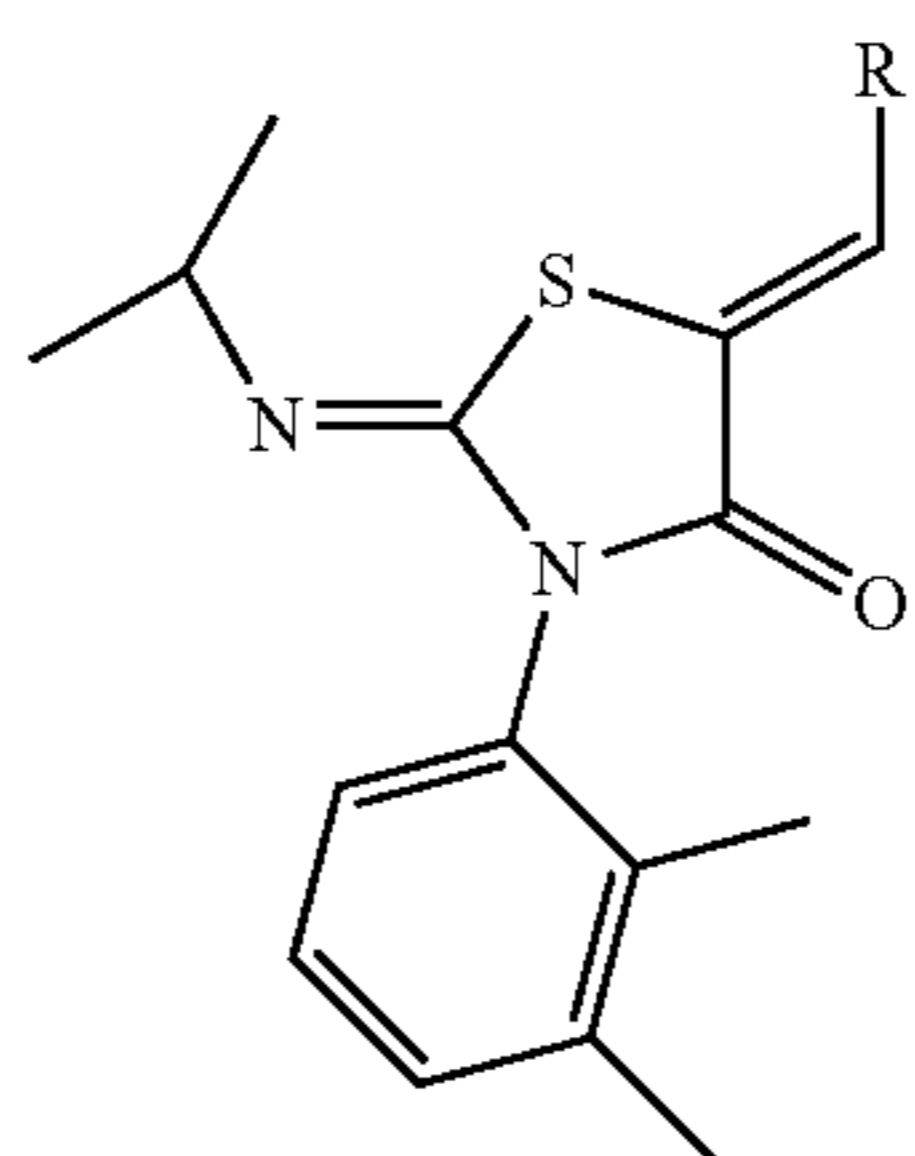
60

$^1\text{H NMR}$ (CDCl_3): δ 7.64 (s, 1H), 7.60 (d, $J=2.3$ Hz, 1H), 7.44 (dd, $J=2.3, 8.2$ Hz, 1H), 7.30-7.19 (m, 4H), 7.02 (d, $J=8.2$ Hz, 1H), 4.23-4.19 (m, 2H), 4.07-4.00 (m, 2H), 3.59 (hept, $J=6.4$ Hz, 1H), 2.40 (s, 3H), 2.14 (s br, 1H), 1.19 (d, $J=6.4$ Hz, 6H).

65

Examples 37 to 47

Starting from Scaffold 5, the following examples have been prepared:

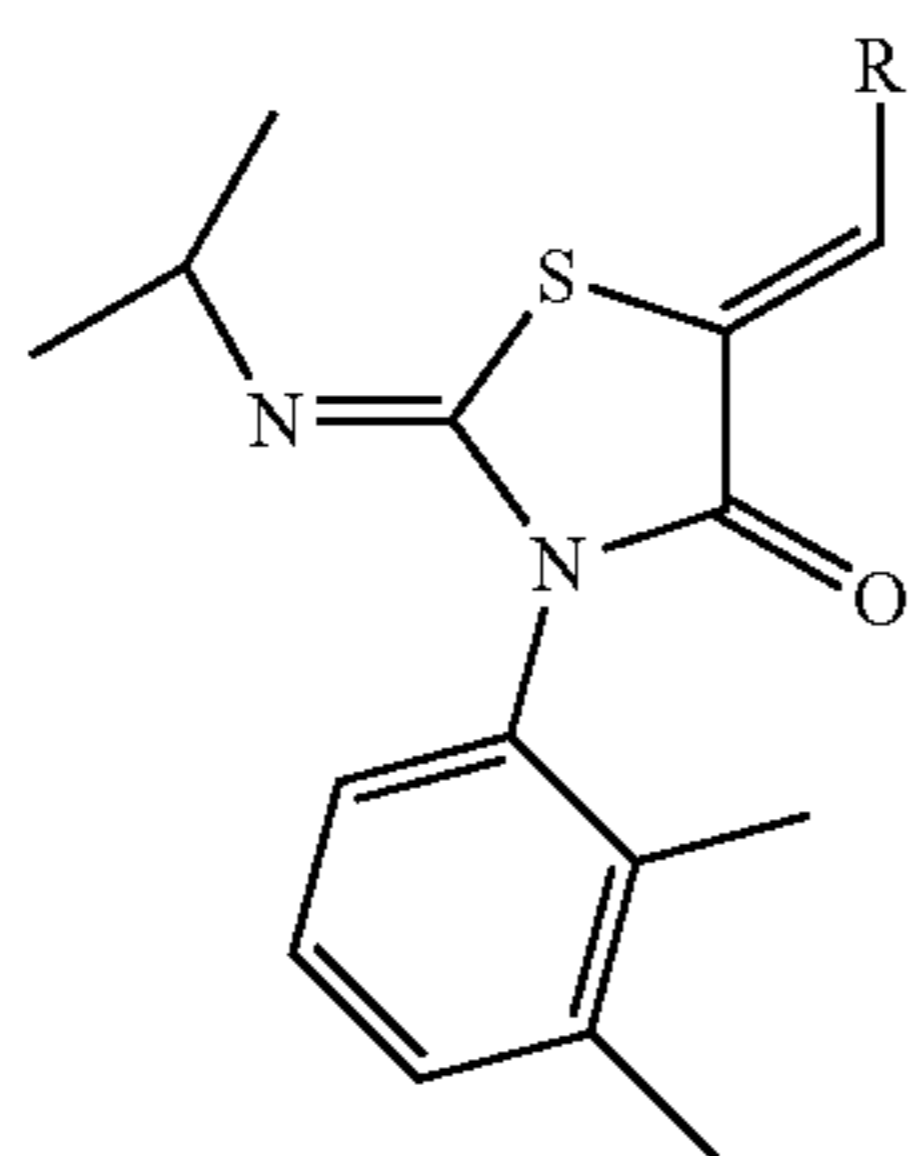


Example	R	Method	Scale	LC-MS	
			(mmol)	t_R	$[M + 1]^+$
37		E	0.200	1.11	395
38		E	0.200	1.11	409
39		E	0.200	1.05	394
40		D	0.763	0.99	411
41		D	0.572	0.93	485

51

52

-continued



Example	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^+$
42		D	0.572	1.06	445
43		D	0.572	1.03	429
44		D	0.572	1.03	425
45		D	0.572	1.00	441
46		D	0.572	0.98	475
47		D	0.650	1.00	439

53

Example 40

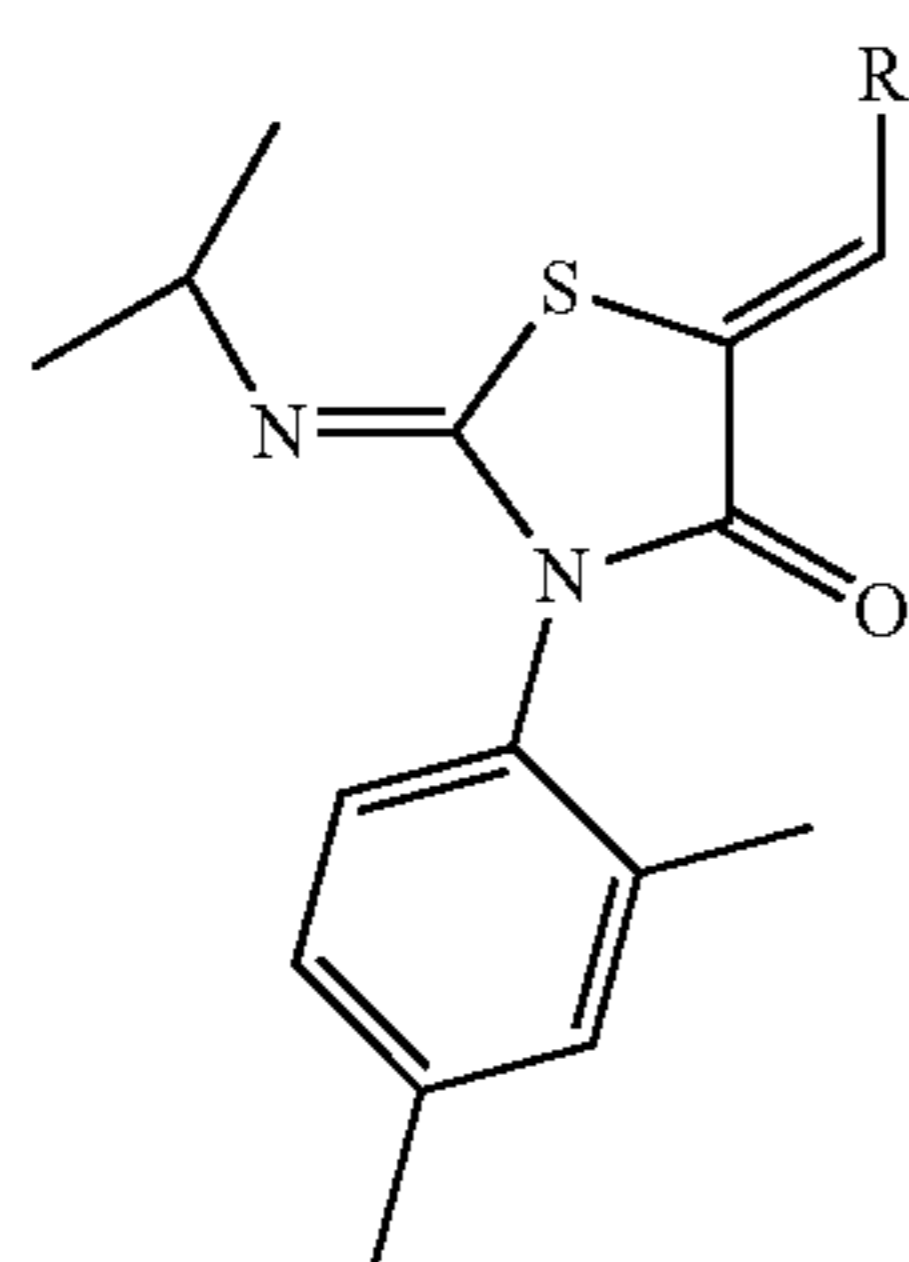
^1H NMR (CDCl_3): δ 7.73 (s, 1H), 7.56-7.51 (m, 2H), 7.24-7.18 (m, 2H), 7.06-7.00 (m, 3H), 4.18-4.14 (m, 2H), 4.04-3.98 (m, 2H), 3.50 (hept, $J=6.4$ Hz, 1H), 2.35 (s, 3H), 2.05 (s, 3H), 2.00 (s br, 1H), 1.18 (d, $J=6.4$ Hz, 3H), 1.17 (d, $J=6.4$ Hz, 3H).

Example 47

^1H NMR (CDCl_3): δ 7.57 (s, 1H), 7.17-7.00 (m, 4H), 6.97-6.85 (m, 2H), 4.30-4.18 (m, 2H), 4.11-4.03 (m, 1H), 3.86-3.70 (m, 2H), 3.49 (hept, $J=6.4$ Hz, 1H), 2.26 (s, 3H), 1.95 (s, 3H), 1.07 (d, $J=6.4$ Hz, 6H).

Examples 48 and 49

Starting from Scaffold 6, the following examples are prepared:



Example	R	Method	Scale (mmol)	LC-MS	
				t_R	$[\text{M} + 1]^+$
48		E	0.200	1.12	409
49		D	0.762	1.00	411

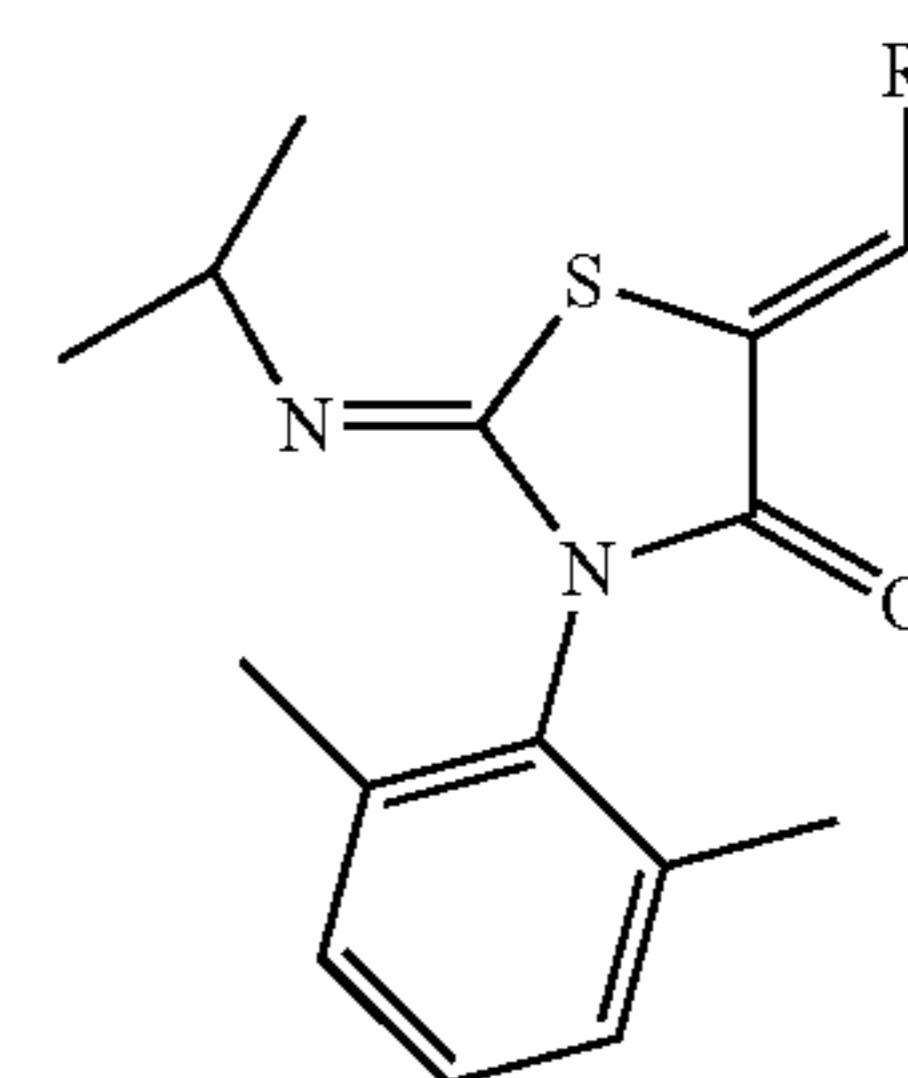
Example 48

^1H NMR (CDCl_3): δ 7.72 (s, 1H), 7.56-7.50 (m, 2H), 7.14-6.98 (m, 5H), 4.17-4.12 (m, 2H), 4.02-3.96 (m, 2H), 3.58 (hept, $J=6.2$ Hz, 1H), 2.37 (s, 3H), 2.14 (s, 3H), 2.04 (s br, 1H), 1.17 (d, $J=6.2$ Hz, 3H), 1.16 (d, $J=6.2$ Hz, 3H).

54

Examples 50 to 51

Starting from Scaffold 7, the following examples are prepared:



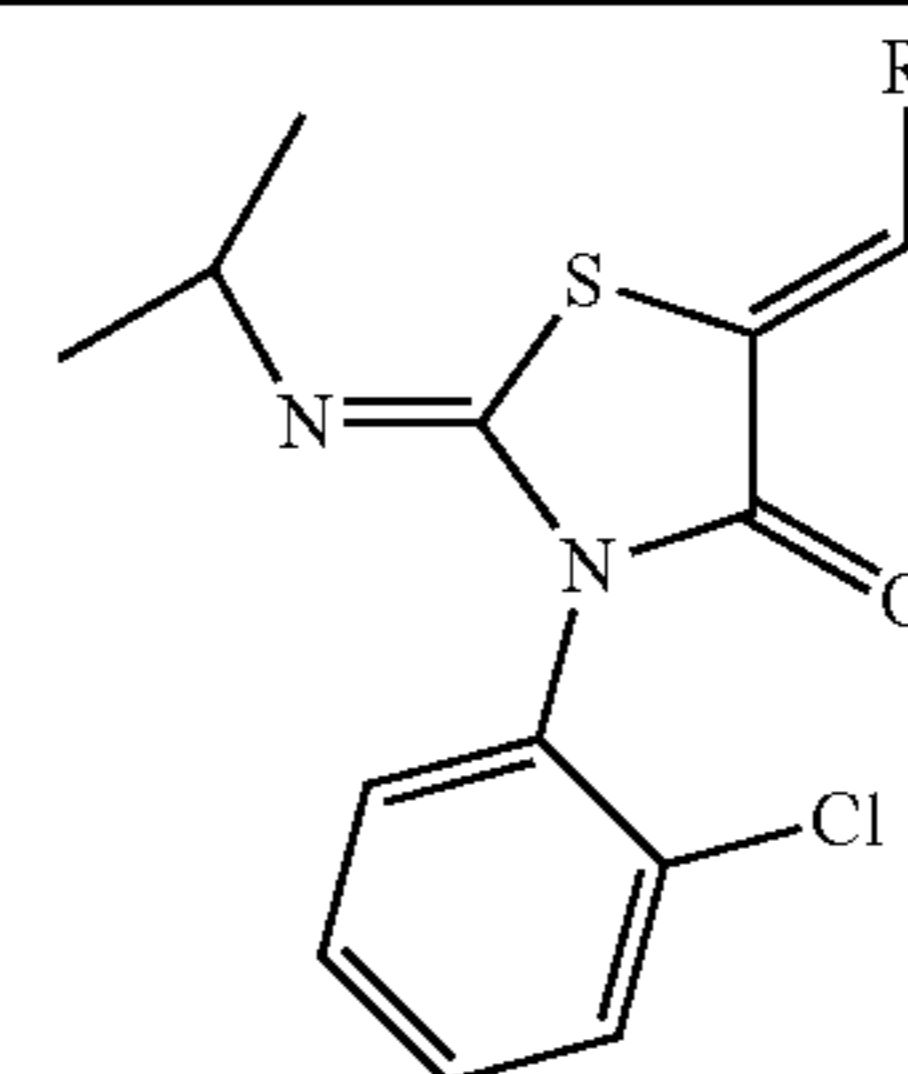
Example	R	Method	Scale (mmol)	LC-MS	
				t_R	$[\text{M} + 1]^+$
50		E	0.200	1.13	409
51		D	0.762	1.02	411

Example 51

^1H NMR (CDCl_3): δ 7.73 (s, 1H), 7.57-7.52 (m, 2H), 7.27-7.21 (m, 1H), 7.17-7.12 (m, 2H), 7.04-6.99 (m, 2H), 4.18-4.13 (m, 2H), 4.03-3.98 (m, 2H), 3.57 (hept, $J=6.1$ Hz, 1H), 2.15 (s, 6H), 2.01 (s br, 1H), 1.16 (d, $J=6.4$ Hz, 6H).

Examples 52 to 57

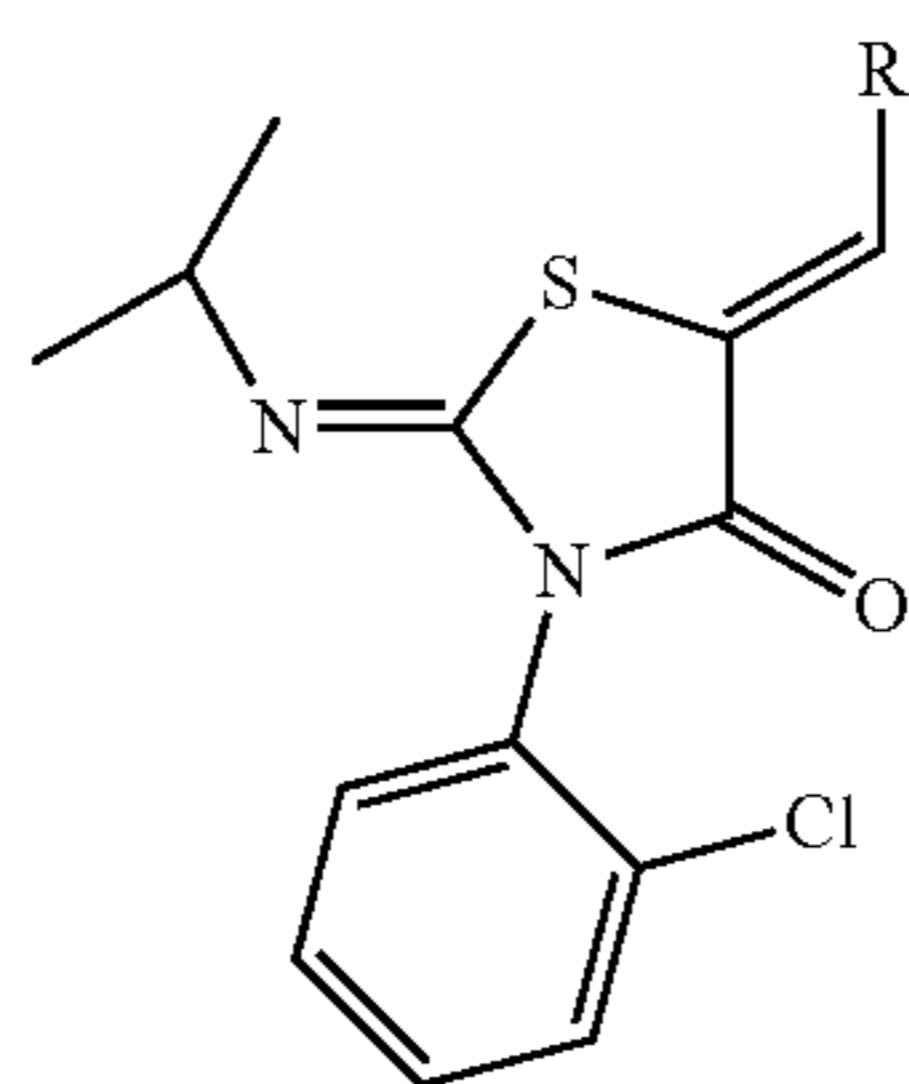
Starting from Scaffold 8, the following examples are prepared:



Ex-ample	R	Meth-od	Scale (mmol)	LC-MS	
				t_R	$[\text{M} + 1]^+$
52		E	0.200	1.11	401

55

-continued



Ex-ample	R	Meth-od	Scale (mmol)	LC-MS	
				t_R	$[M+1]^+$
53		E	0.200	1.11	415
54		E	0.200	1.09	400
55		D	0.744	0.99	417
56		D	0.558	1.05	451
57		D	0.558	0.98	481

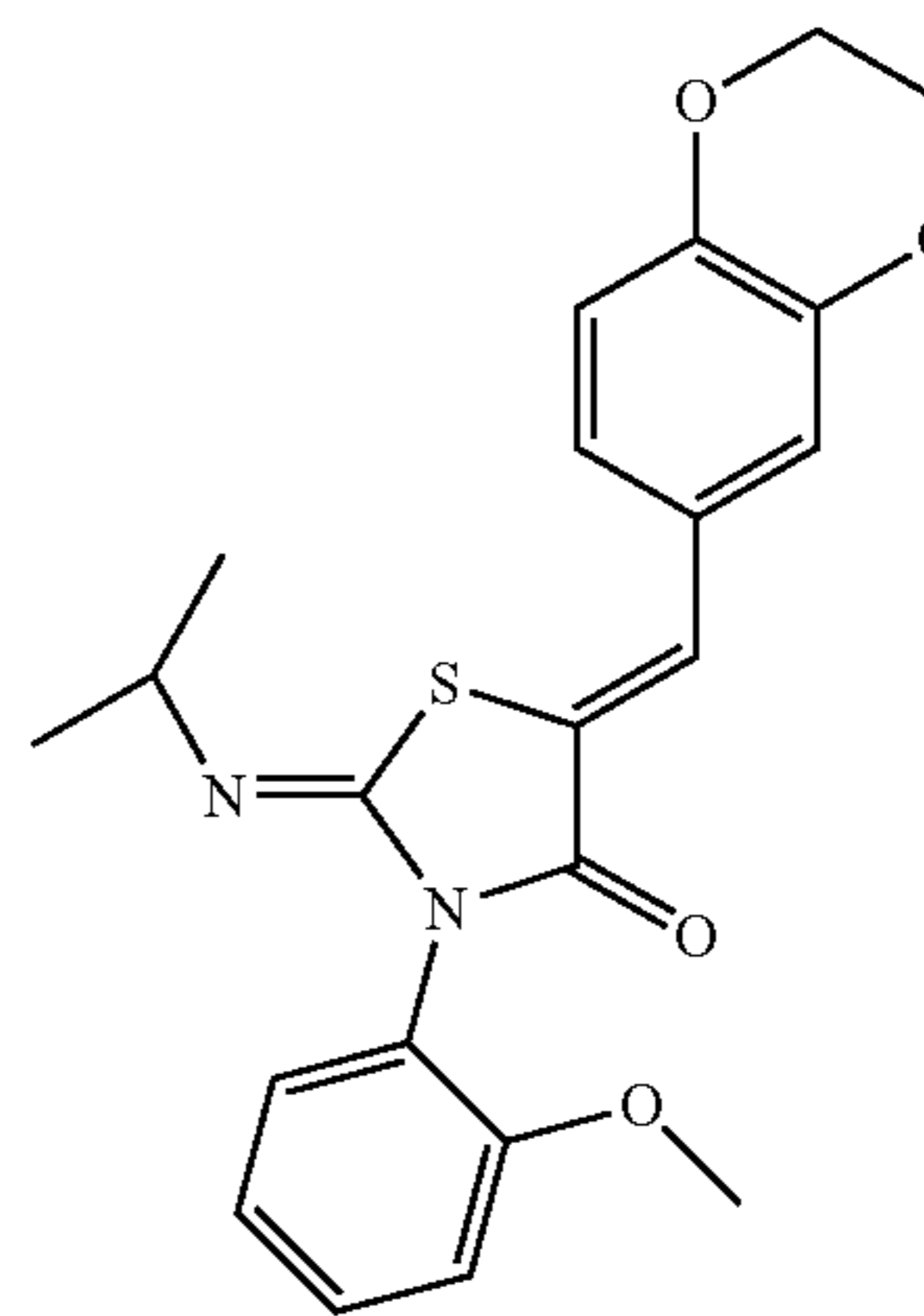
Example 55

$^1\text{H NMR}$ (CDCl_3): δ 7.74 (s, 1H), 7.56-7.50 (m, 3H), 7.41-7.32 (m, 3H), 7.04-7.00 (m, 2H), 4.18-4.13 (m, 2H),

56

4.04-3.98 (m, 2H), 3.58 (hept, $J=6.1$ Hz, 1H), 2.01 (s br, 1H), 1.17 (d, $J=5.9$ Hz, 3H), 1.16 (d, $J=6.4$ Hz, 3H).

Example 58



5-(2,3-Dihydro-benzo[1,4]dioxin-6-ylmethyl-(Z)-ylidene)-2-[(Z)-isopropylimino]-3-(2-methoxyphenyl)-thiazolidin-4-one is obtained starting from Scaffold 9 (53 mg, 0.200 mmol) and 2,3-dihydro-benzo[1,4]dioxine-6-carbaldehyde (49 mg, 0.300 mmol) following Method C. LC-MS: $t_R=1.03$ min, $[M+1]^+=411$.

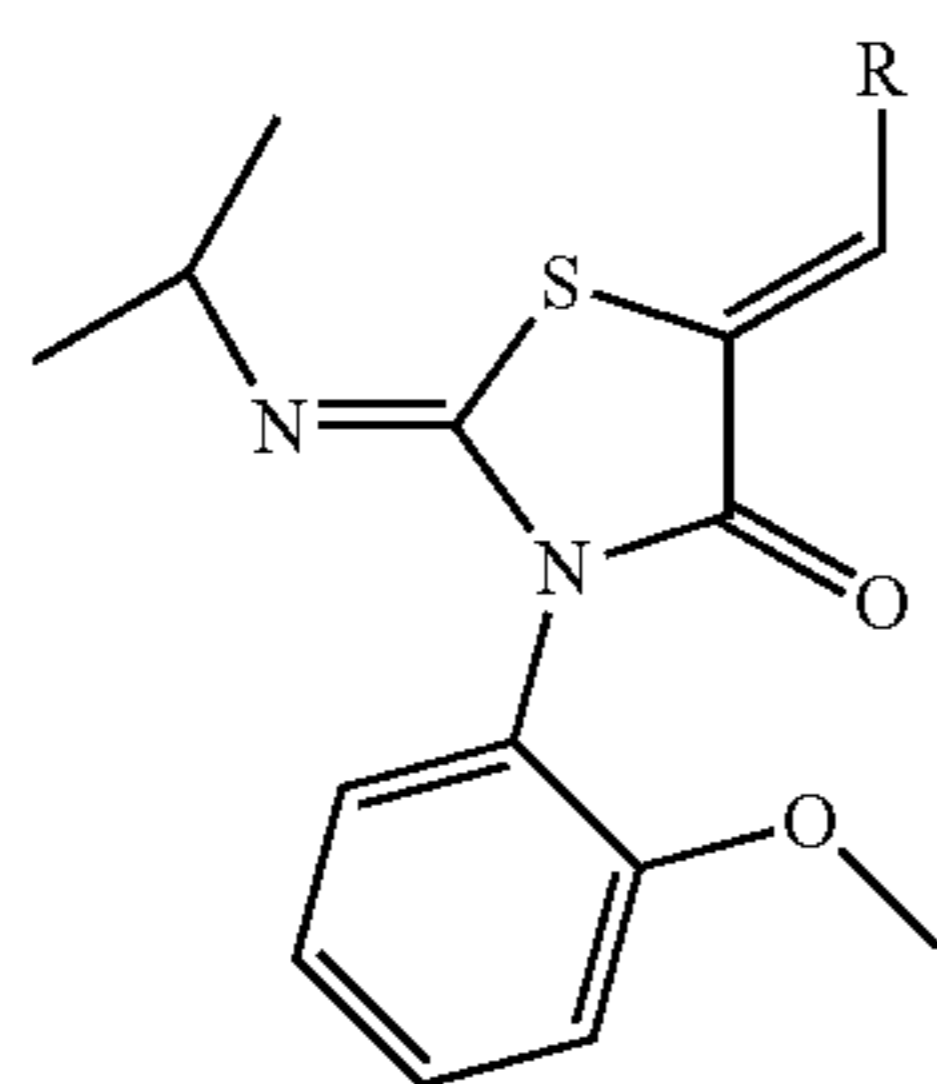
Examples 58 to 60

Starting from Scaffold 9, the following examples are prepared:

Ex-ample	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M+1]^+$
58		C	0.200	1.03	411
59					
60					

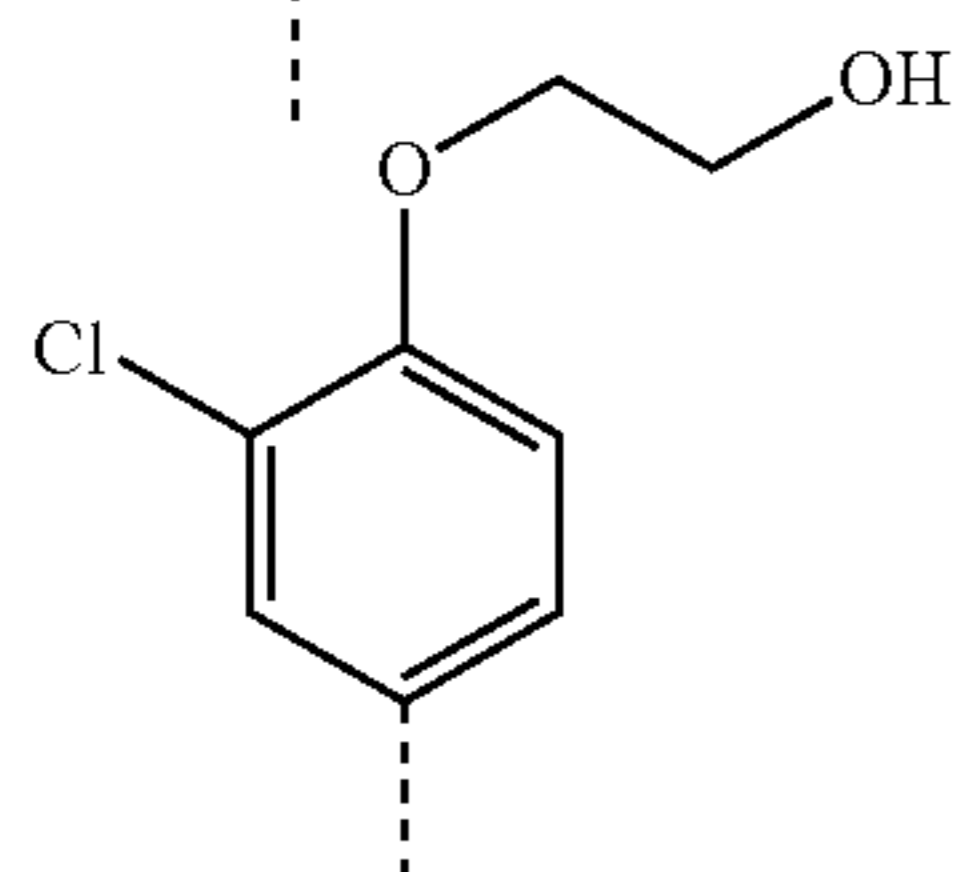
57

-continued



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^+$

59		D	0.378	0.92	413
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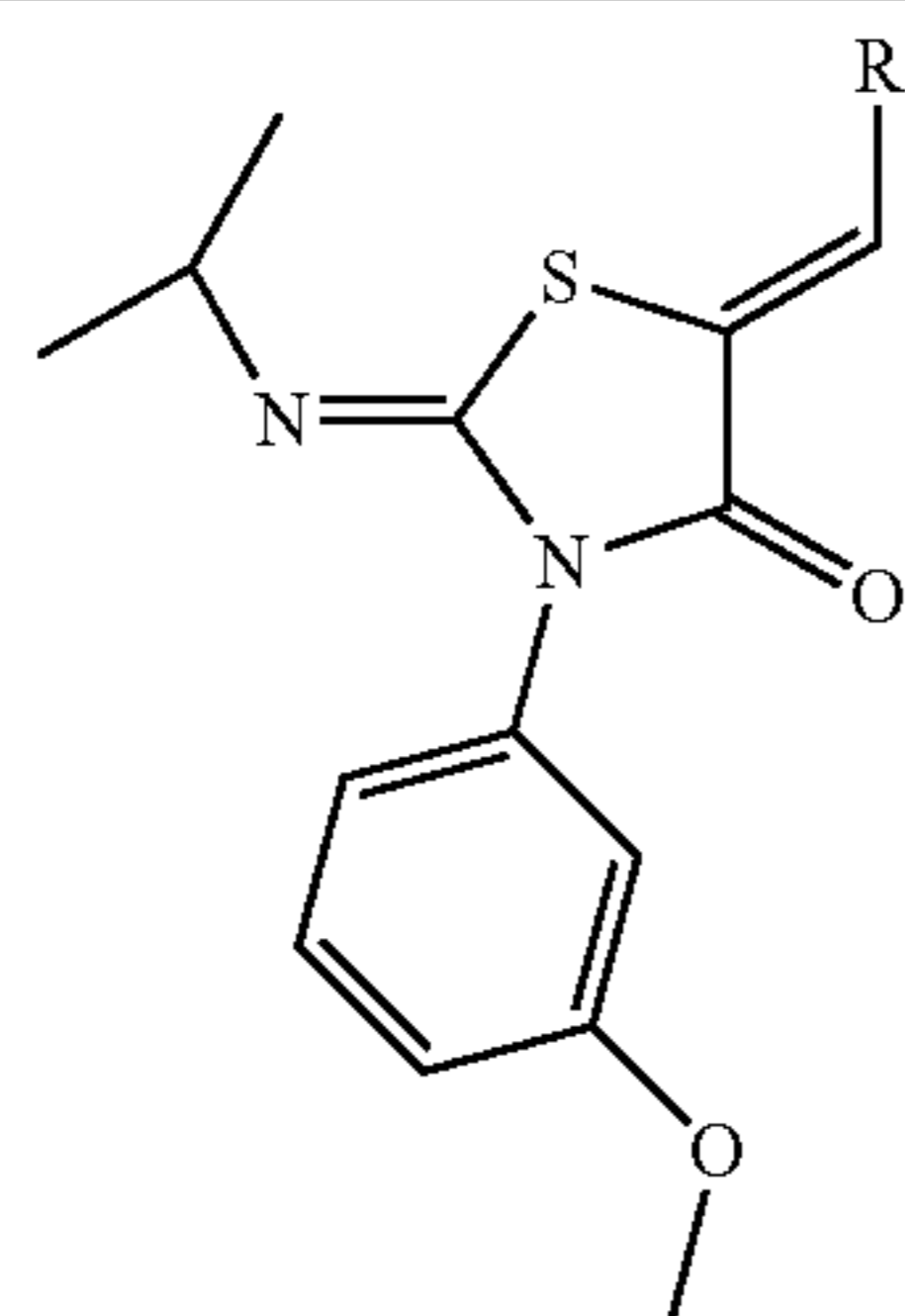
60		D	0.567	0.99	447
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Example 60

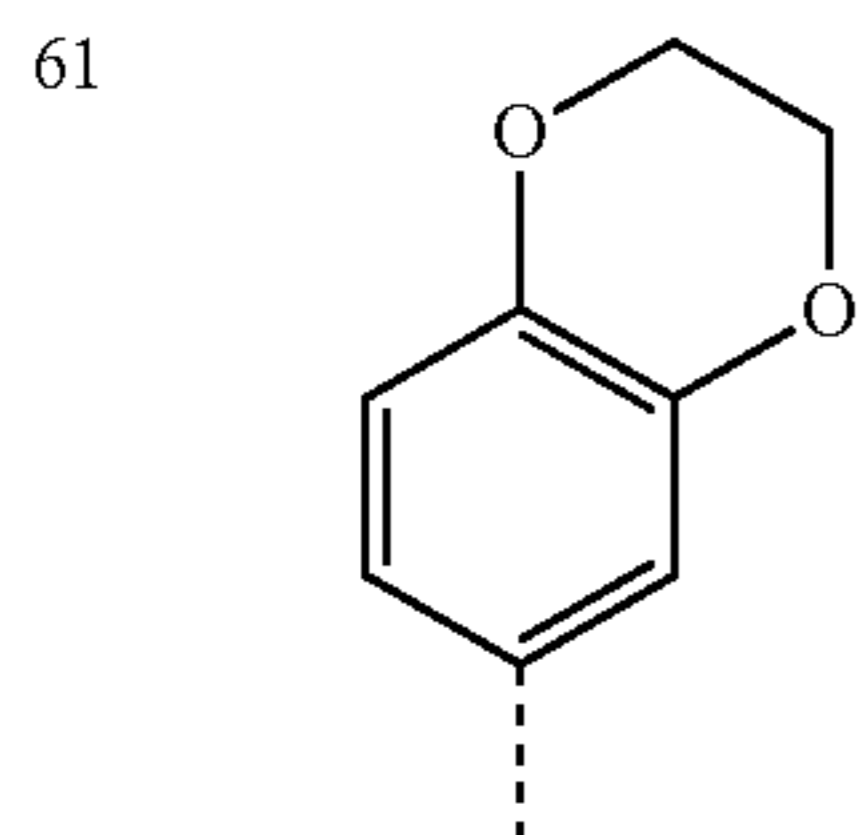
$^1\text{H NMR}$ (CDCl_3): δ 7.55 (s, 1H), 7.52 (d, $J=2.3$ Hz, 1 $^{\prime}$ -1), 7.38-7.29 (m, 2H), 7.15 (dd, $J=1.8, 7.6$ Hz, 1H), 7.00-6.92 (m, 3H), 4.15-4.11 (m, 2H), 3.98-3.93 (m, 2H), 3.72 (s, 3H), 3.50 (hept, $J=6.4$ Hz, 1H), 2.08 (s br, 1H), 1.09 (d, $J=6.4$ Hz, 3H), 1.08 (d, $J=6.4$ Hz, 3H).

Examples 61 and 62

Starting from Scaffold 10, the following examples are prepared:



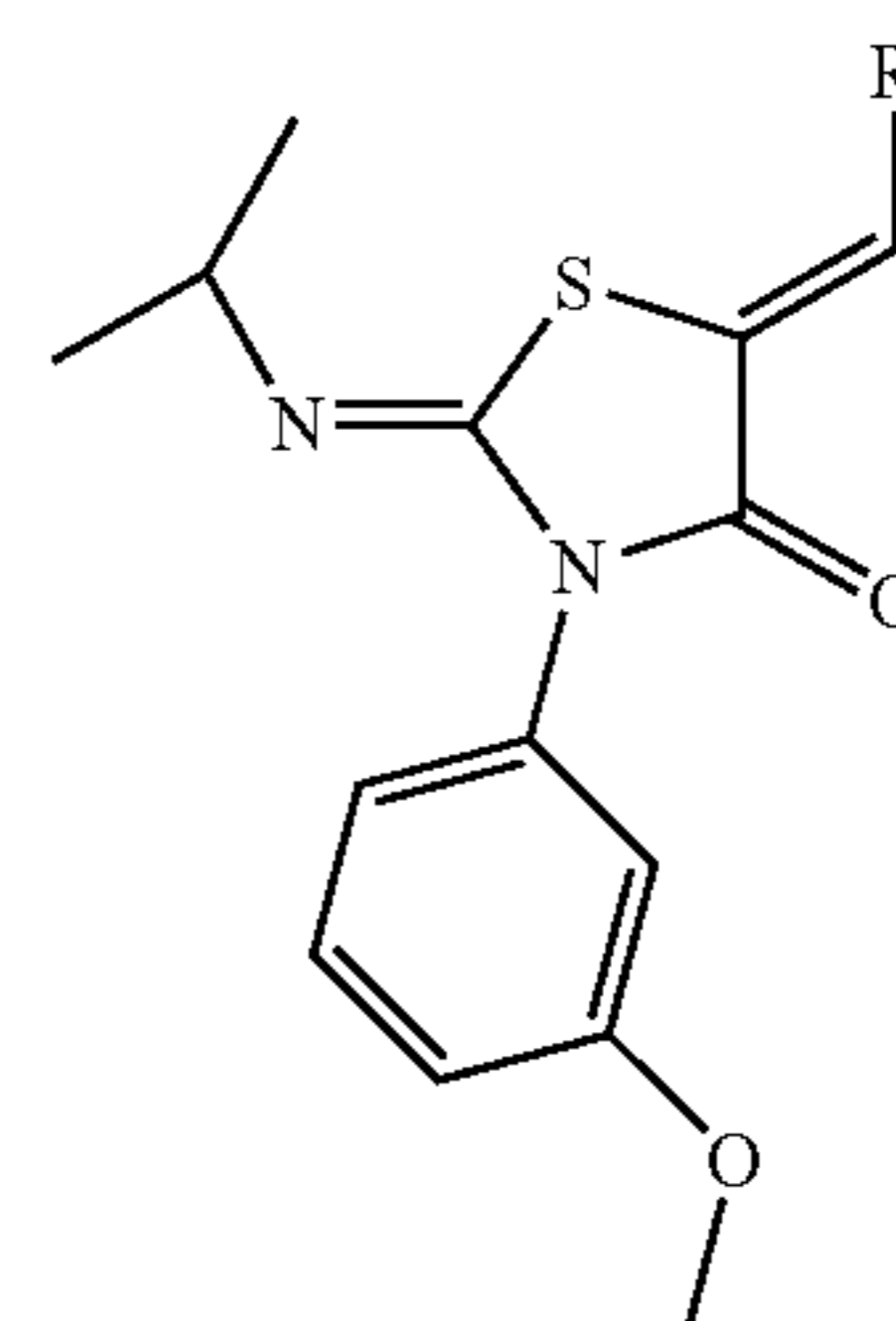
Example	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^+$



61		E	0.200	1.06	411
----	--	---	-------	------	-----

58

-continued



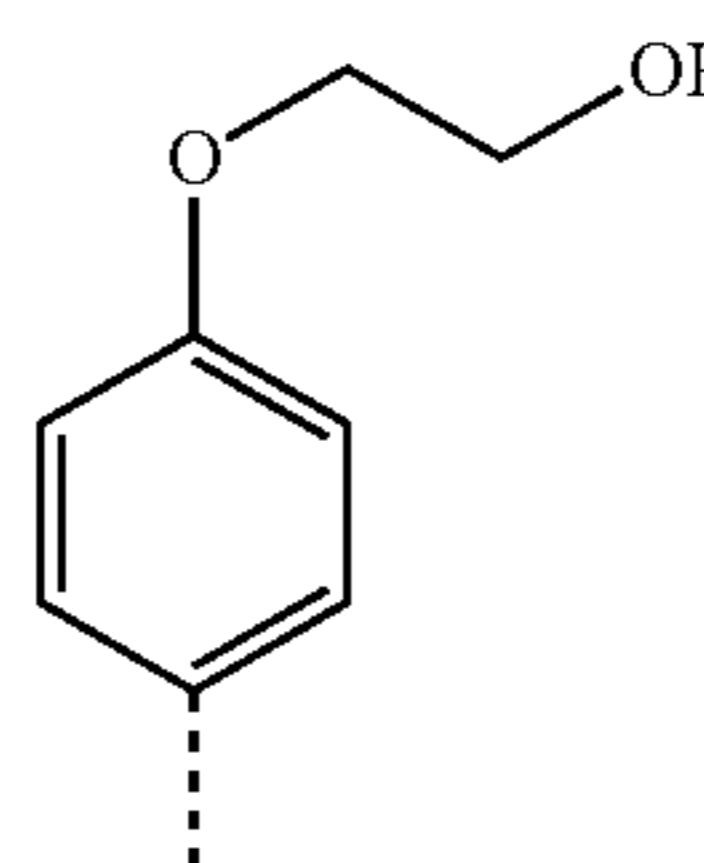
5

10

15

Example	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^+$

62		D	0.380	0.05	413
----	--	---	-------	------	-----

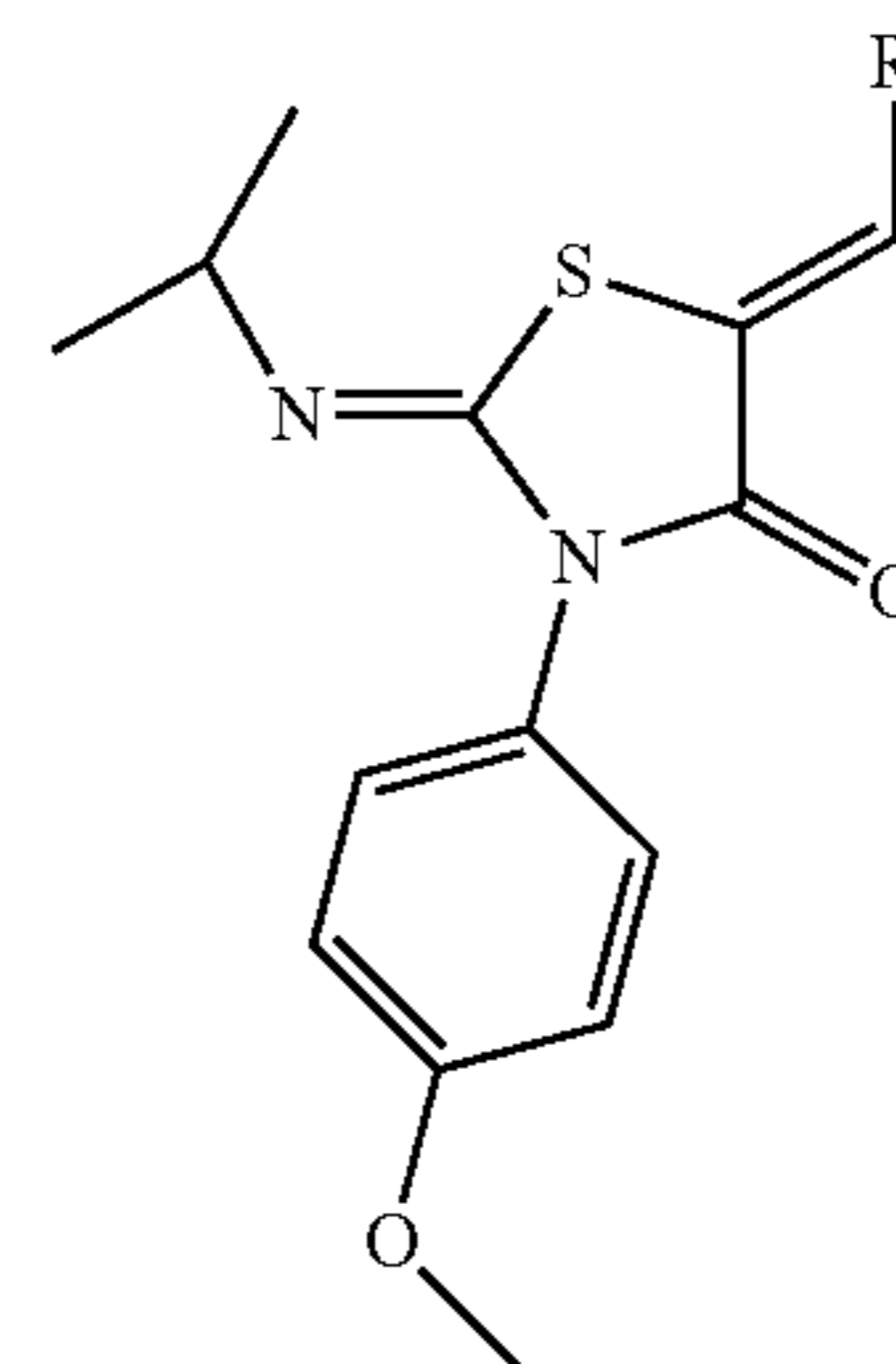


25

30

Examples 63 to 65

Starting from Scaffold 11, the following examples are prepared:



40

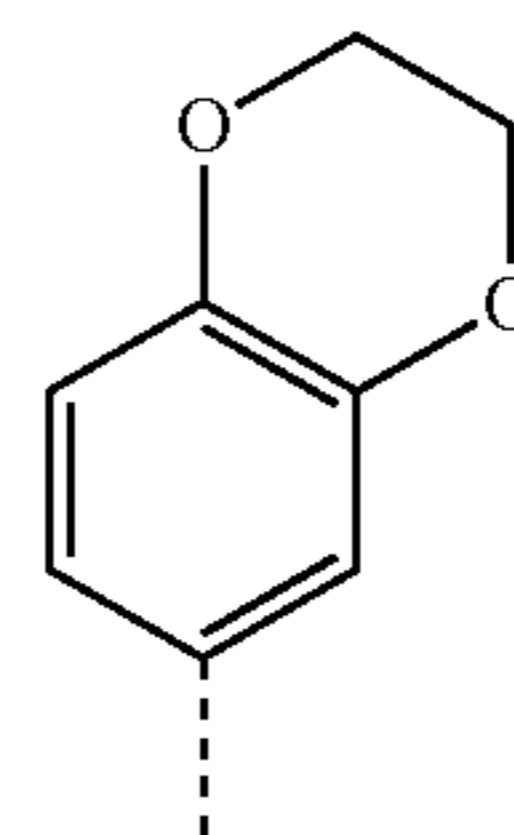
45

50

Ex-
am-
ple

R	Method	Scale (mmol)	LC-MS	
			t_R	$[M + 1]^+$

63		E	0.200	1.5	411
----	--	---	-------	-----	-----

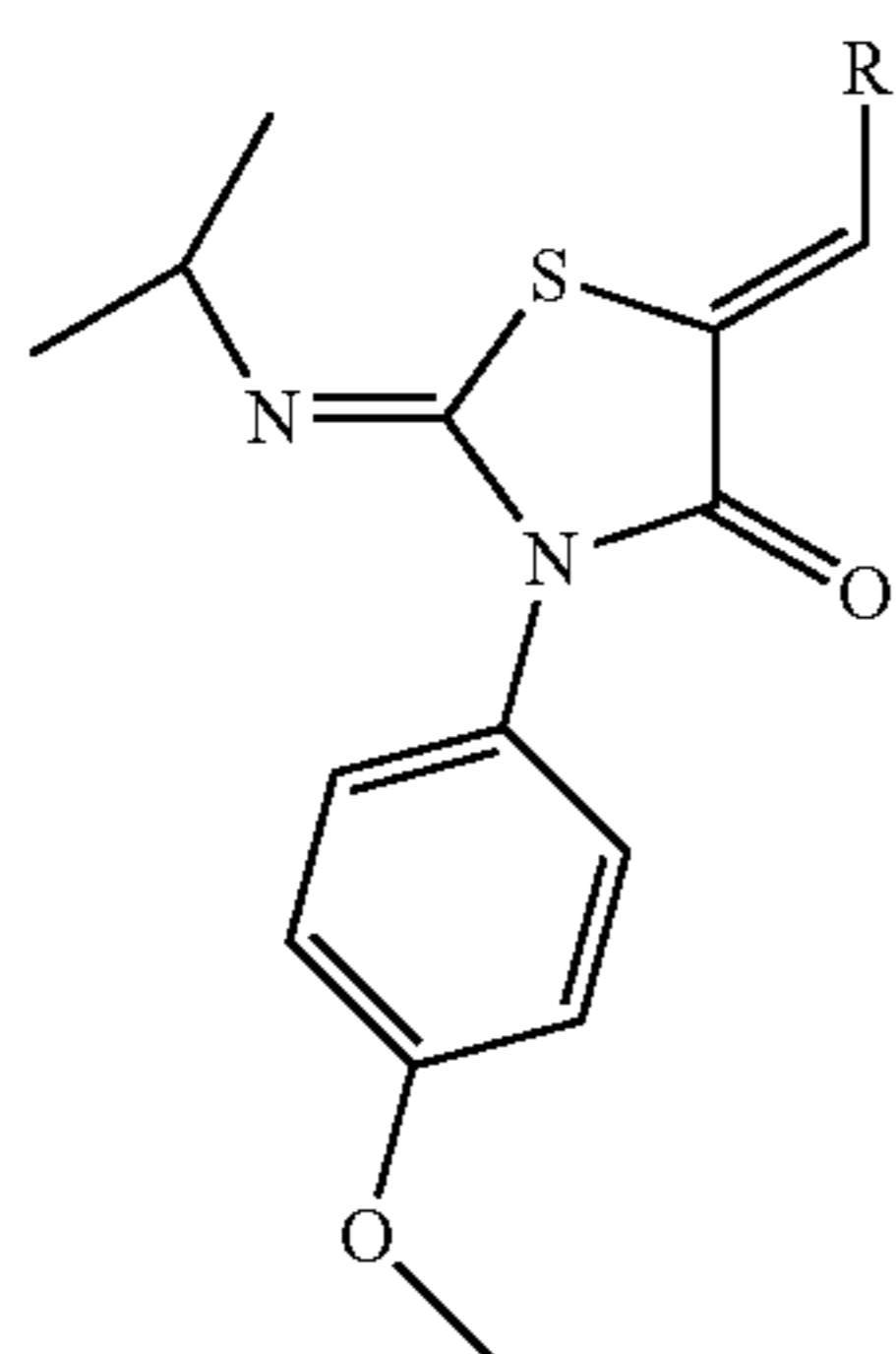


60

65

59

-continued



Ex- am- ple	R	Method	Scale		LC-MS	
			(mmol)	t_R	$[M + 1]^+$	
64		D	0.380	0.93	413	
65		D	0.567	0.99	447	

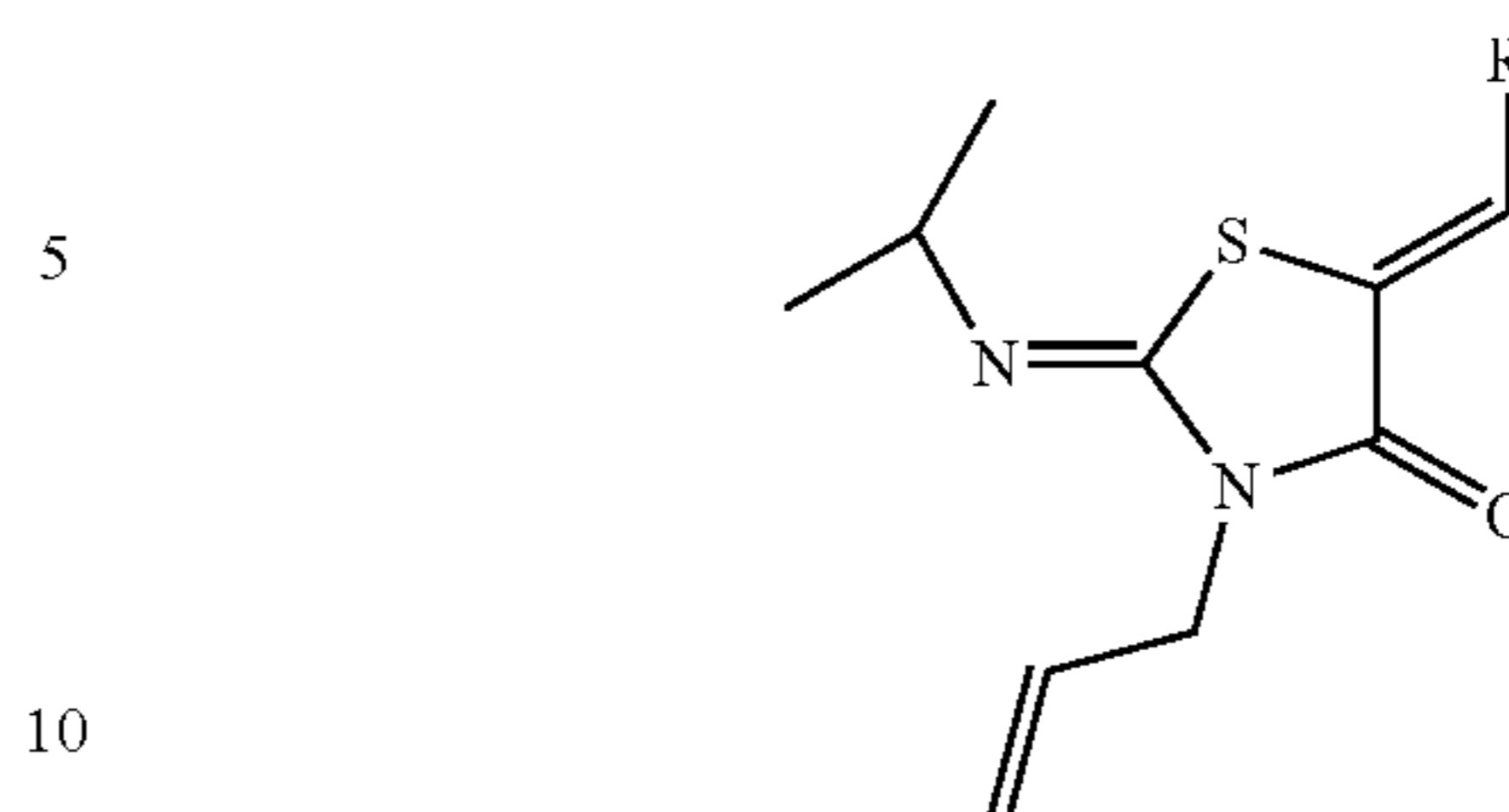
Examples 66 to 71

Starting from Scaffold 12, the following examples are prepared:

Ex- am- ple	R	Method	Scale		LC-MS	
			(mmol)	t_R	$[M + 1]^+$	
66		E	0.200	1.07	331	

60

-continued



Ex- am- ple	R	Method	Scale		LC-MS	
			(mmol)	t_R	$[M + 1]^+$	
67		E	0.080	0.05	345	
68		C	20.0	0.99	330.2	
69		D	0.757	0.94	347	
70		D	0.756	1.02	381	
71		D	0.756	0.94	411	

Example 68

$^1\text{H NMR}$ ($\text{D}_6\text{-DMSO}$): δ 7.55 (s, 1H), 7.46-7.42 (m, 2H), 6.82-6.76 (m, 2H), 5.90-5.76 (m, 1H), 5.13-5.02 (m, 2H), 4.36-4.27 (m, 2H), 3.50 (hept, $J=6.0$ Hz, 1H), 2.99 (s, 6H), 1.16 (d, $J=5.9$ Hz, 6H).

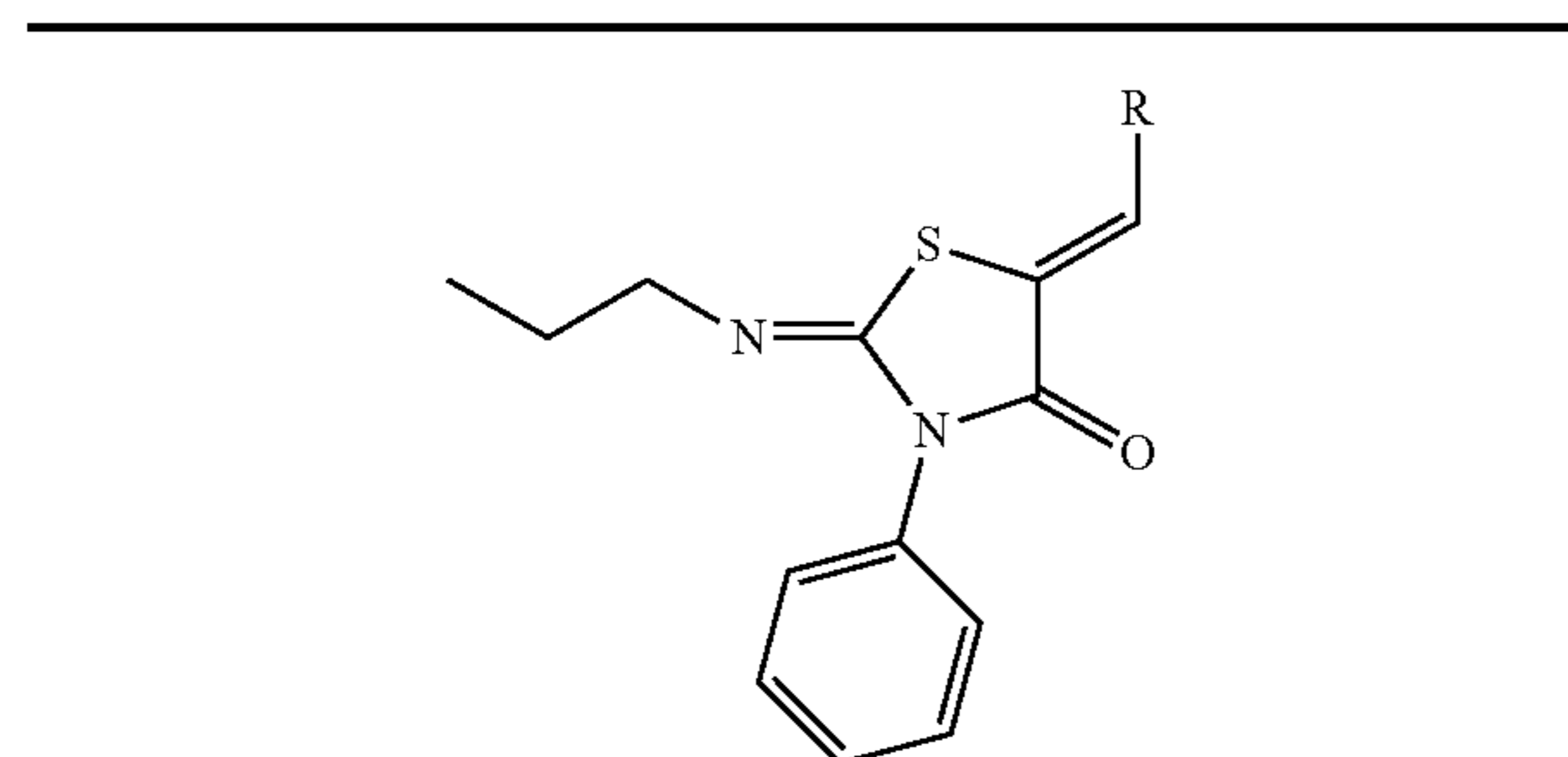
61

Example 69

$^1\text{H NMR}$ (CDCl_3): δ 7.66 (s, 1H), 7.51-7.46 (m, 2H), 7.01-6.96 (m, 2H), 5.96-5.83 (m, 1H), 5.28-5.14 (m, 2H), 4.49-4.44 (m, 2H), 4.16-4.12 (m, 2H), 4.03-3.96 (m, 2H), 3.55 (hept, $J=6.1$ Hz, 1H), 2.01 (t br, $J=5$ Hz, 1H), 1.24 (d, $J=5.9$ Hz, 6H).

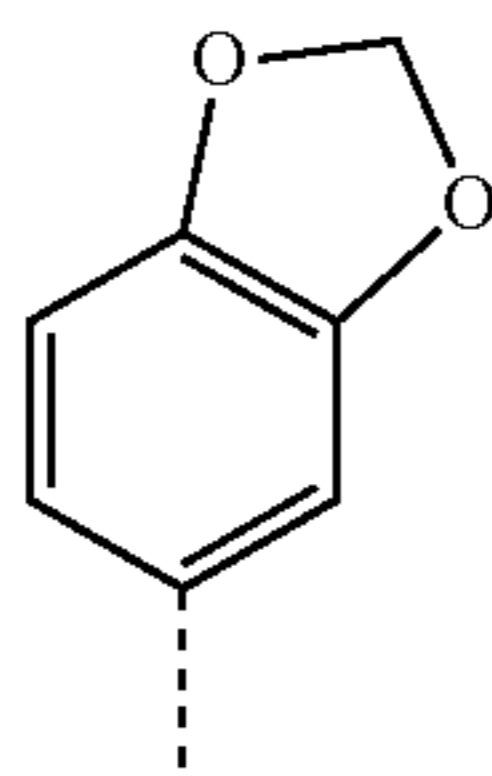
Examples 72 to 77

Starting from Scaffold 13, the following examples are prepared:



Ex- am- ple	R	LC-MS		
		Scale Method (mmol)	t_R	$[M + 1]^+$

72



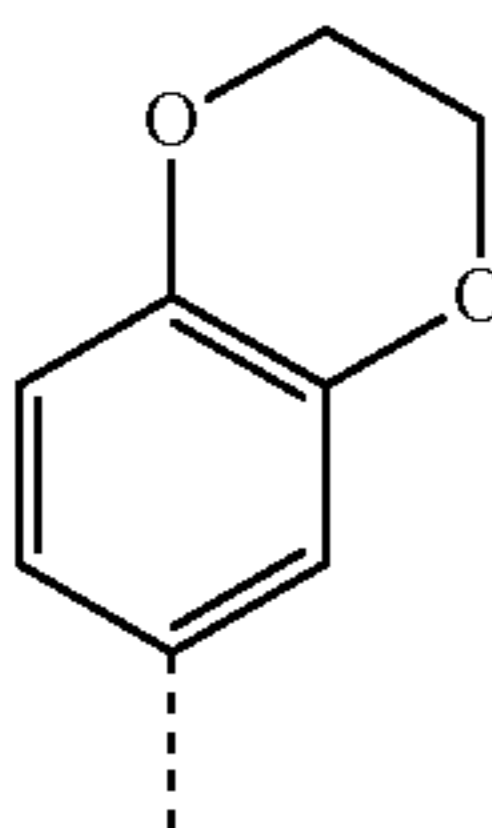
C

0.640

1.06

367

73



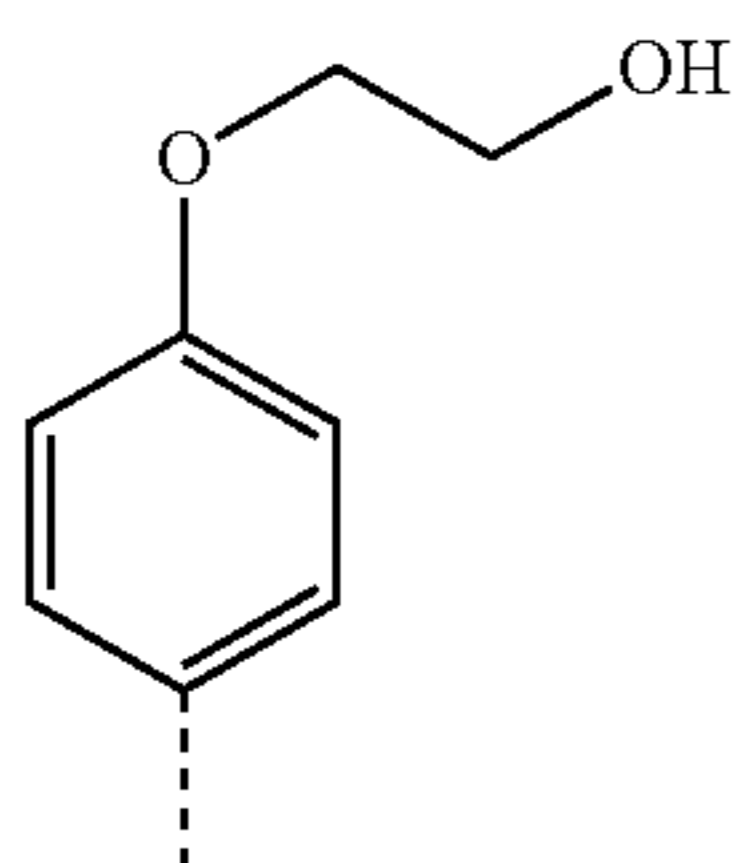
C

0.333

1.05

381

74



D

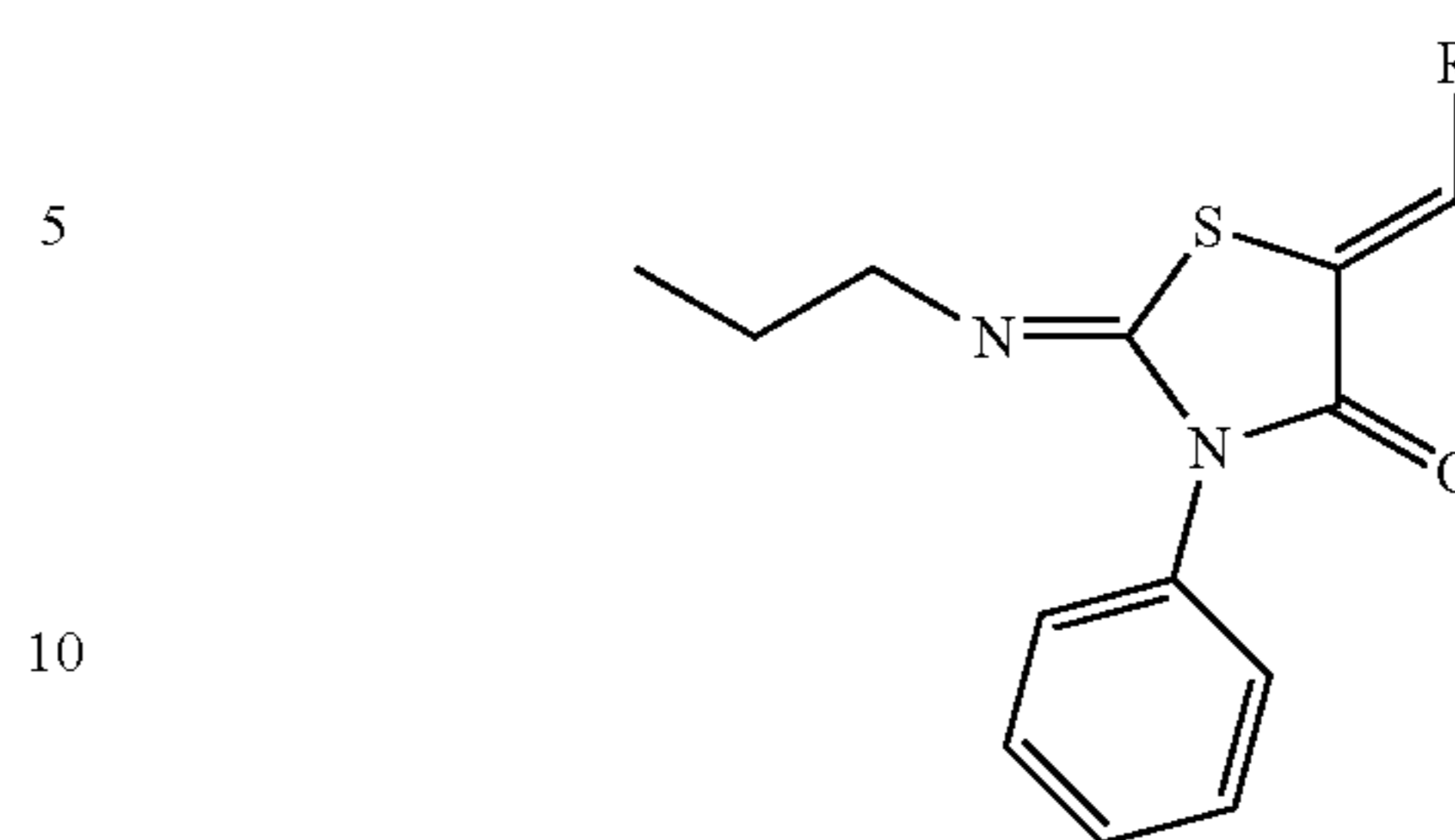
0.854

0.95

383

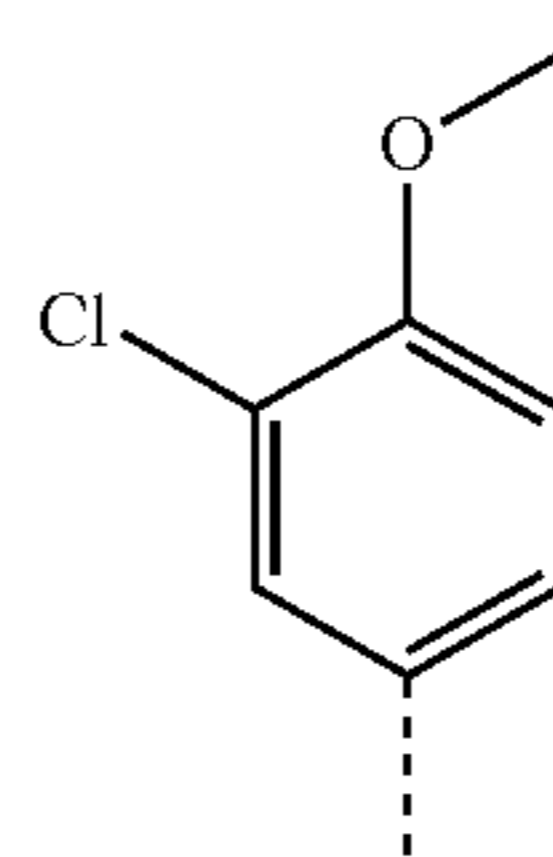
62

-continued



Ex- am- ple	R	Scale Method (mmol)	LC-MS	
			t_R	$[M + 1]^+$

75



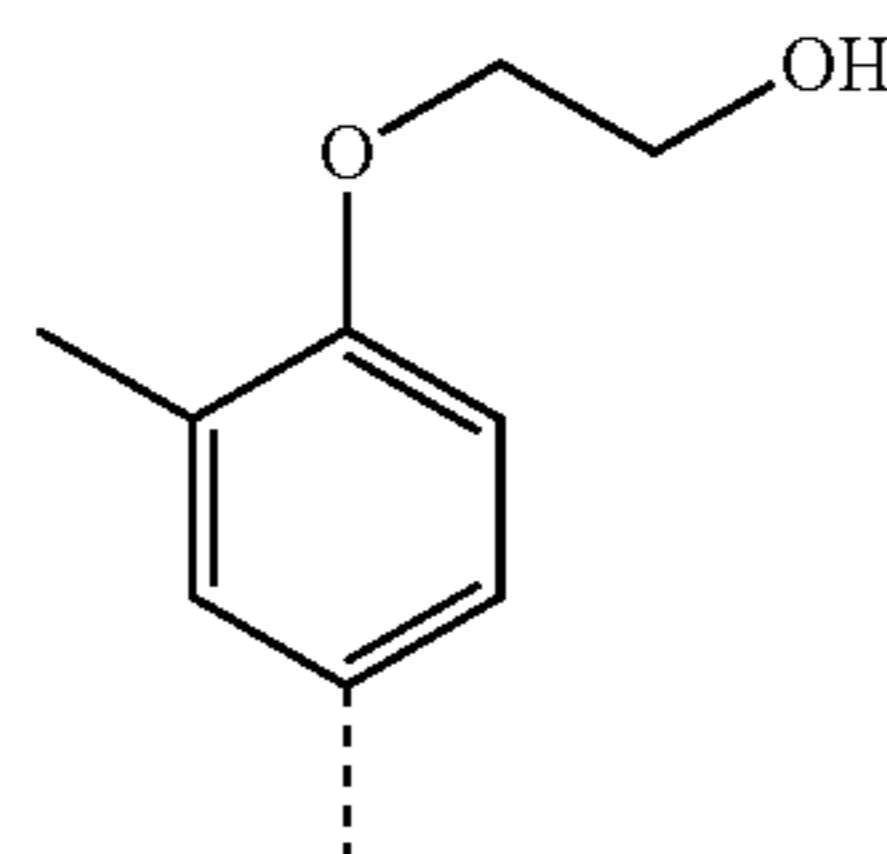
D

1.067

1.01

417

76



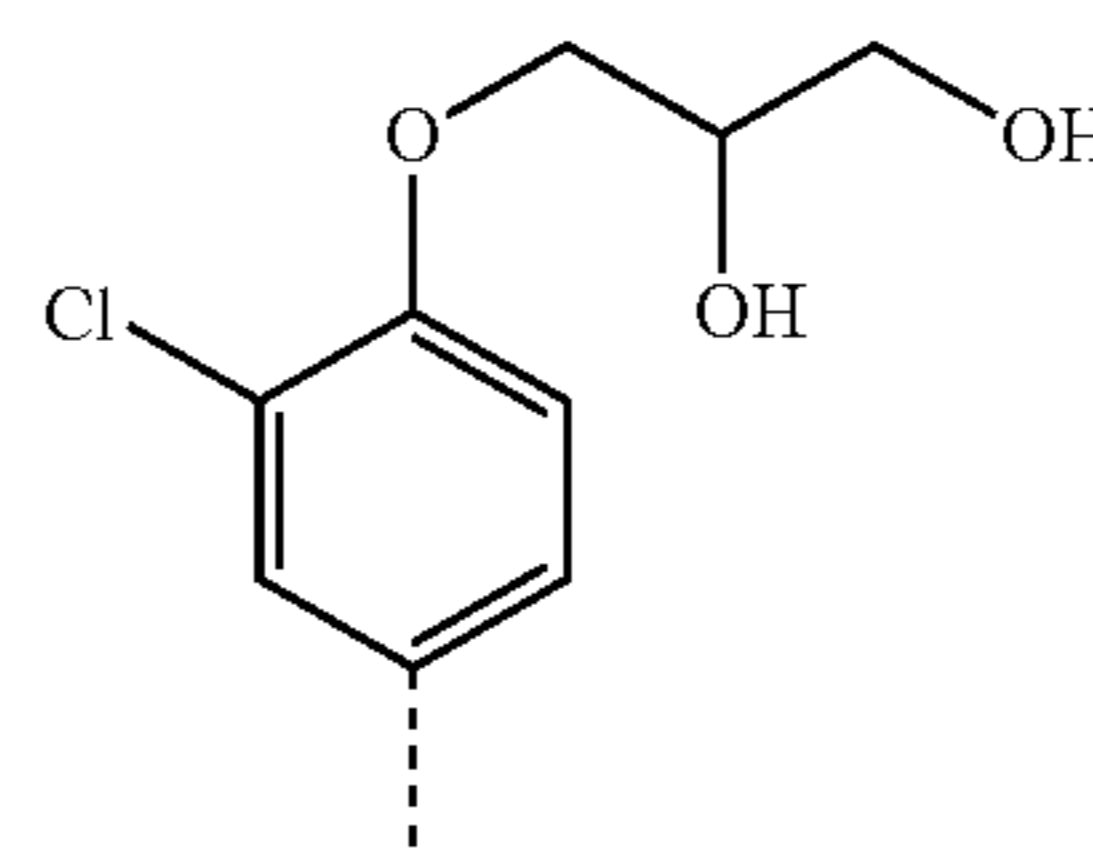
D

1.067

0.97

397

77



D

0.640

0.94

447

Example 74

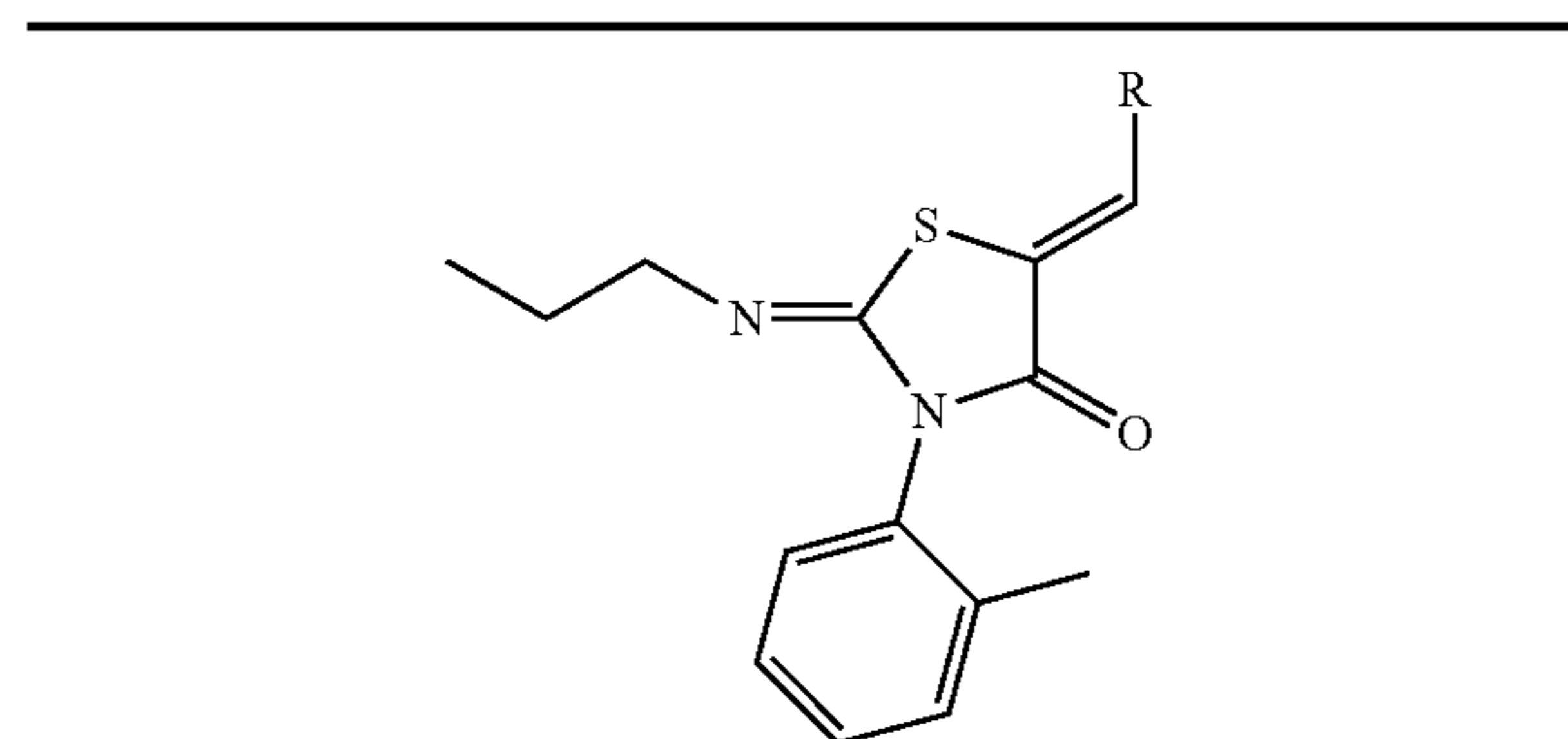
$^1\text{H NMR}$ (CDCl_3): δ 7.74 (s, 1H), 7.56-7.44 (m, 4H), 7.43-7.32 (m, 3H), 7.03-6.98 (m, 2H), 4.18-4.13 (m, 2H), 4.04-3.96 (m, 2H), 3.38 (t, $J=6.6$ Hz, 2H), 2.01 (s br, 1H), 1.72-1.59 (m, 2H), 0.95 (t, $J=7.6$ Hz, 3H).

Example 76

$^1\text{H NMR}$ (CDCl_3): δ 7.72 (s, 1H), 7.53-7.33 (m, 7H), 6.93 (d, $J=8.8$ Hz, 1H), 4.19-4.15 (m, 2H), 4.06-4.00 (m, 2H), 3.40 (t, $J=7.0$ Hz, 2H), 2.33 (s, 3H), 1.98 (t br, $J=6$ Hz, 1H), 1.67 (hex, $J=7.0$ Hz, 2H), 0.96 (t, $J=7.0$ Hz, 3H).

63
Examples 78 to 86

Starting from Scaffold 14, the following examples are prepared:



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^+$
78		C	0.805	1.08	381
79		C	0.805	1.08	395
80		D	0.805	0.96	397
81		D	0.427	0.99	411
82		D	0.805	1.03	431

64
-continued

Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^+$
5					
10					
15					
83		D	0.604	1.01	411
20					
25					
84		D	0.604	0.96	461
30					
85		F	0.351	0.96	461
35					
40		F	0.314	0.96	461
45					

Example 80

$^1\text{H NMR}$ (CDCl_3): δ 7.74 (s, 1H), 7.57-7.52 (m, 2H), 7.36-7.28 (m, 3H), 7.20-7.16 (m, 1H), 7.05-7.00 (m, 2H), 4.18-4.14 (m, 2H), 4.04-3.98 (m, 2H), 3.46-3.30 (m, 2H), 2.20 (s, 3H), 2.00 (s br, 1H), 1.68-1.56 (m, 2H), 0.93 (t, $J=7.0$ Hz, 3H).

Example 81

$^1\text{H NMR}$ (CDCl_3): δ 7.74 (s, 1H), 7.56-7.51 (m, 2H), 7.35-7.28 (m, 3H), 7.20-7.15 (m, 1H), 7.03-6.98 (m, 2H), 4.20 (t, $J=5.9$ Hz, 2H), 3.89 (t, $J=5.9$ Hz, 2H), 3.49-3.30 (m, 2H), 2.20 (s, 3H), 2.15-2.03 (m, 2H), 1.68-1.55 (m, 2H), 0.92 (t, $J=7.6$ Hz, 3H).

Example 86

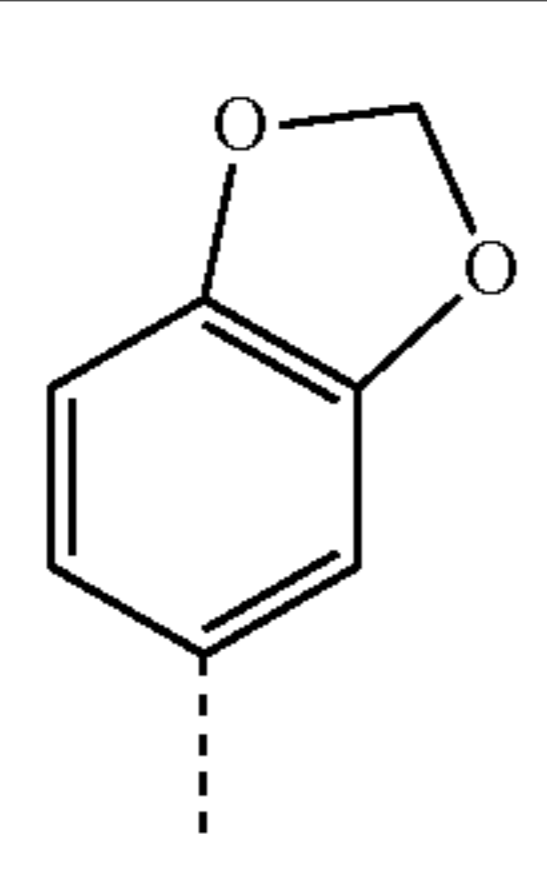
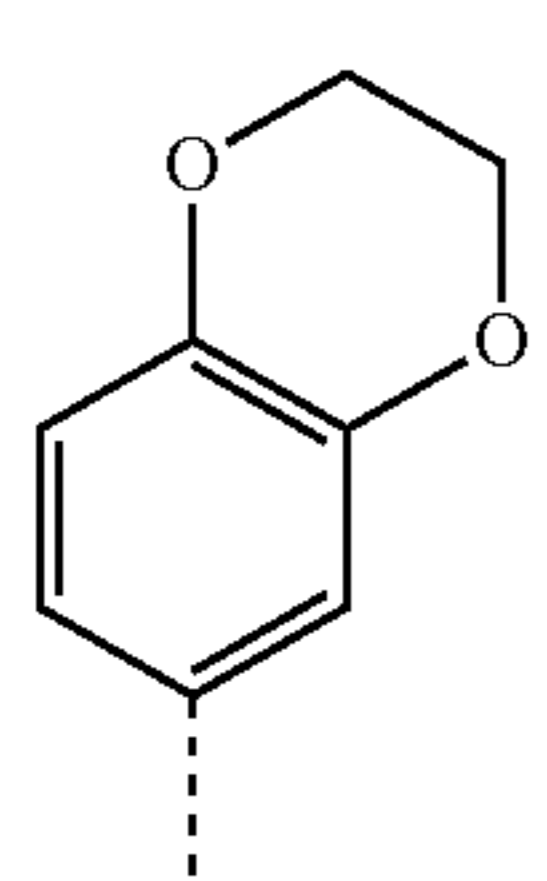
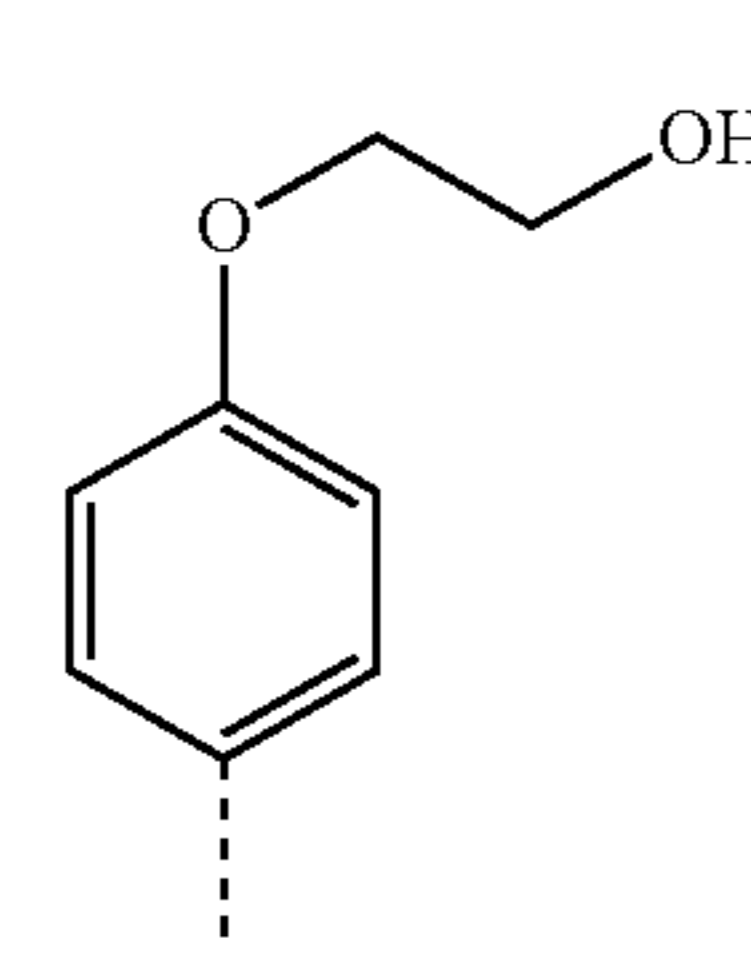
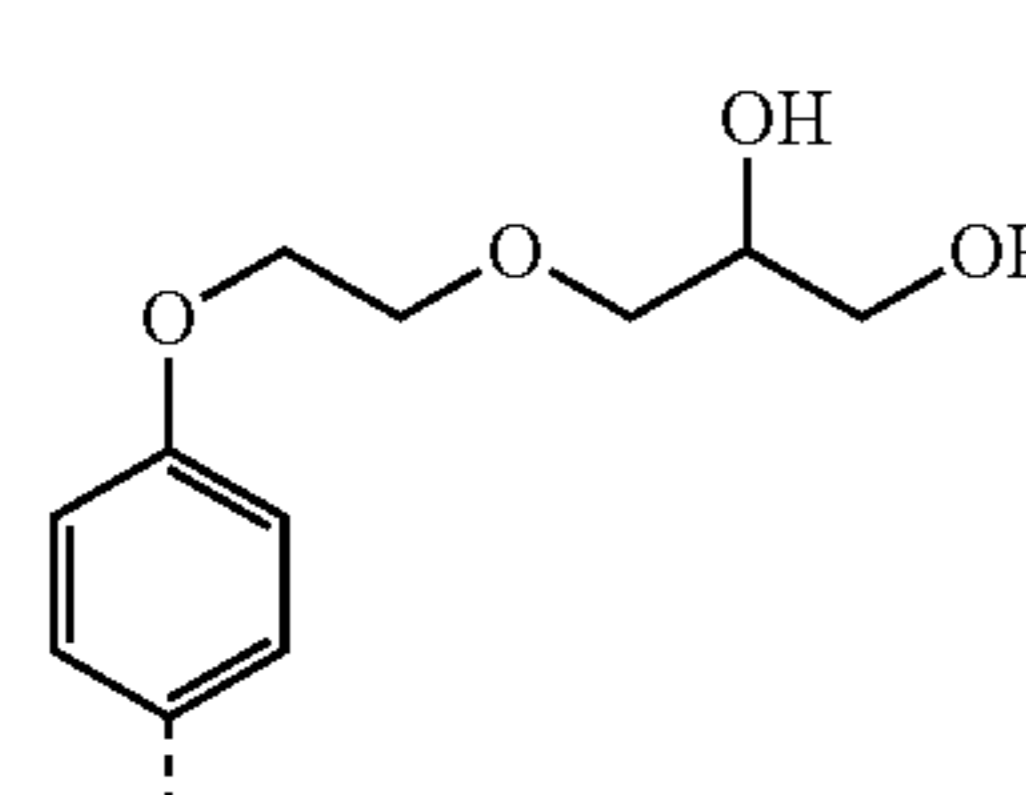
$^1\text{H NMR}$ (CDCl_3): δ 7.66 (s, 1H), 7.62 (d, $J=2.3$ Hz, 1H), 7.47 (dd, $J=2.3, 8.8$ Hz, 1H), 7.36-7.28 (m, 3H), 7.21-7.16 (m,

65

1H), 7.05 (d, J=8.8 Hz, 1H), 4.25-4.16 (m, 3H), 3.94-3.82 (m, 2H), 3.45-3.30 (m, 2H), 2.72 (d, J=4.1 Hz, 1H), 2.20 (s, 3H), 2.07 (t, J=6.2 Hz, 1H), 1.63 (hex, J=7.0 Hz, 2H), 0.93 (t, J=7.0 Hz, 3H).

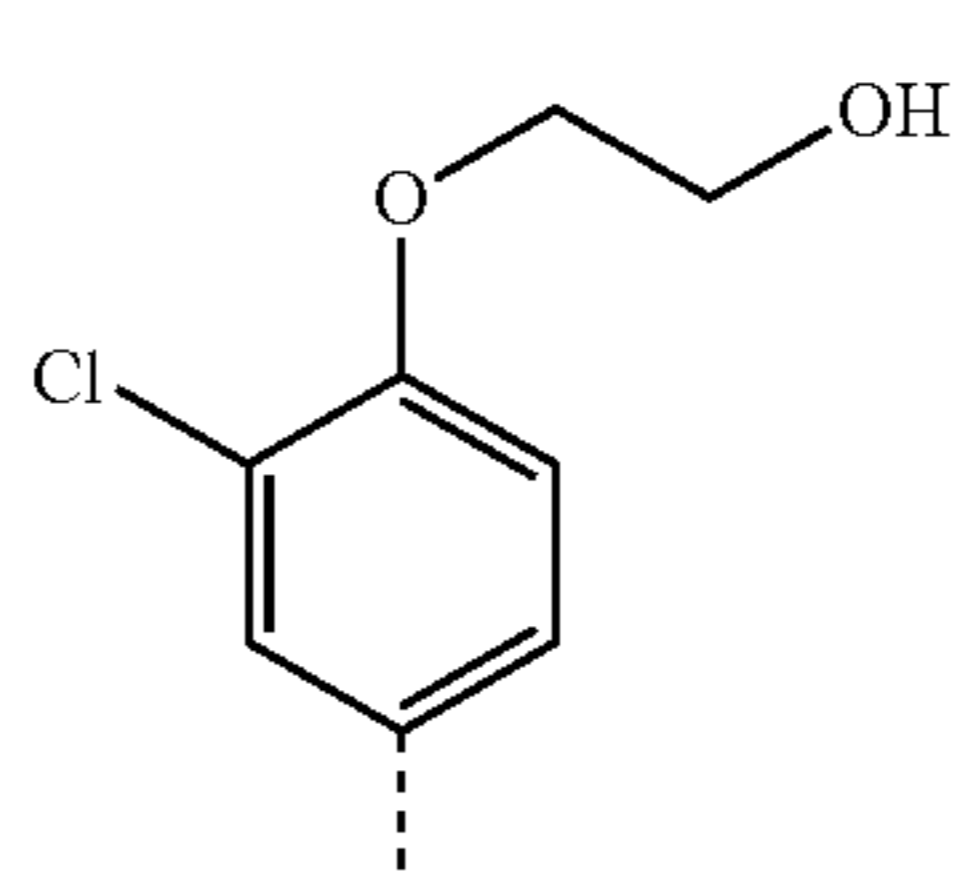
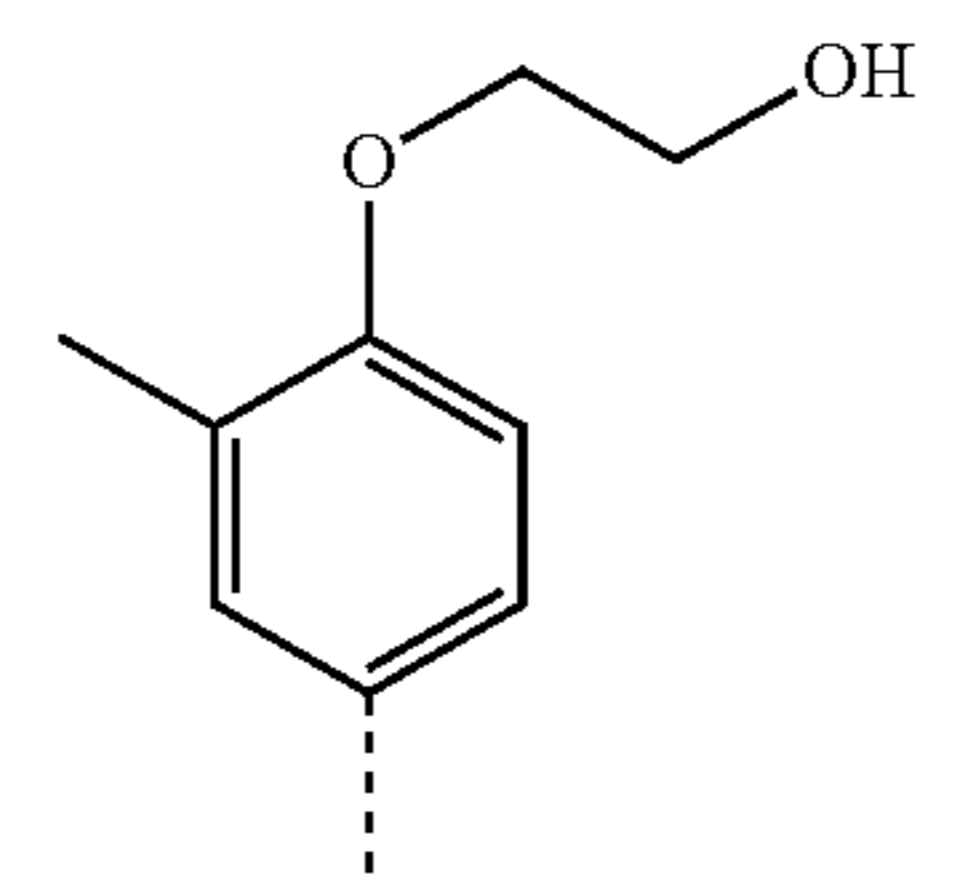
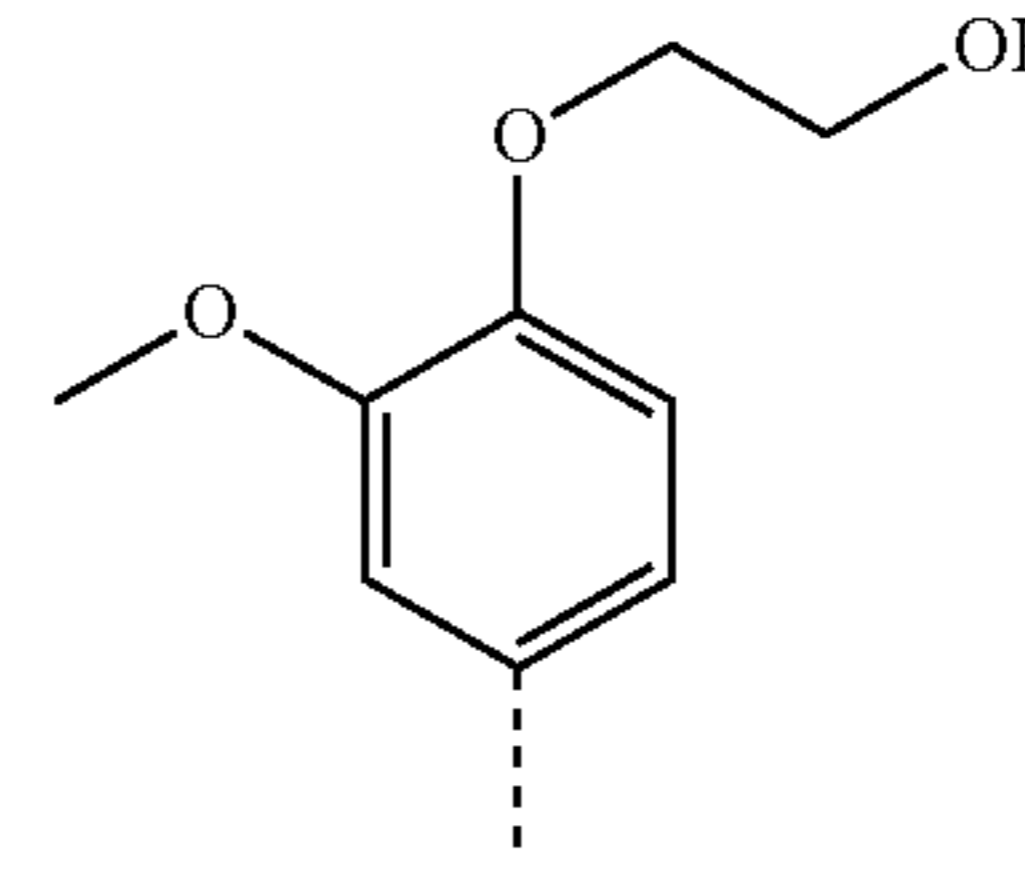
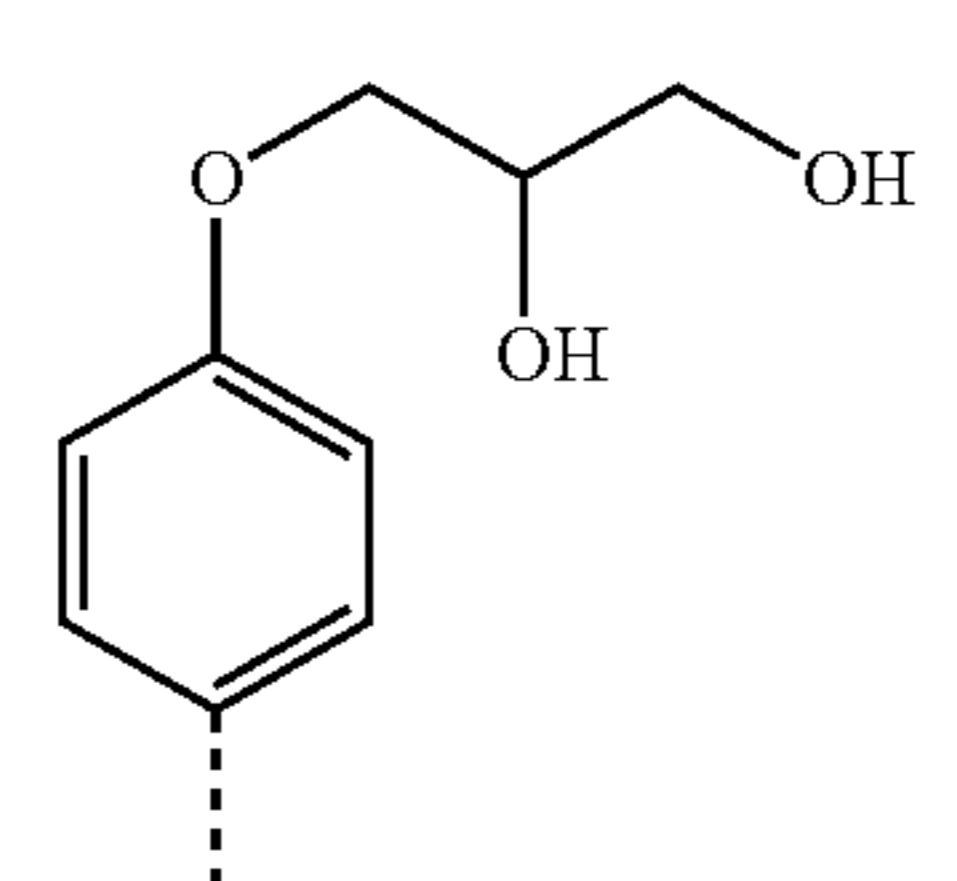
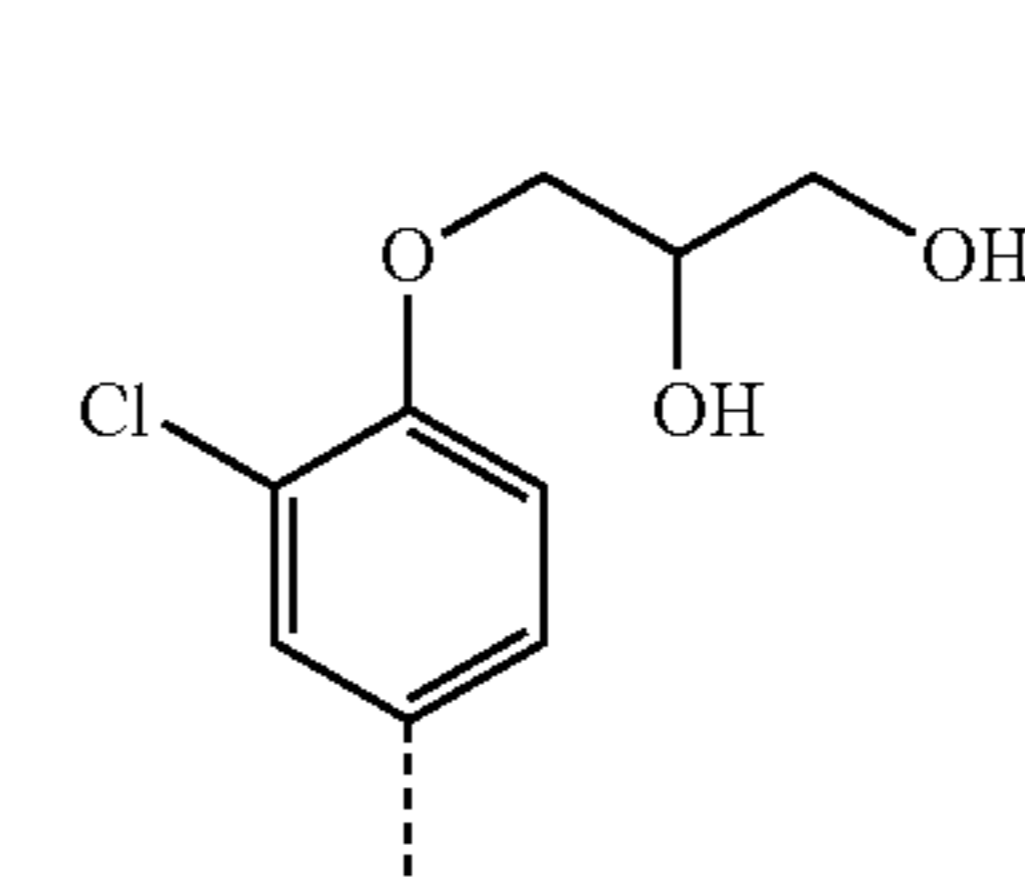
Examples 87 to 95

Starting from Scaffold 15, the following examples are prepared:

Ex-ample	R	LC-MS		
		Method	Scale (mmol)	t_R [M + 1] ⁺
87		C	0.762	1.09 395
88		C	0.762	1.10 409
89		D	0.762	0.98 411
90		D	0.762	0.92 485

66

-continued

Ex-ample	R	Method	Scale (mmol)	LC-MS	
				t_R	[M + 1] ⁺
91		D	1.906	1.05	445
92		D	0.572	1.02	425
93		D	0.762	0.99	441
94		D	0.762	0.90	441
95		D	0.572	0.98	475

67

Example 87

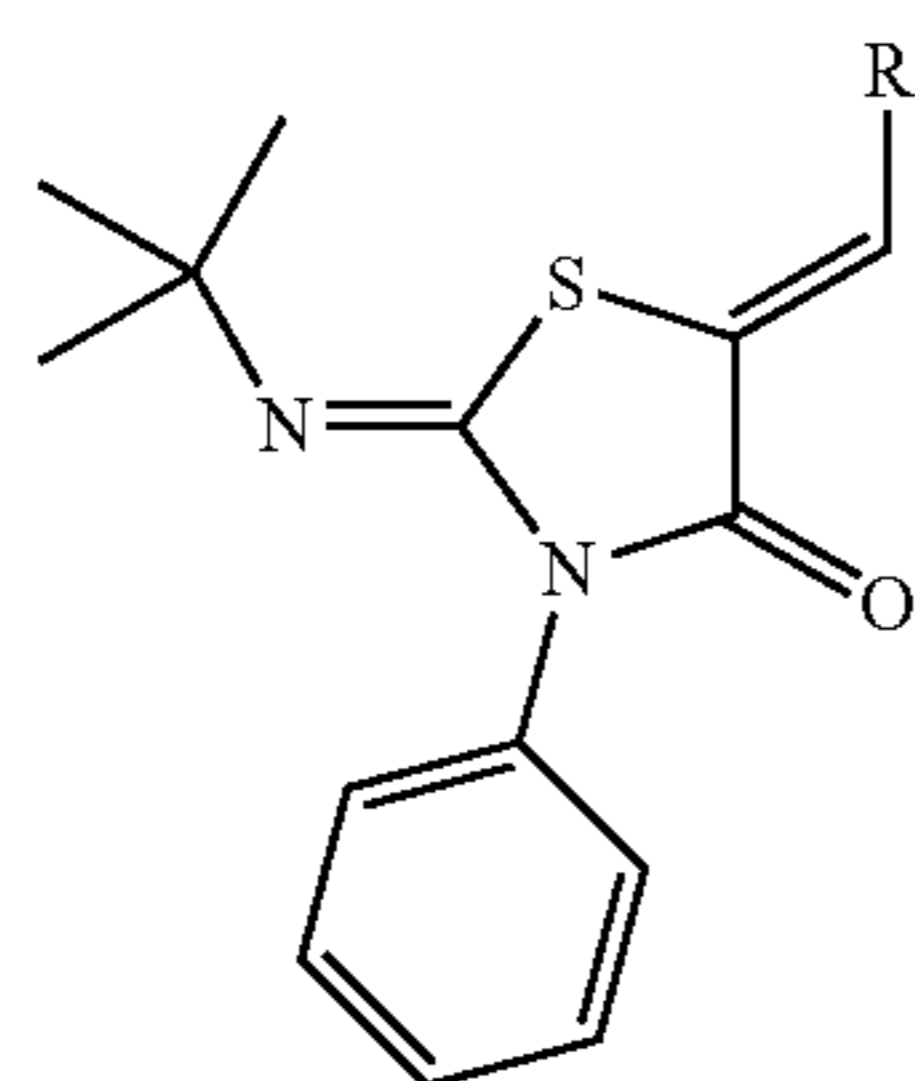
¹H NMR (CDCl₃): δ 7.69 (s, 1H), 7.23-7.18 (m, 2H), 7.13-7.08 (m, 2H), 7.04-7.00 (m, 1H), 6.93-6.90 (m, 1H), 6.06 (s, 2H), 3.46-3.30 (m, 2H), 2.34 (s, 3H), 2.07 (s, 3H), 1.70-1.55 (m, 2H), 0.92 (t, J=7.6 Hz, 3H).

Example 89

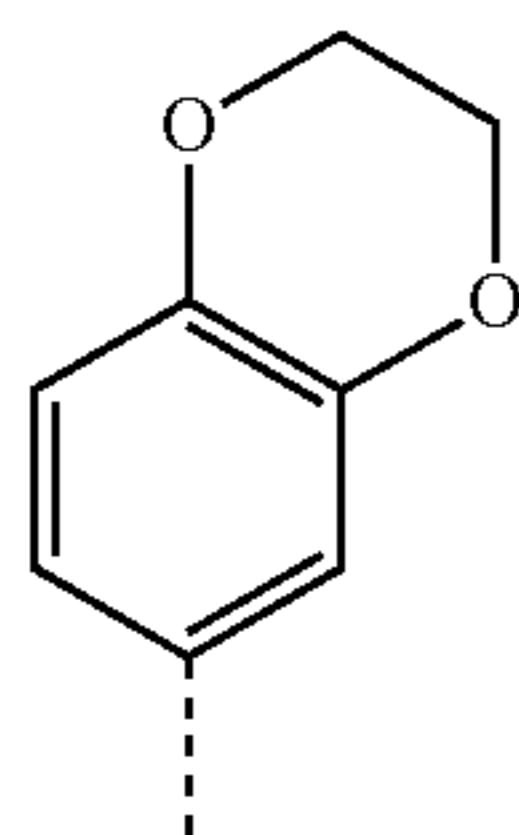
¹H NMR (CDCl₃): δ 7.74 (s, 1H), 7.57-7.52 (m, 2H), 7.23-7.20 (m, 2H), 7.05-7.00 (m, 3H), 4.18-4.14 (m, 2H), 4.03-3.98 (m, 2H), 3.48-3.30 (m, 2H), 2.35 (s, 3H), 2.07 (s, 3H), 1.67-1.57 (m, 2H), 0.93 (t, J=7.6 Hz, 3H).

Examples 96 and 97

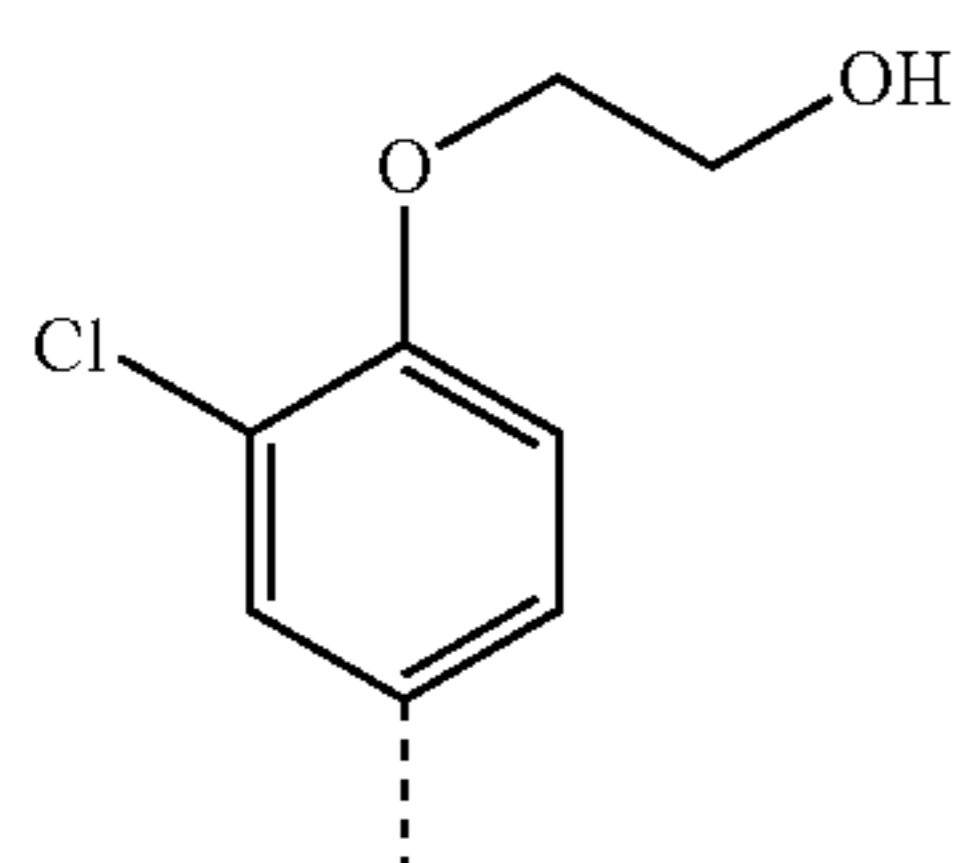
Starting from Scaffold 16 the following examples are prepared:



Ex- am- ple	R	Method	Scale		LC-MS	
			(mmol)	t _R	[M + 1] ⁺	
96		C	0.08	1.11	395	



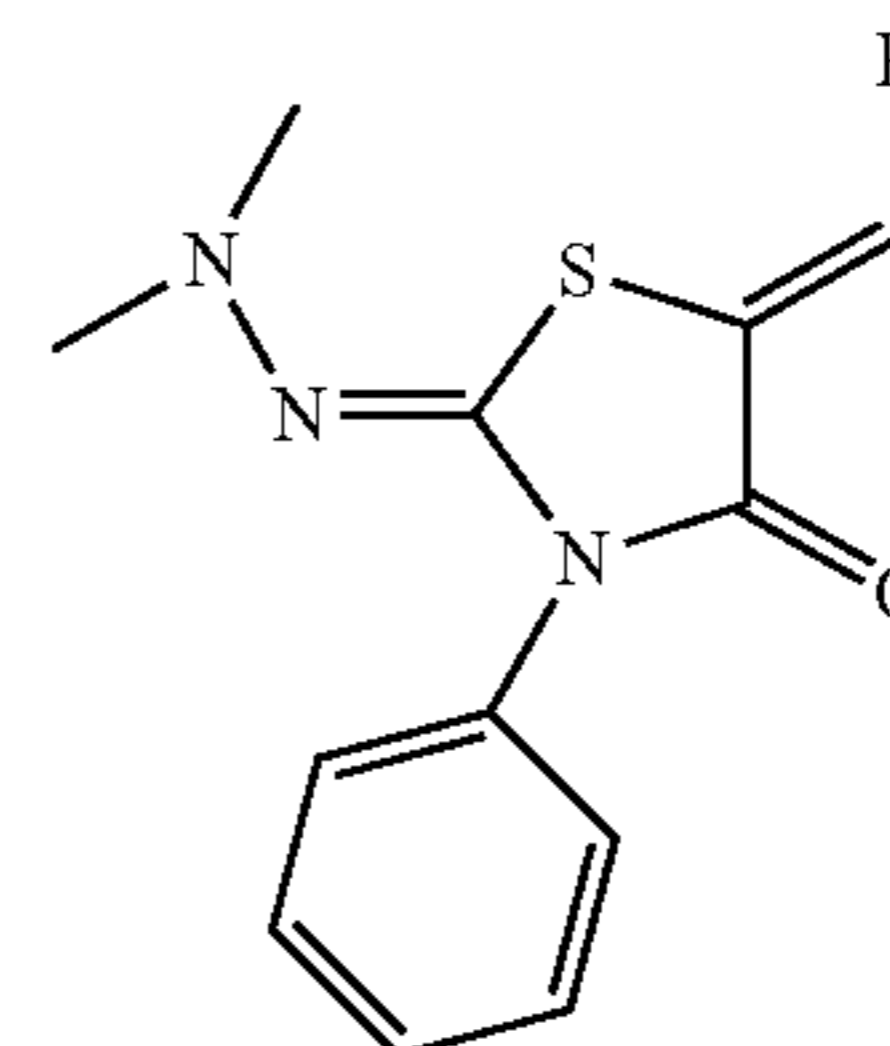
97		d	0.604	1.08	431
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68

Examples 98 to 101

Starting from Scaffold 17, the following examples are prepared:



Ex- am- ple	R	Method	Scale		LC-MS	
			(mmol)	t _R	[M + 1] ⁺⁺	
98		C	0.850	1.06	368	
99		E	0.08	1.04	382	
100		D	0.850	0.95	384	
101		D	0.638	1.01	418	

Example 98

¹H NMR (CDCl₃): δ 7.68 (s, 1H), 7.53-7.35 (m, 5H), 7.14-7.10 (m, 2H), 6.92-6.88 (m, 1H), 6.05 (s, 2H), 2.60 (s, 6H).

Example 99

¹H NMR (CDCl₃): δ 7.65 (s, 1H), 7.54-7.35 (m, 5H), 7.15-7.09 (m, 2H), 6.94 (d, J=8.2 Hz, 1H), 4.35-4.29 (m, 4H), 2.58 (s, 6H).

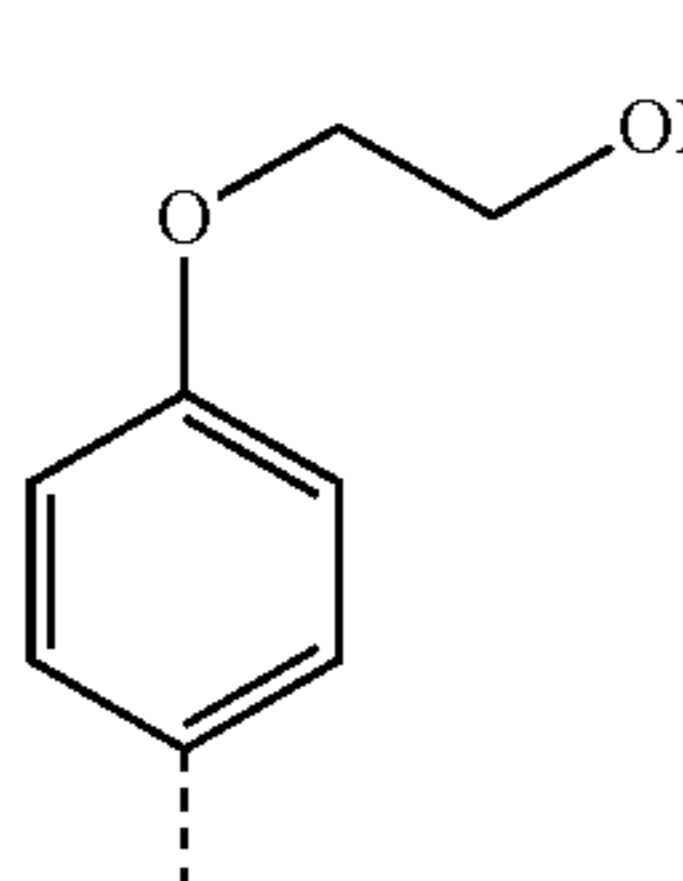
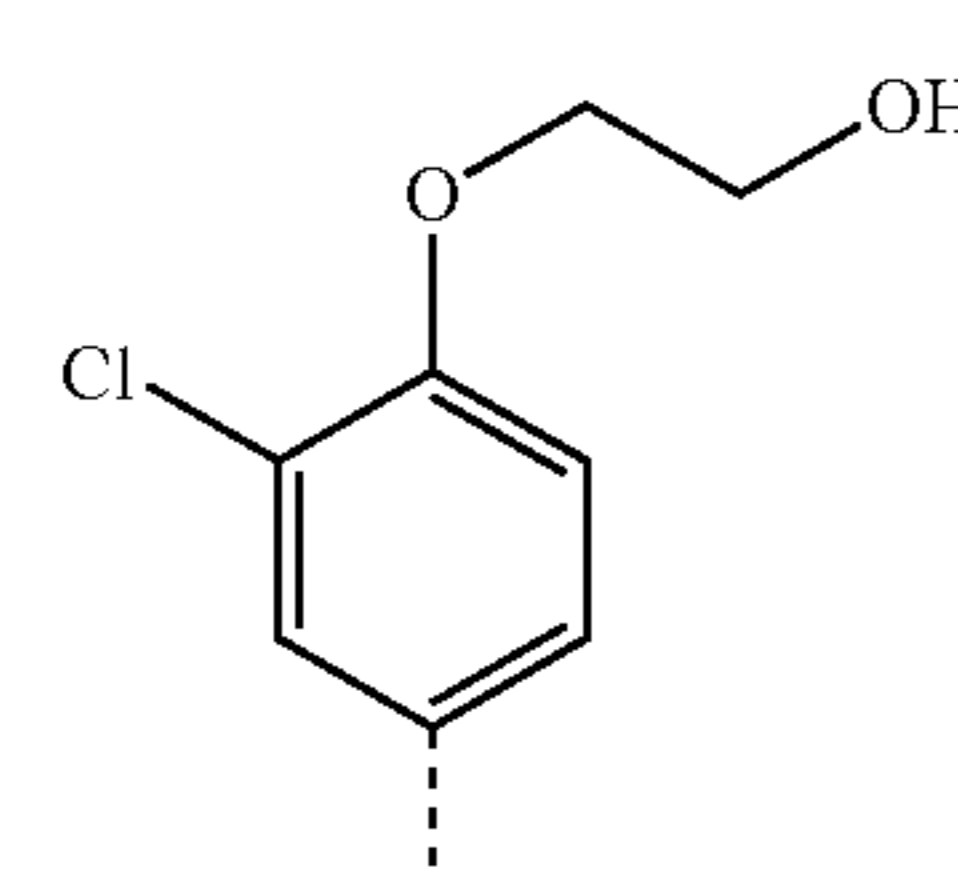
69

Example 100

¹H NMR (CDCl₃): δ 7.74 (s, 1H), 7.58-7.35 (m, 7H), 7.04-6.99 (m, 2H), 4.17-4.13 (m, 2H), 4.03-3.98 (m, 2H), 2.62 (s, 6H), 2.00 (s br, 1H).

Examples 102 and 103

Starting from Scaffold 18, the following examples are prepared:

Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t _R	[M + 1] ⁺⁺
102		D	0.681	0.89	369
103		D	1.815	0.96	403

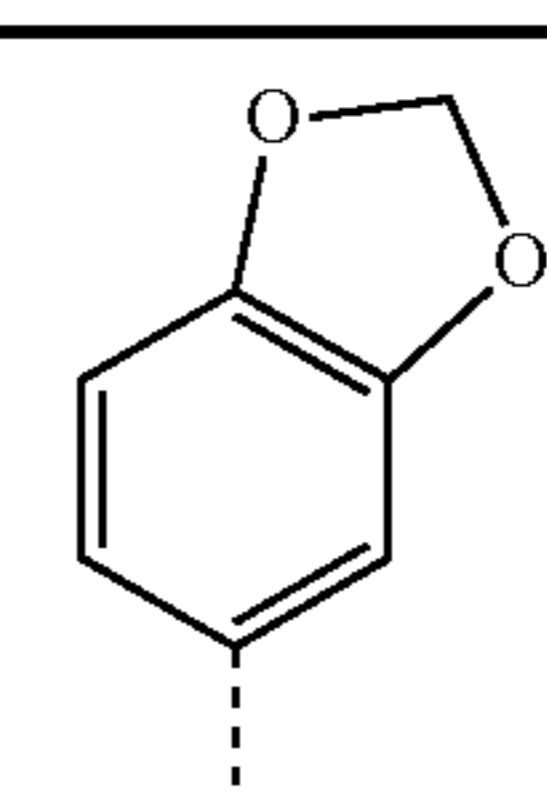
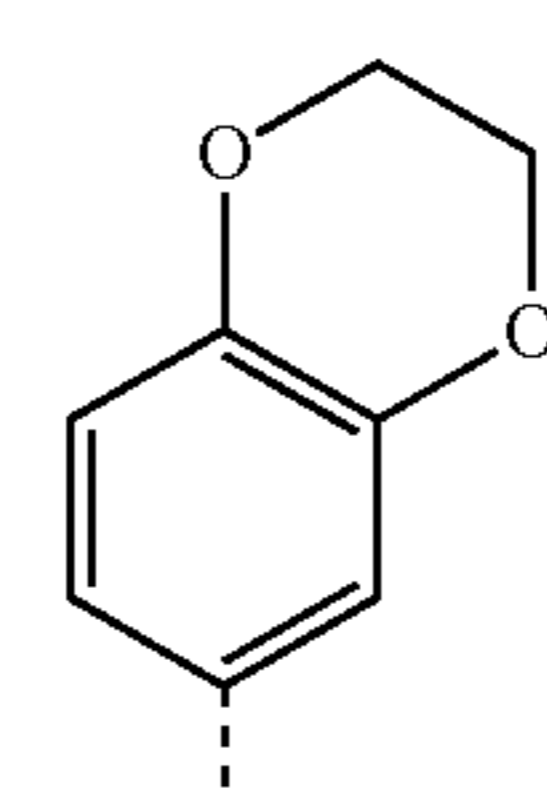
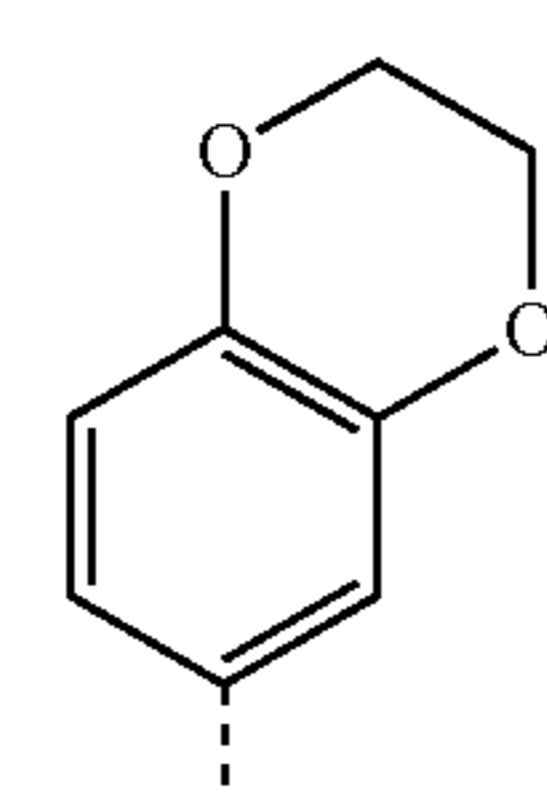
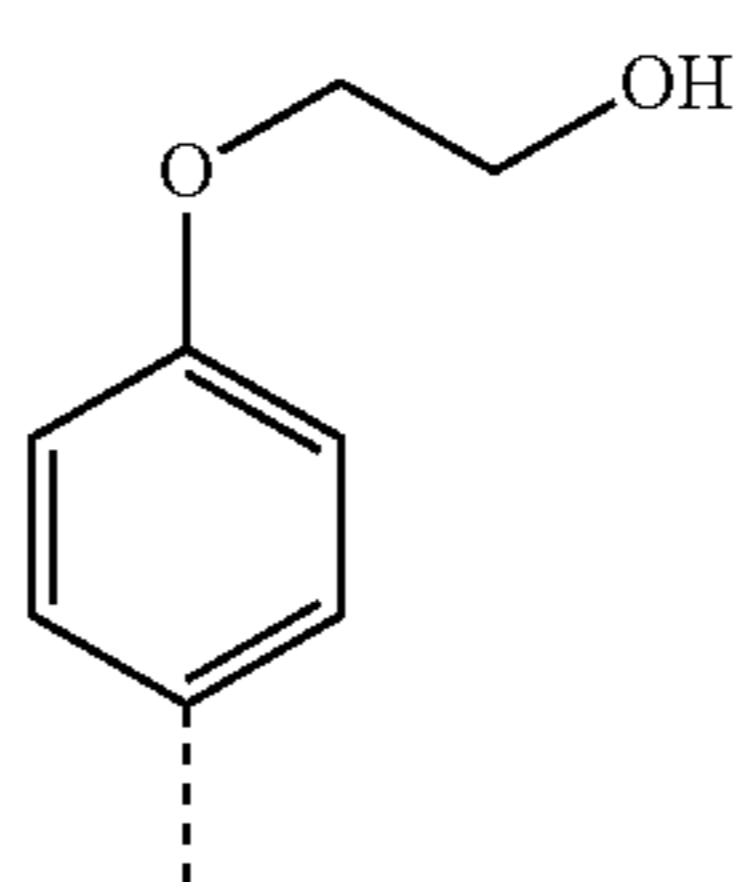
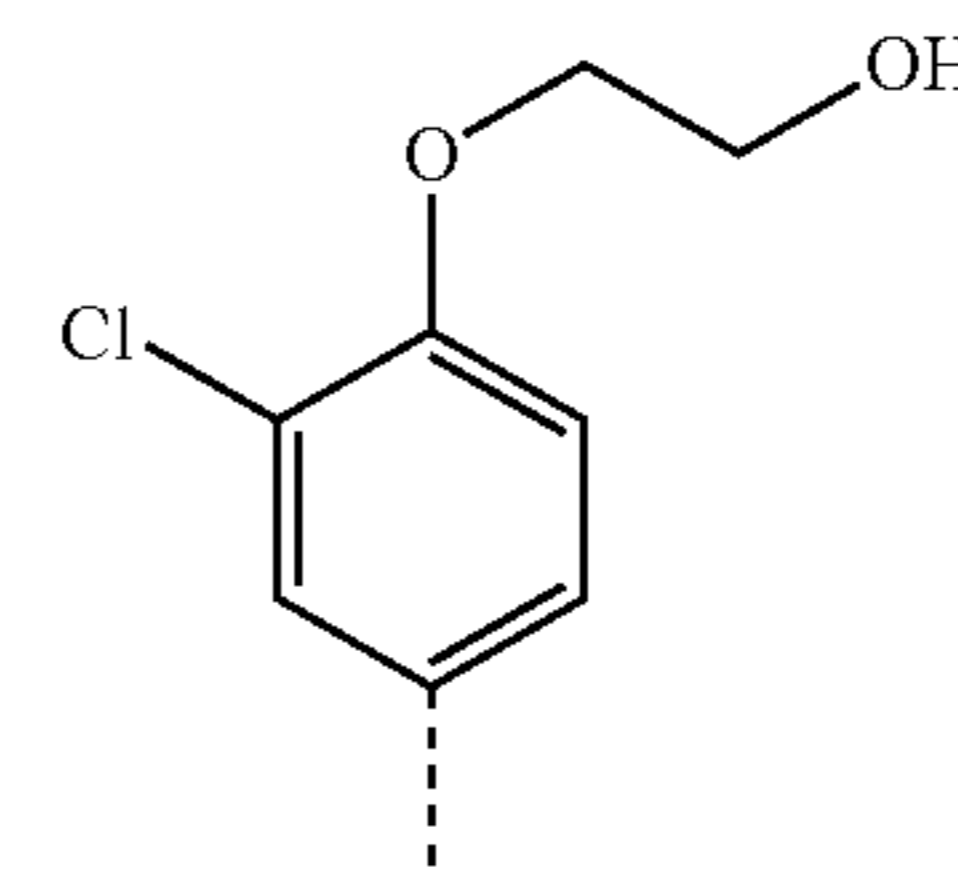
Example 103

¹H NMR (CDCl₃): δ 7.67 (s, 1H), 7.62 (d, J=2.3 Hz, 1H), 7.54-7.33 (m, 6H), 7.04 (d, J=8.8 Hz, 1H), 4.25-4.20 (m, 2H), 4.09-4.02 (m, 2H), 3.49 (q, J=7.0 Hz, 2H), 2.16 (s br, 1H), 1.25 (t, J=7.0 Hz, 3H).

70

Examples 104 to 108

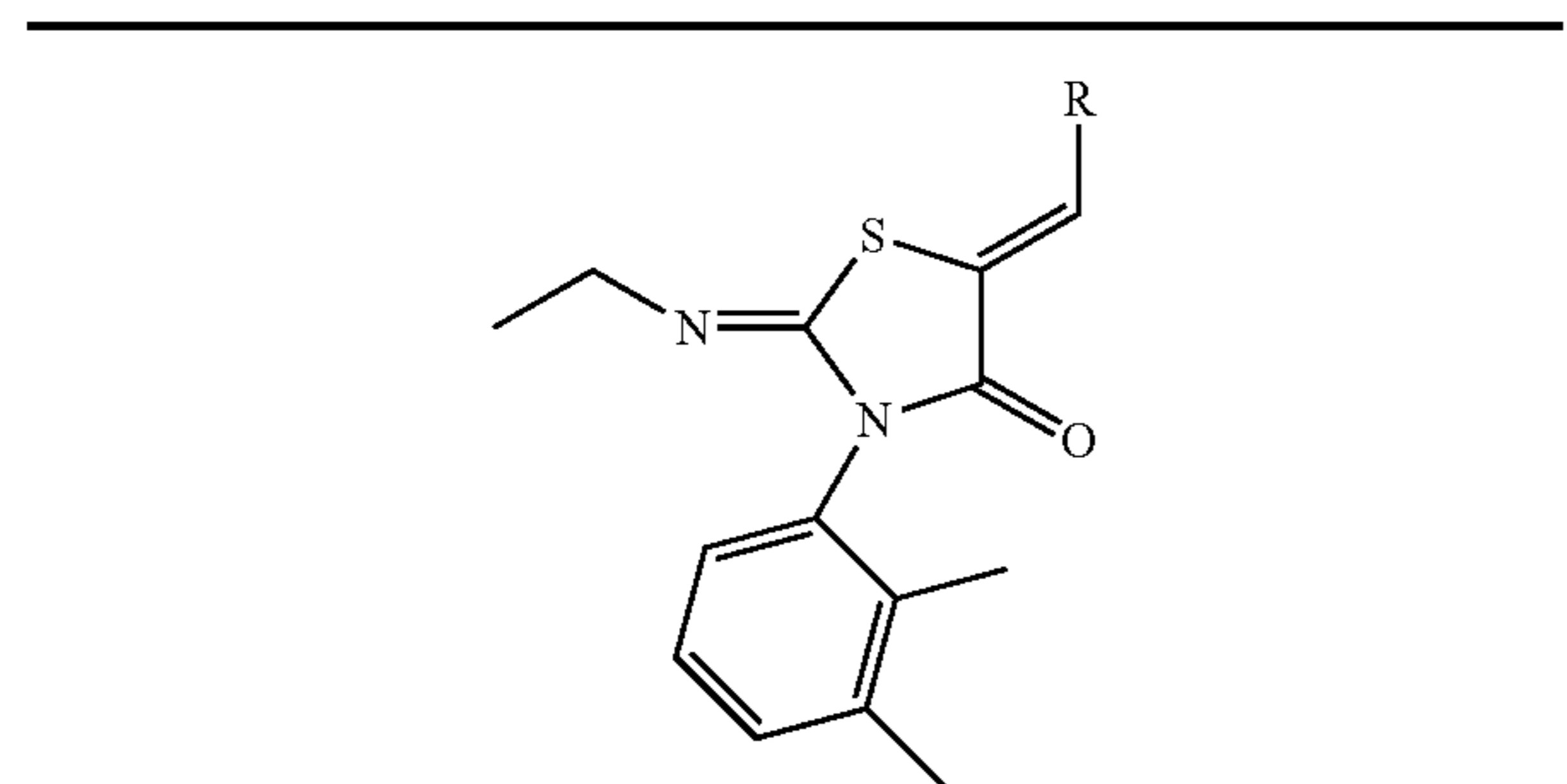
Starting from Scaffold 19, the following examples are prepared:

Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t _R	[M + 1] ⁺⁺
104		E	0.200	1.05	367
105		E	0.200	1.05	381
106		E	0.200	0.98	366
107		D	0.200	0.92	383
108		D	0.640	1.00	417

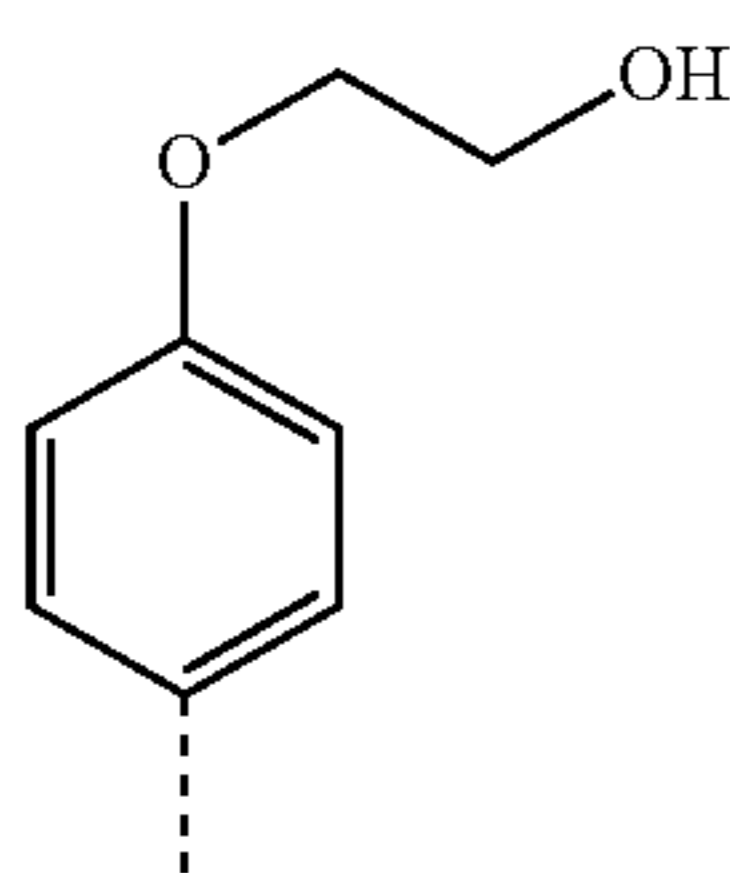
71

Examples 109 and 110

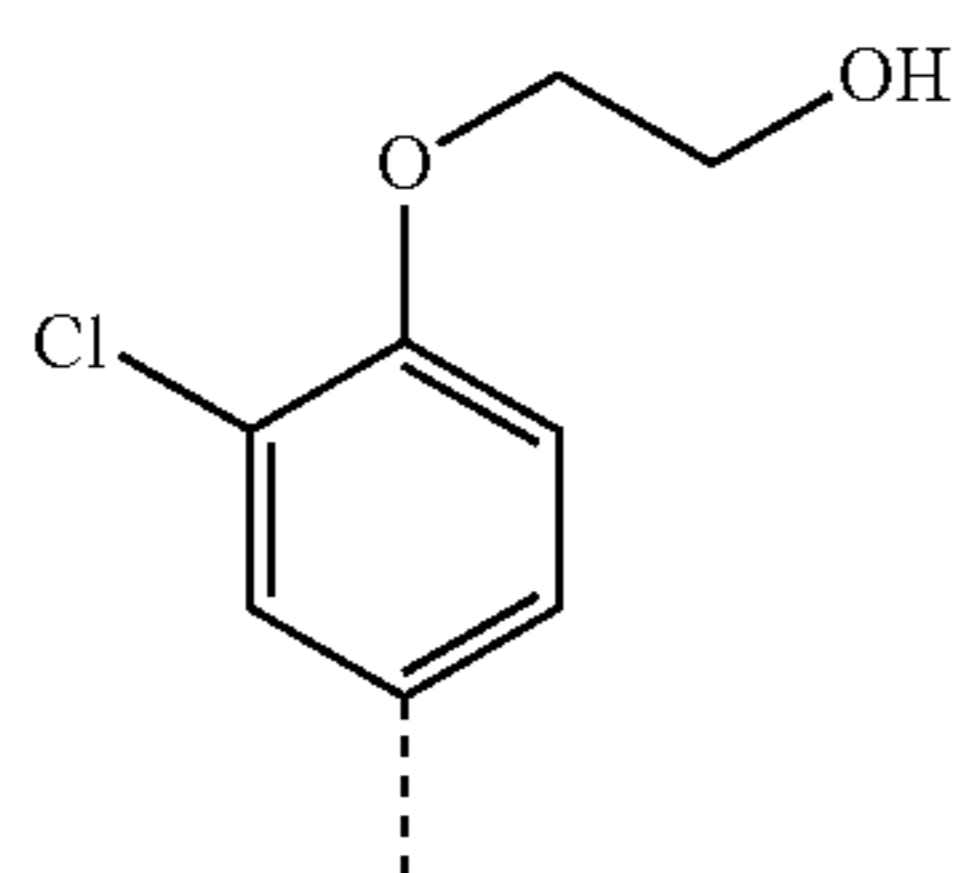
Starting from Scaffold 20, the following examples are prepared:



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
109		D	0.604	0.94	397



110		D	0.604	1.02	431
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Example 110

$^1\text{H NMR}$ (CDCl_3): δ 7.67 (s, 1H), 7.63 (d, $J=2.3$ Hz, 1H), 7.46 (dd, $J=2.3, 8.8$ Hz, 1H), 7.25-7.19 (m, 2H), 7.07-7.01 (m, 2H), 4.25-4.20 (m, 2H), 4.08-4.02 (m, 2H), 3.55-3.43 (m, 2H), 2.35 (s, 3H), 2.15 (s br, 1H), 2.07 (s, 3H), 1.25-1.19 (m, 3H).

72

Examples 111 and 112

Starting from Scaffold 21, the following examples are prepared:

5

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Ex-
am-
ple

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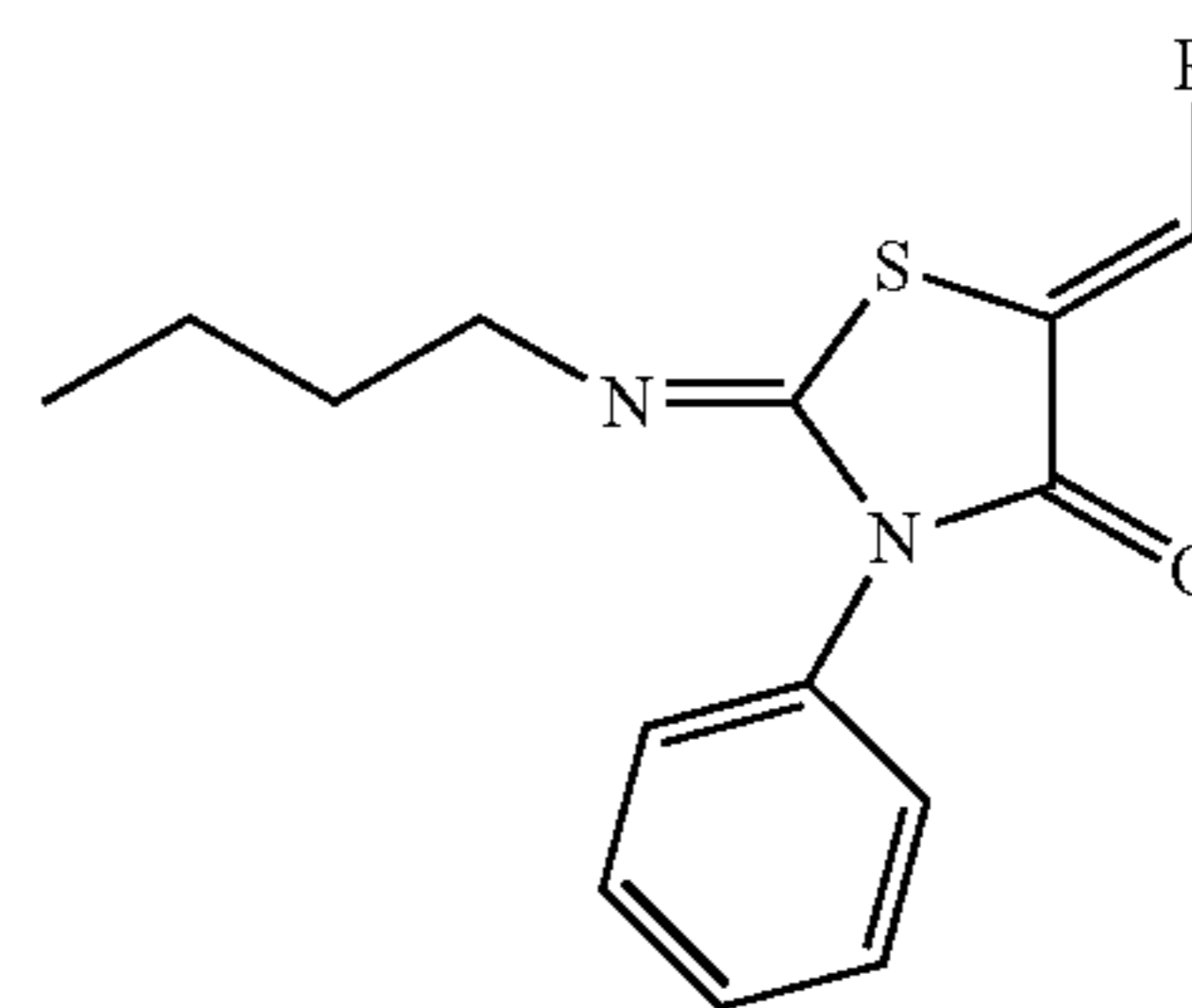
50

Ex-
am-
ple

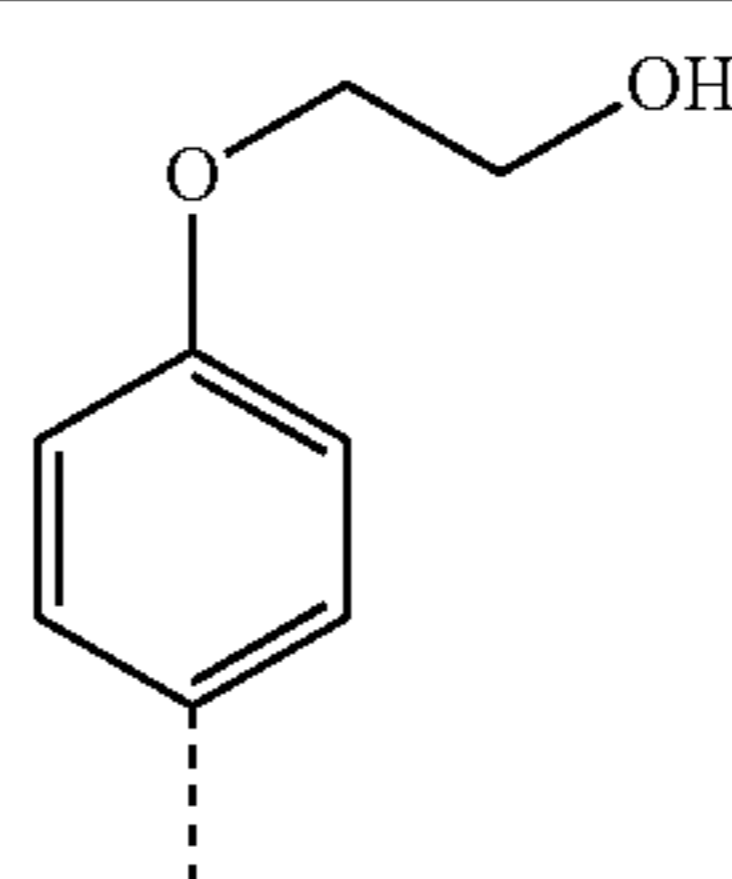
55

60

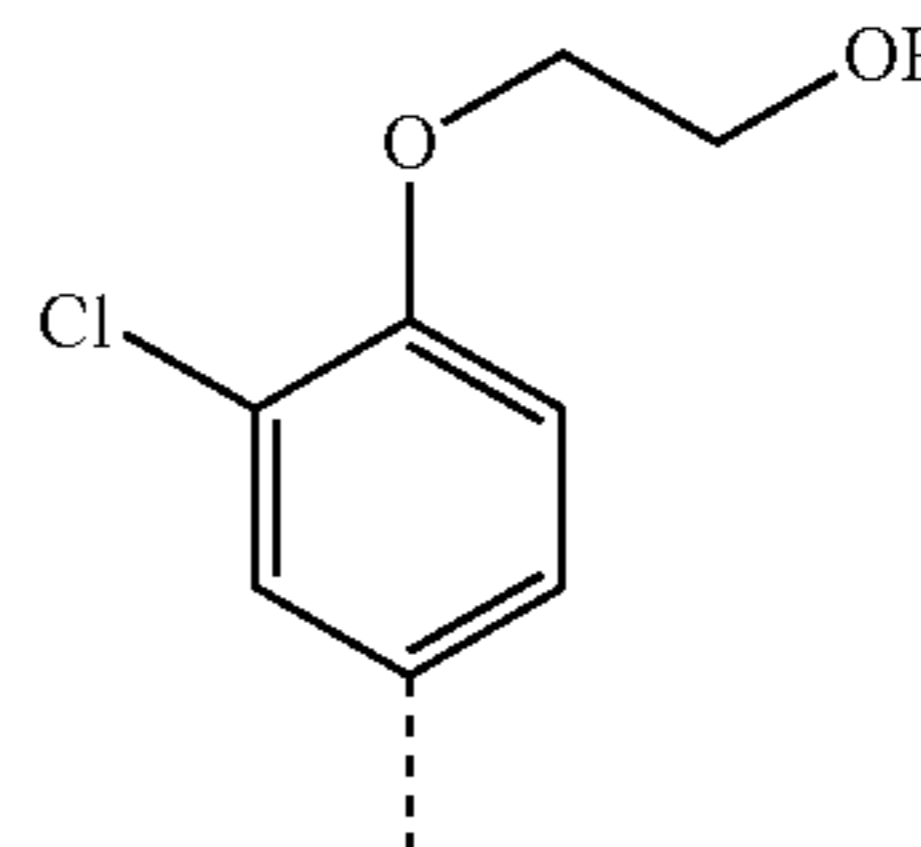
65



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
111		D	0.604	0.98	397



112		D	0.604	1.05	431
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Examples 113 and 114

Starting from Scaffold 22, the following examples are prepared:

45

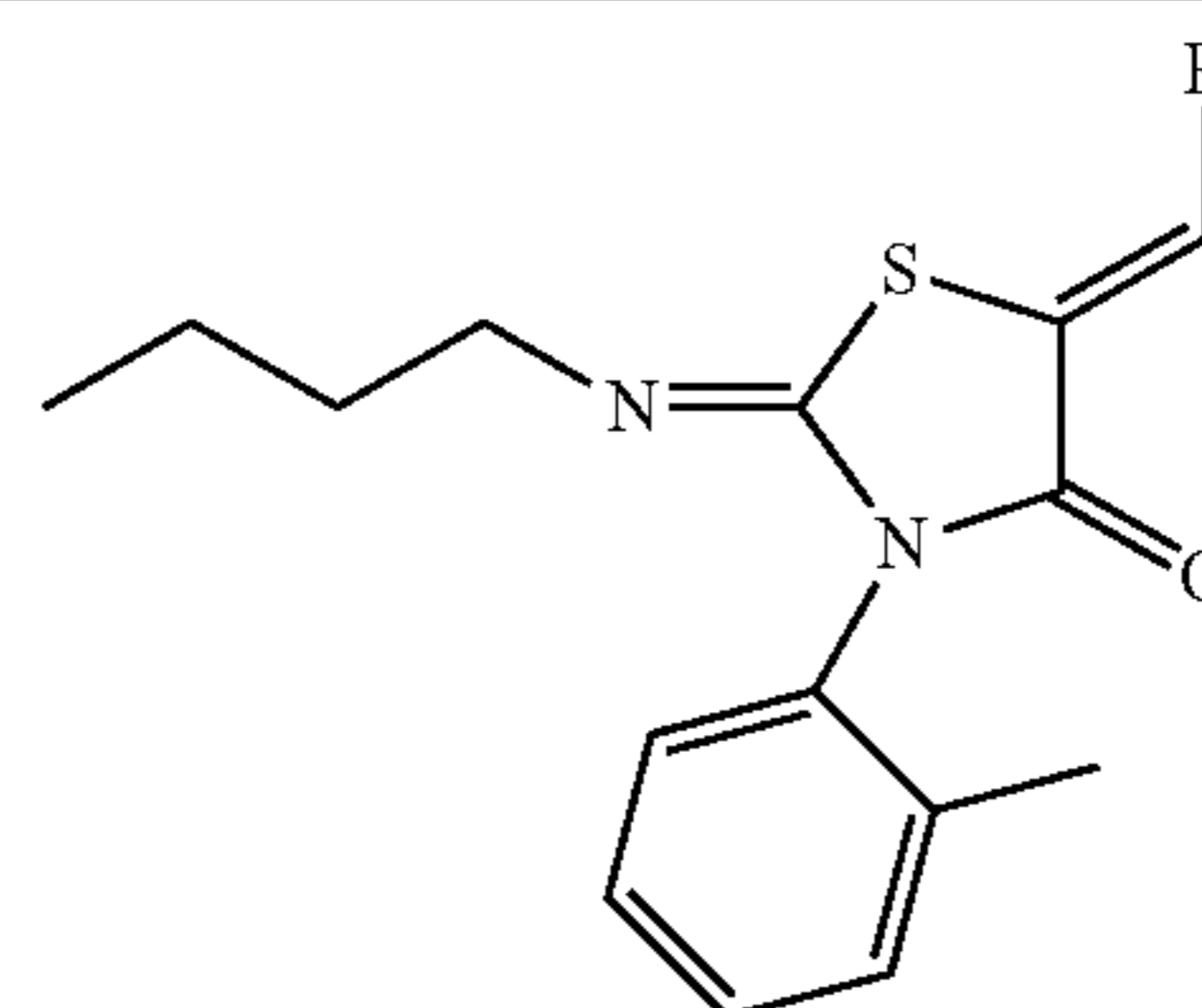
50

Ex-
am-
ple

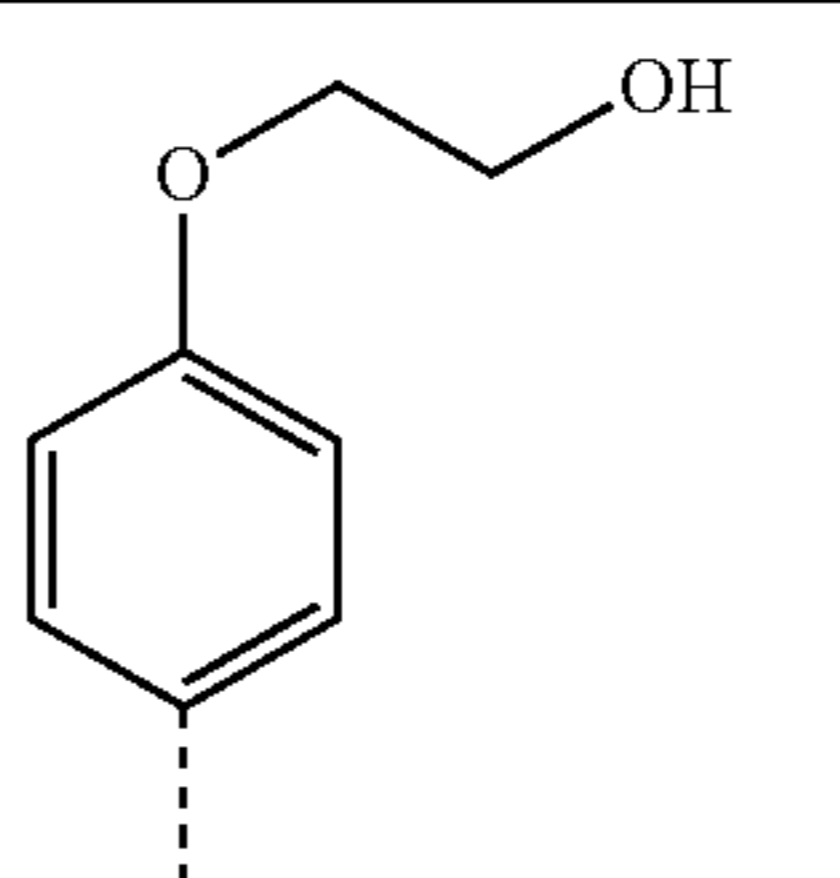
55

60

65

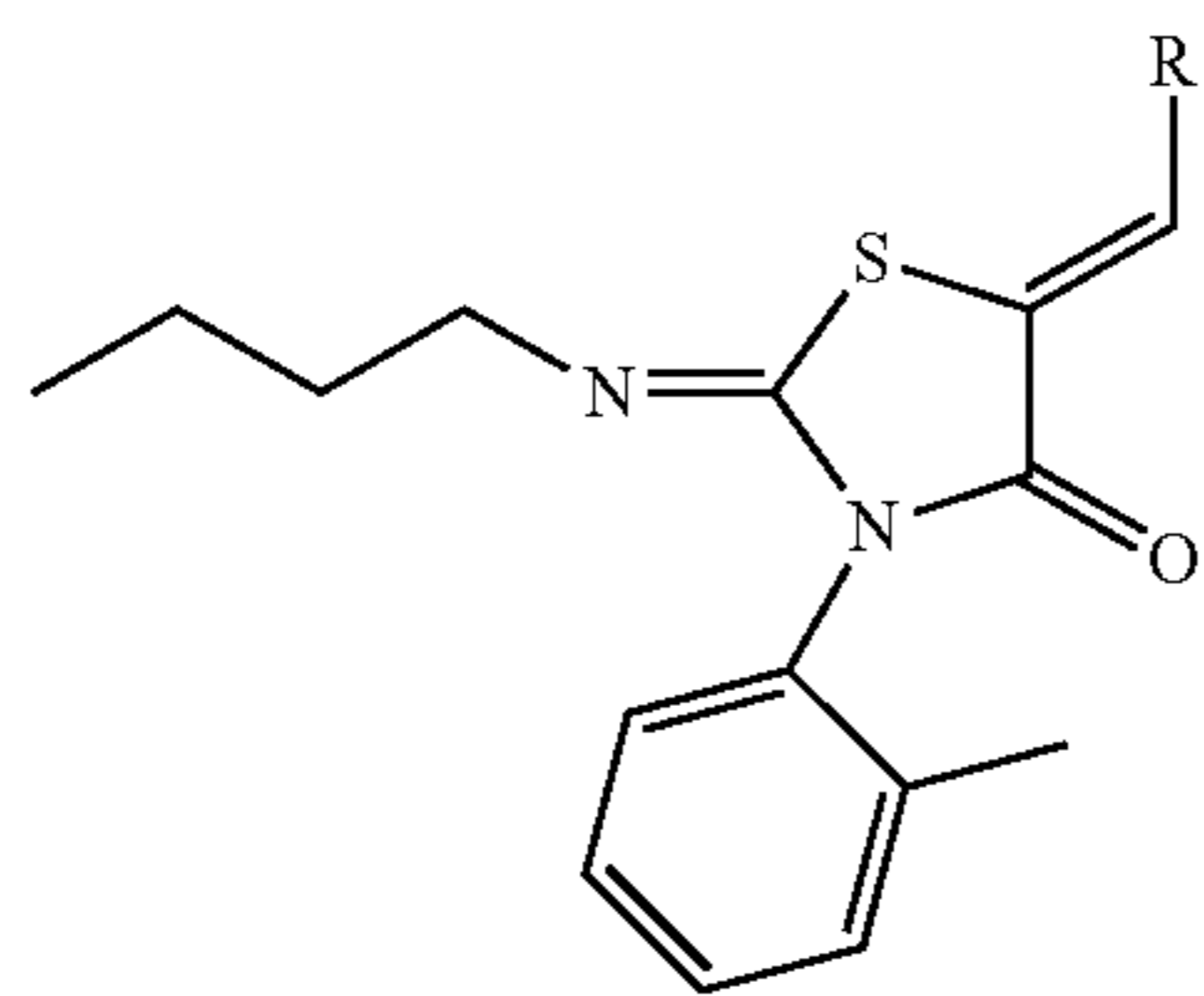


Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
113		D	0.572	1.01	411



73

-continued



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
114		D	0.762	1.10	409

Example 114

$^1\text{H NMR}$ (CDCl_3): δ 7.67 (s, 1H), 7.62 (d, $J=2.3$ Hz, 1H), 7.46 (dd, $J=2.3, 8.2$ Hz, 1H), 7.39-7.29 (m, 3H), 7.20-7.16 (m, 1H), 7.05 (d, $J=8.8$ Hz, 1H), 4.25-4.20 (m, 2H), 4.07-7.02 (m, 2H), 3.51-3.35 (m, 2H), 2.20 (s, 3H), 2.14 (s br, 1H), 1.65-1.55 (m, 2H), 1.43-4.30 (m, 2H), 0.93 (t, $J=7.3$ Hz, 3H).

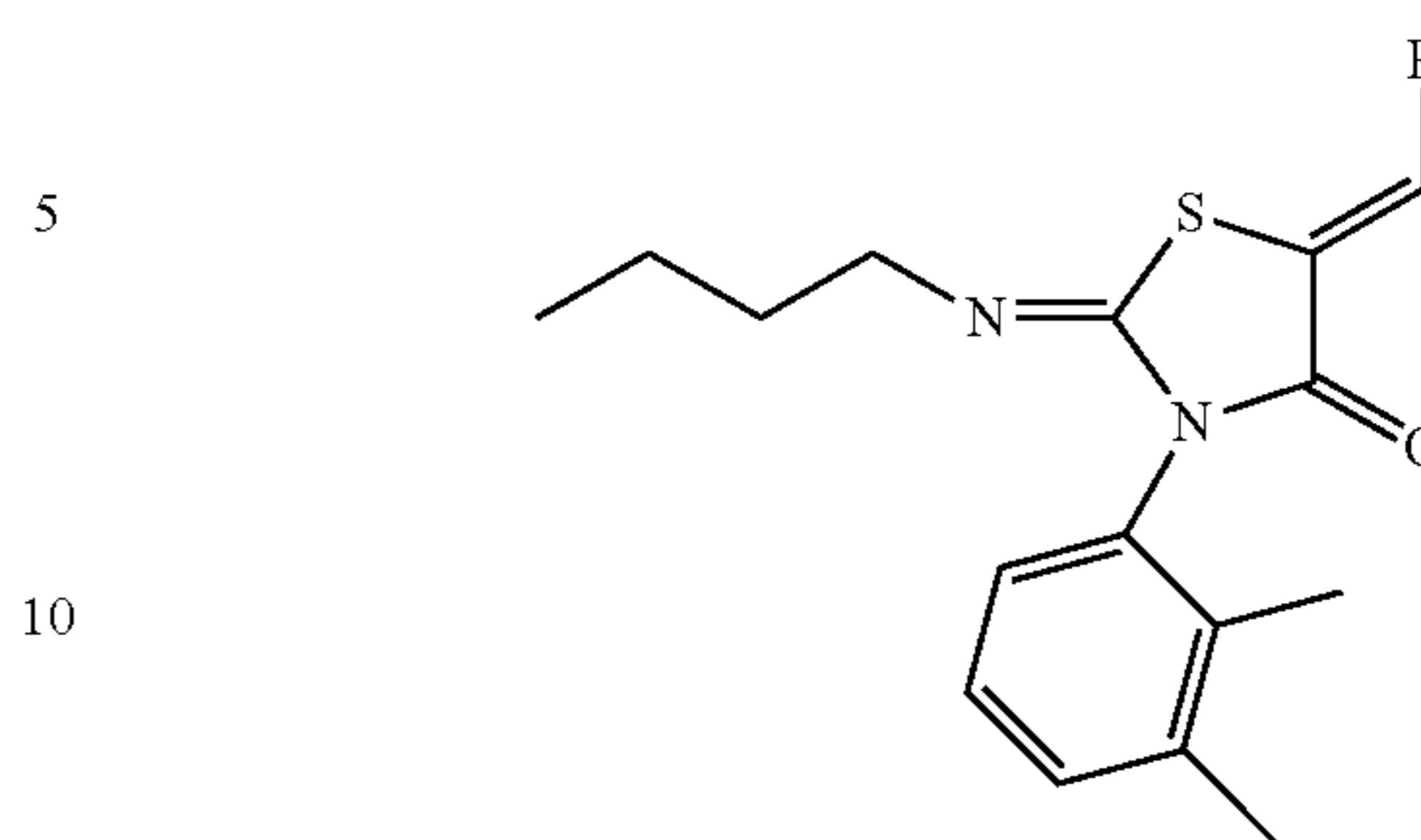
Examples 115 and 116

Starting from Scaffold 23, the following examples are prepared:

Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
115		D	0.543	1.03	425

74

-continued



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
116		D	0.543	1.09	459

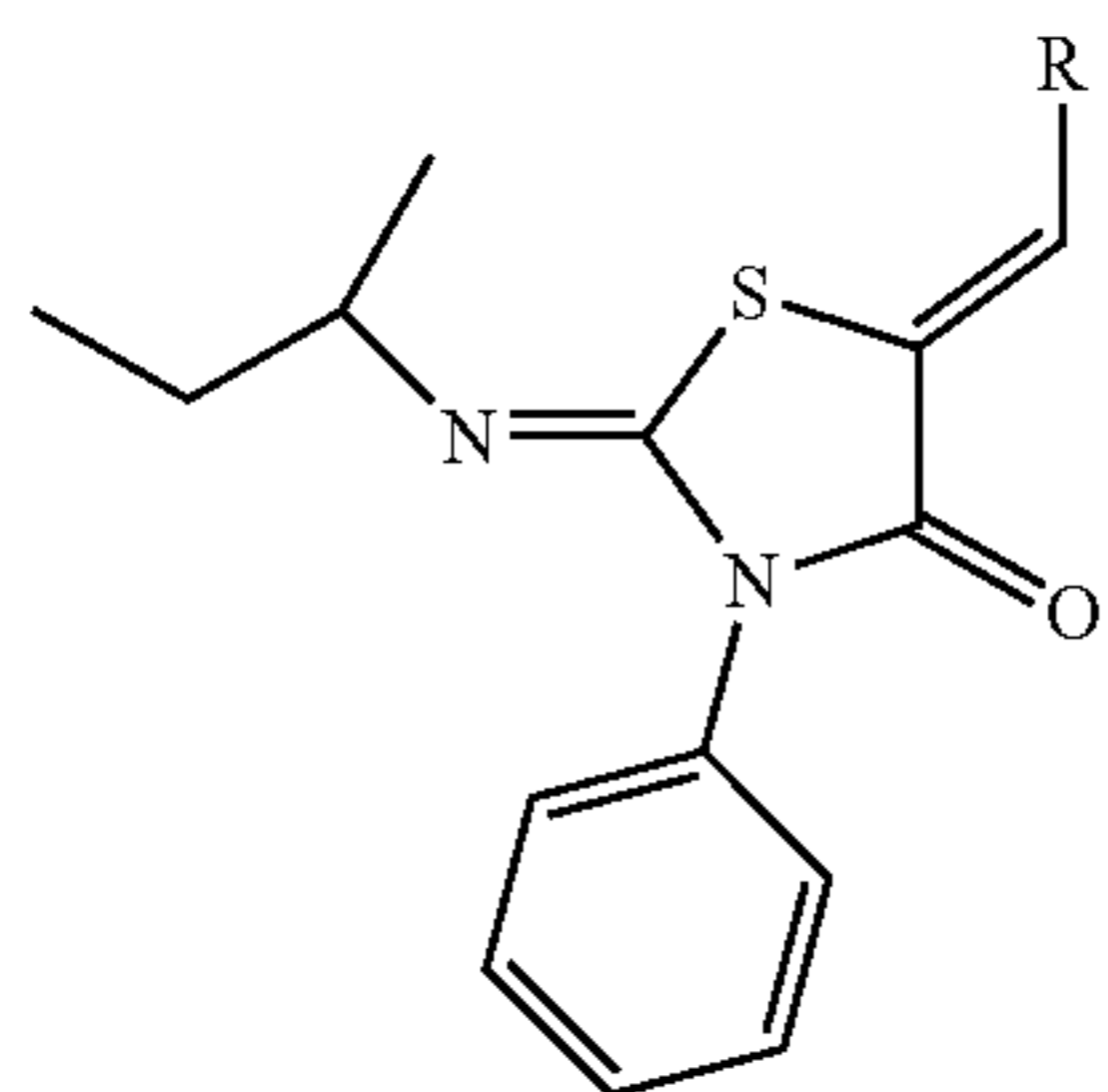
Examples 117 to 120

Starting from Scaffold 24, the following examples are prepared:

Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
117		E	0.200	1.12	381
118		E	0.200	1.10	395

75

-continued



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
119		E	0.200	1.02	380
120		D	0.604	1.04	431

Example 120

$^1\text{H NMR}$ (CDCl_3): δ 7.65 (s, 1H), 7.61 (d, $J=2.3$ Hz, 1H), 7.51-7.32 (m, 6H), 7.03 (d, $J=8.2$ Hz, 1H), 4.24-4.20 (m, 2H), 4.06-4.01 (m, 2H), 3.32 (hex, $J=6.4$ Hz, 1H), 2.15 (s br, 1H), 1.60-1.49 (m, 2H), 1.17 (d, $J=6.4$ Hz, 3H), 0.87 (t, $J=7.3$ Hz, 3H).

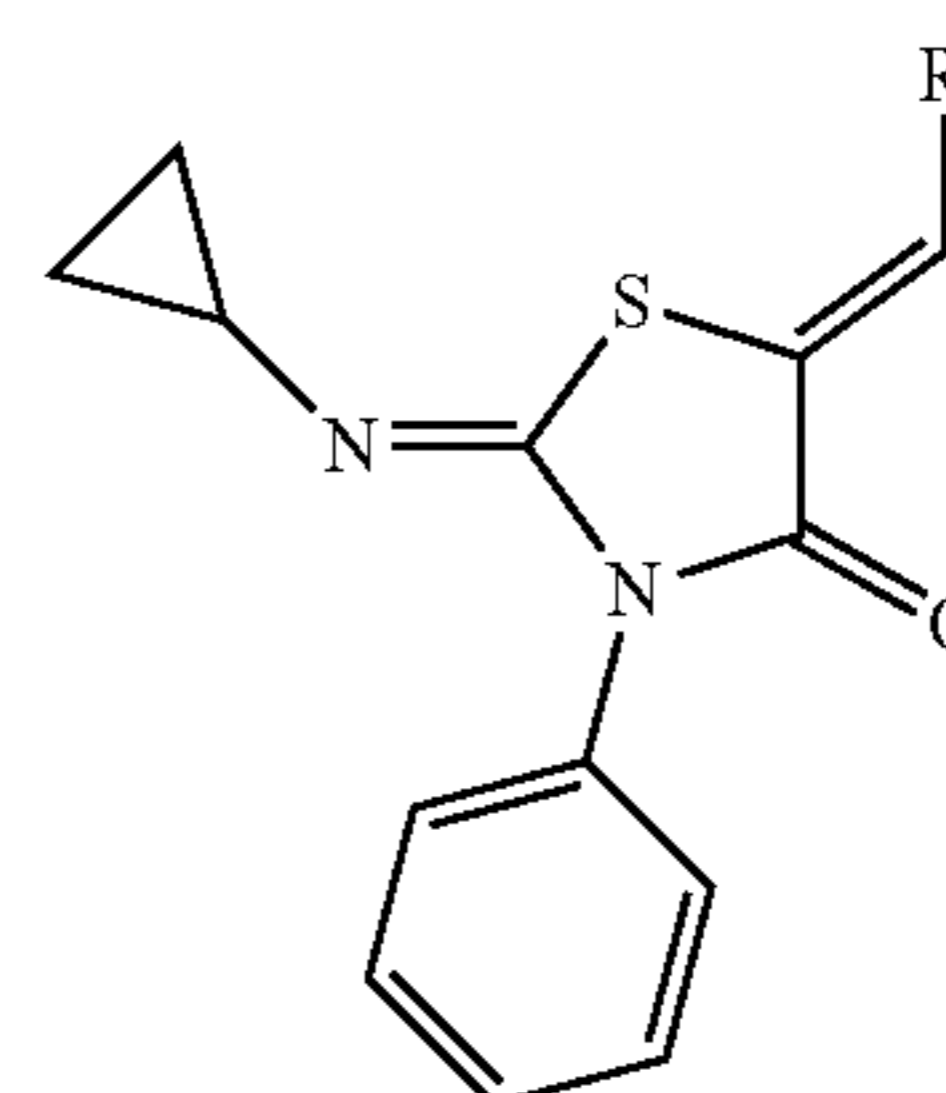
Examples 121 to 123

Starting from Scaffold 25, the following examples are prepared:

Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
121		E	0.200	1.08	365

76

-continued



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
122		E	0.200	1.08	379
123		D	0.200	0.96	381

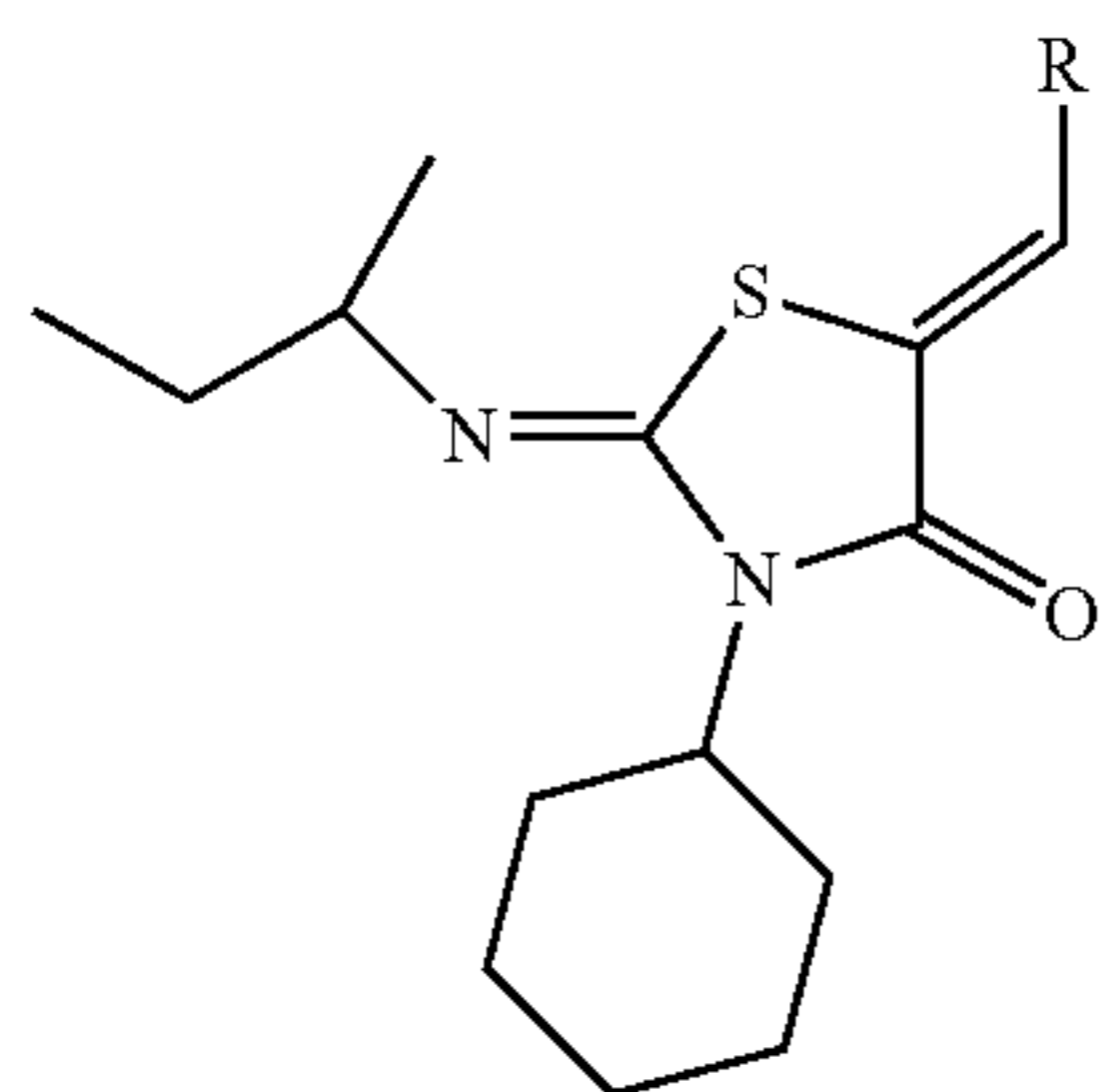
Example 124 and 125

Starting from Scaffold 26, the following examples are prepared:

Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
124		D	0.283	1.08	389

77

-continued



Ex- am- ple	R	Method	Scale		LC-MS	
			(mmol)	t_R	$[M + 1]^{++}$	
125		D	0.283	1.14	423	

Example 124

$^1\text{H NMR}$ (CDCl_3): δ 7.60 (s, 1H), 7.51-7.46 (m, 2H), 7.01-6.96 (m, 2H), 4.49 (tt, $J=3.5, 11.8$ Hz, 1H), 4.16-4.11 (m, 2H), 4.02-3.96 (m, 2H), 3.51 (hept, $J=6.4$ Hz, 1H), 2.50-2.35 (m, 2H), 1.99 (s br, 1H), 1.90-1.80 (m, 2H), 1.70-1.35 (m, 6H), 1.25 (d, $J=6.4$ Hz, 6H).

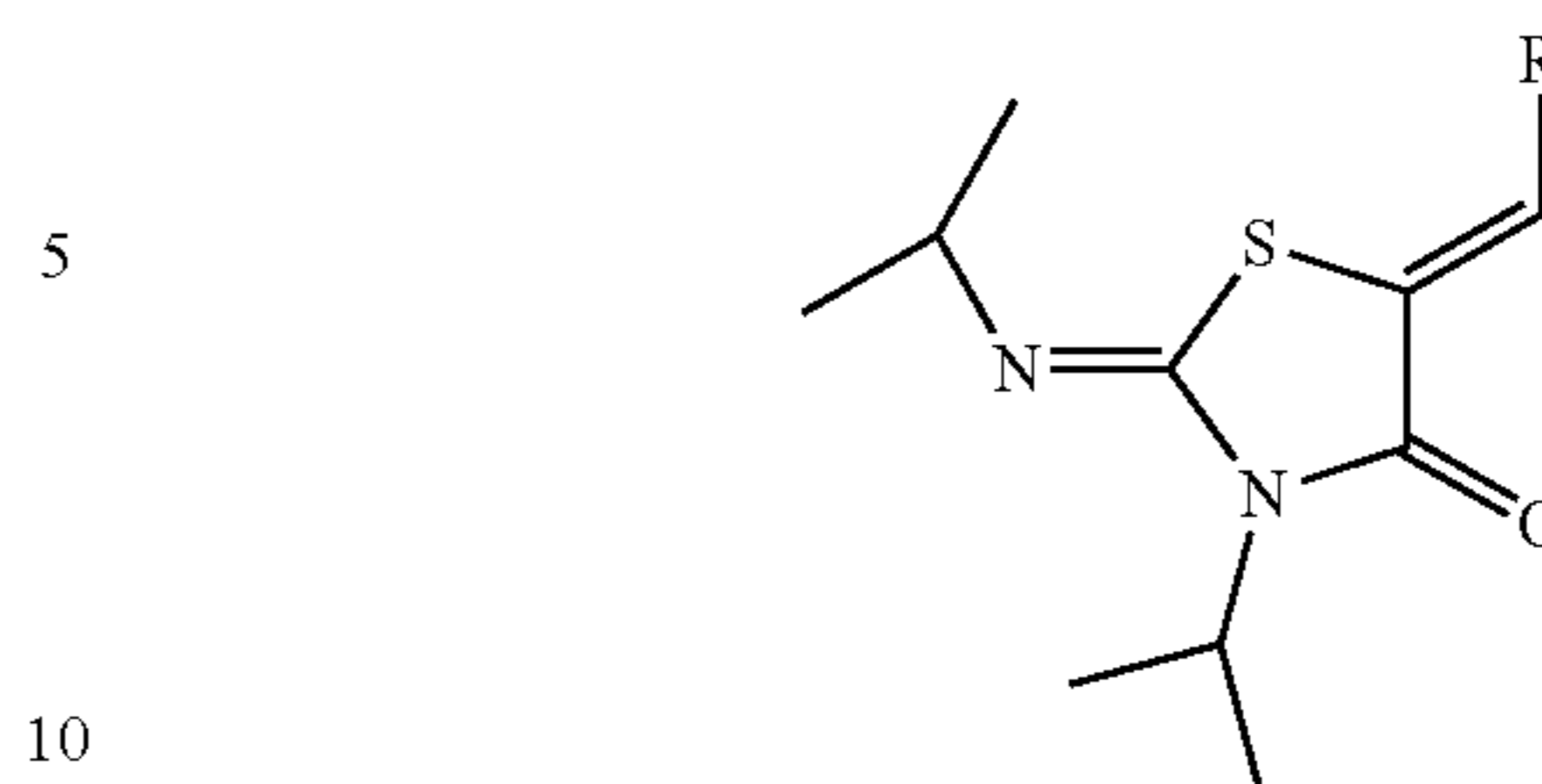
Examples 126 to 131

Starting from Scaffold 27, the following examples are prepared:

Ex- am- ple	R	Method	Scale		LC-MS	
			(mmol)	t_R	$[M + 1]^{++}$	
126		E	0.200	1.12	333	

78

-continued



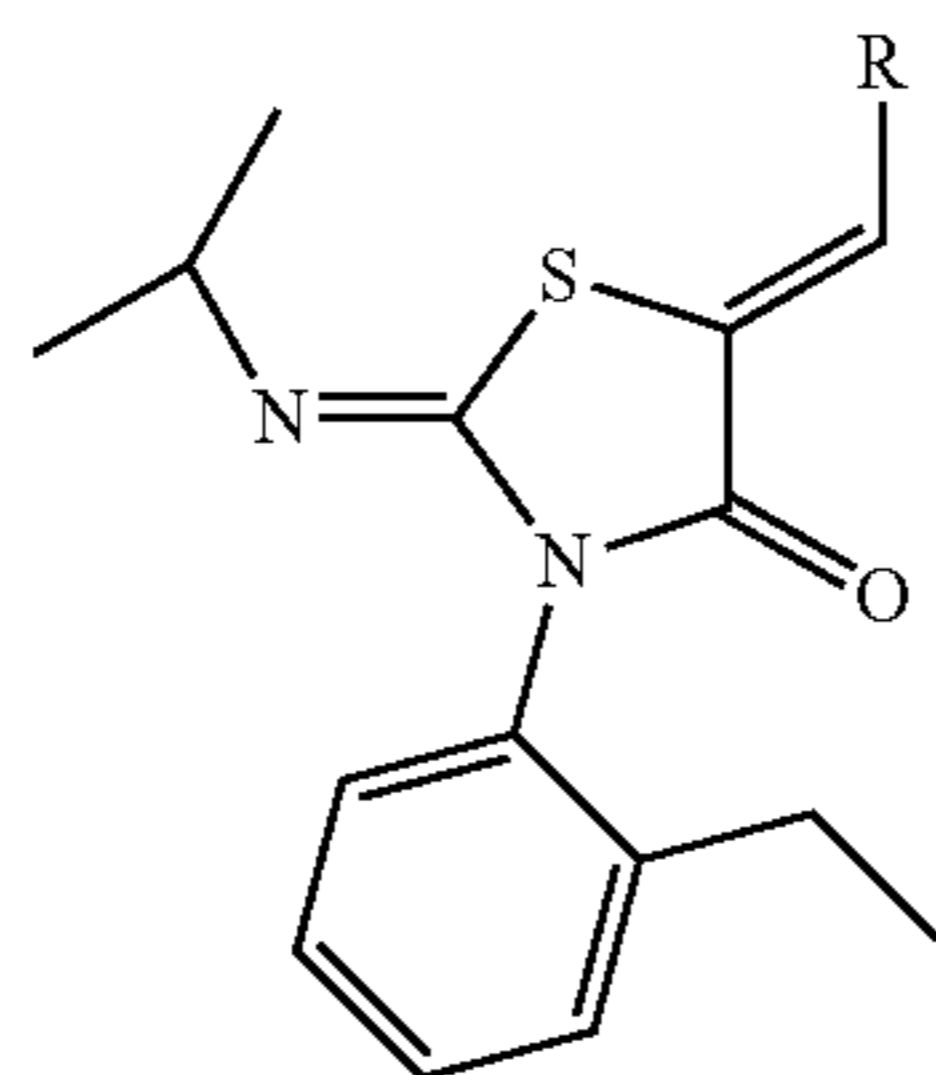
Ex- am- ple	R	Method	Scale		LC-MS	
			(mmol)	t_R	$[M + 1]^{++}$	
127		E	0.200	1.12	347	
128		E	0.200	1.07	332	
129		D	0.200	0.95	345	
130		D	0.499	1.07	383	
131		D	0.750	0.99	413	

Example 131

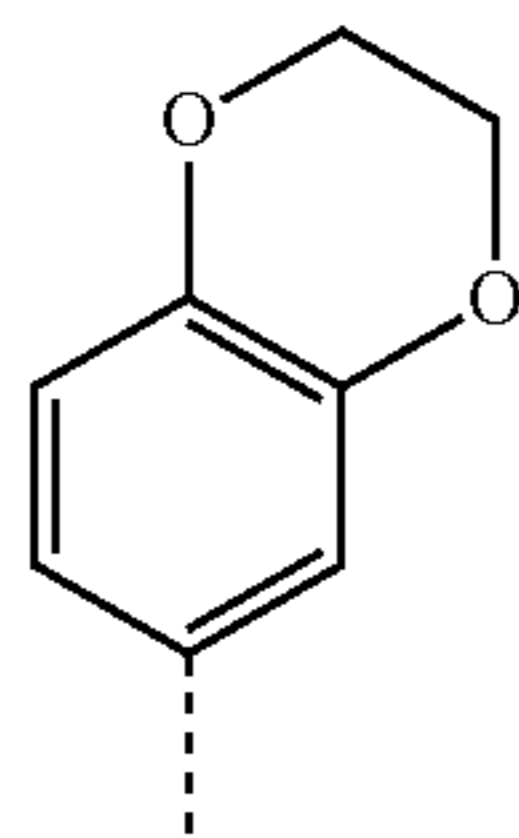
$^1\text{H NMR}$ (CDCl_3): δ 7.55 (d, $J=2.3$ Hz, 1H), 7.52 (s, 1H), 7.40 (dd, $J=2.3, 8.2$ Hz, 1H), 7.00 (d, $J=8.2$ Hz, 1H), 4.91 (hept, $J=7.0$ Hz, 1H), 4.25-4.14 (m, 3H), 3.94-3.81 (m, 2H), 3.53 (hept, $J=6.4$ Hz, 1H), 2.72 (s br, 1H), 2.09 (s br, 1H), 1.50 (d, $J=7.0$ Hz, 6H), 1.26 (d, $J=6.4$ Hz, 6H).

79
Examples 132 to 134

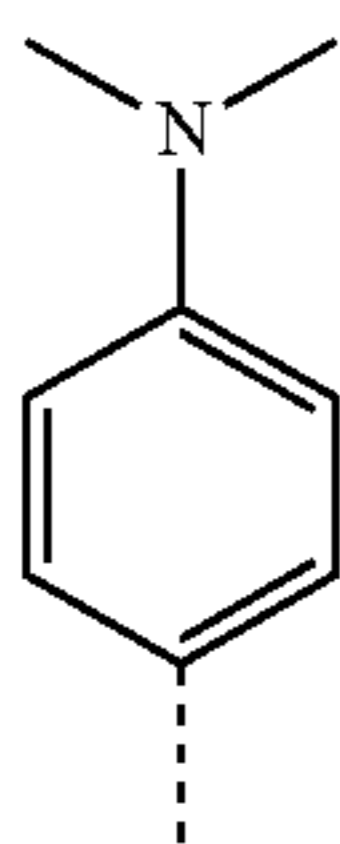
Starting from Scaffold 28, the following examples are prepared:



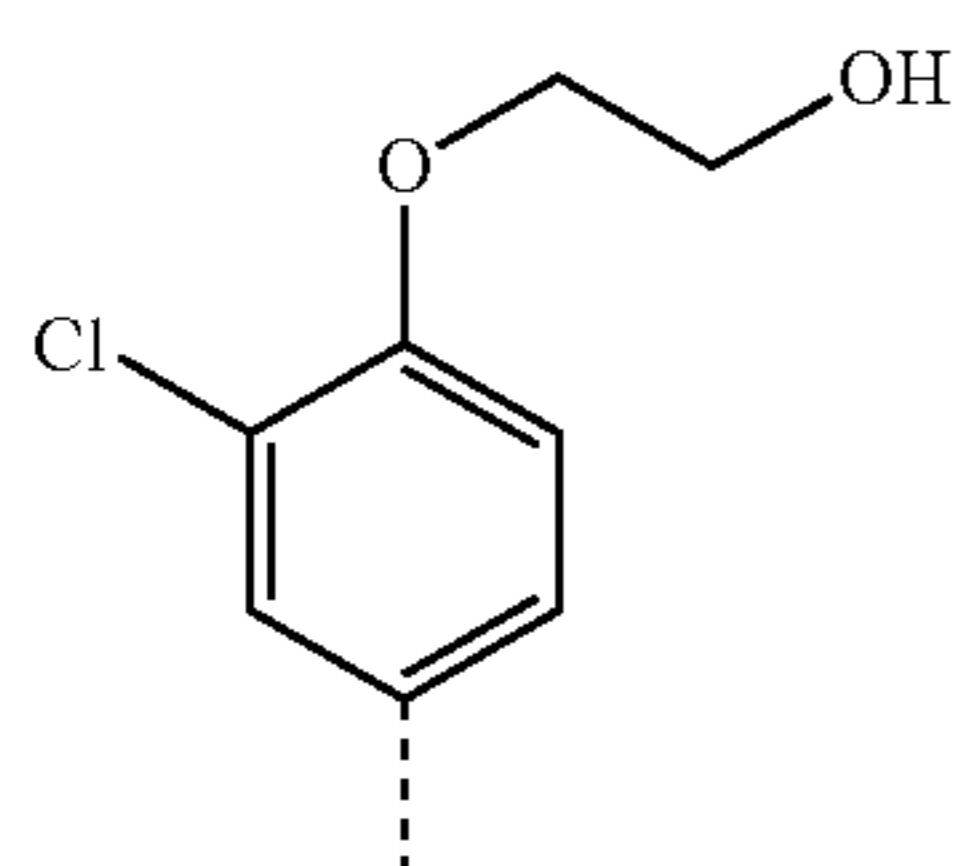
Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
132		E	0.200	1.11	409



133 E 0.200 1.06 394

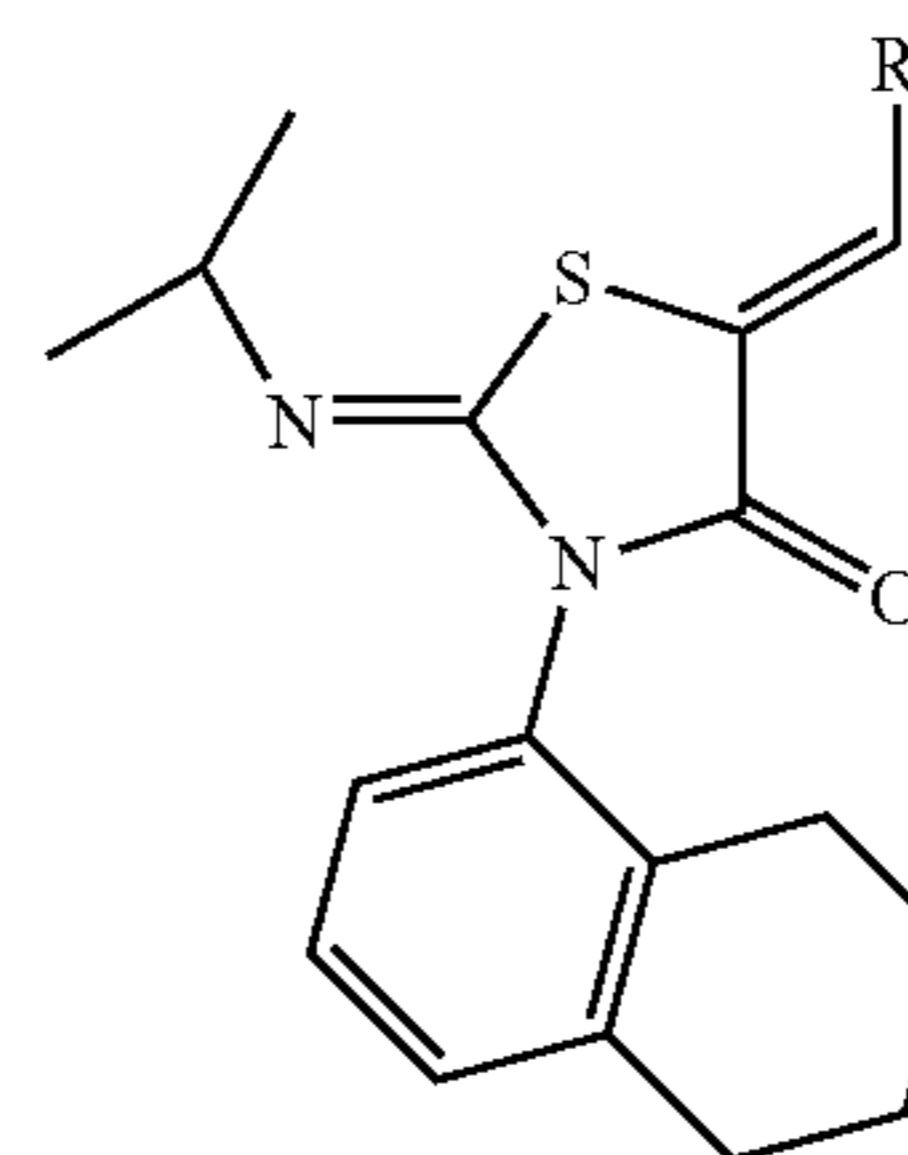


134 D 0.572 1.07 445



80
Examples 135 and 136

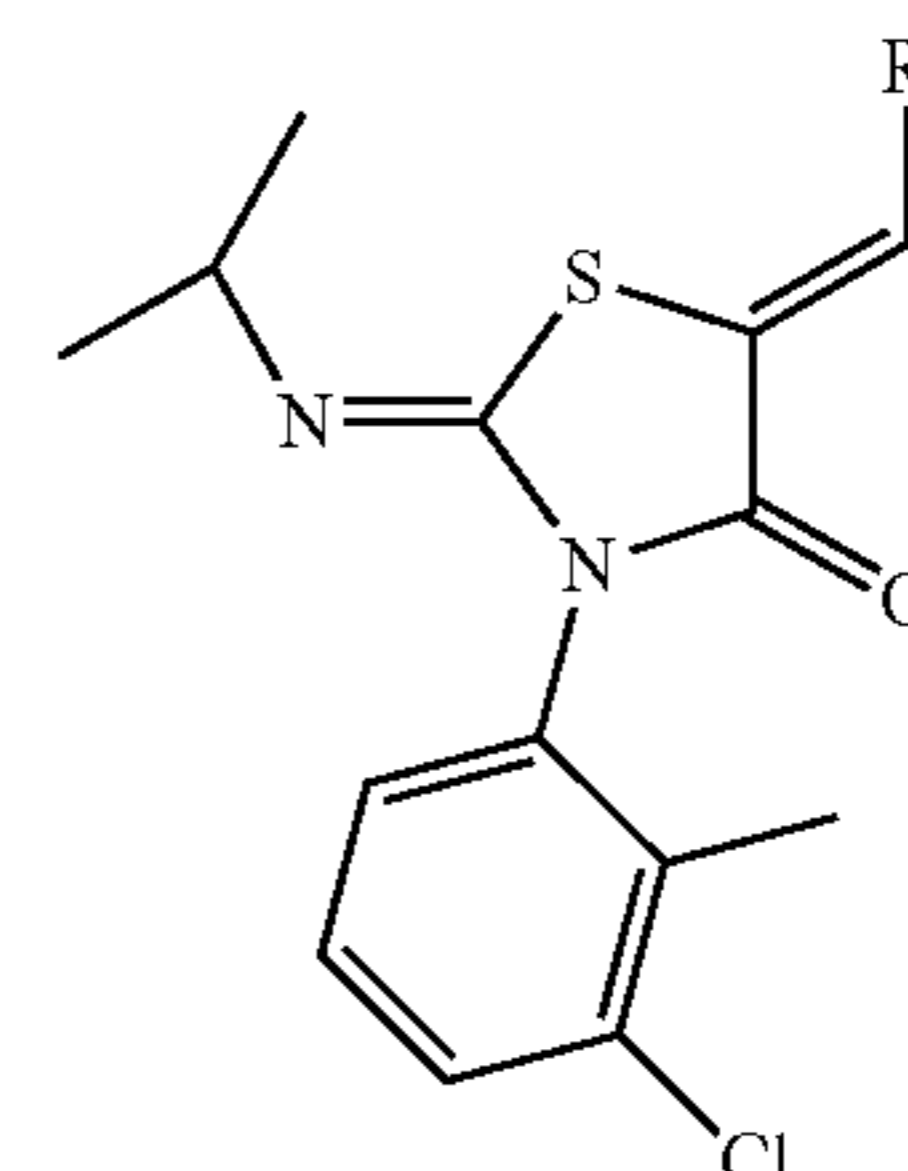
Starting from Scaffold 29, the following examples are prepared:



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
132		E	0.200	1.11	409
133		E	0.200	1.06	394

Examples 137 and 139

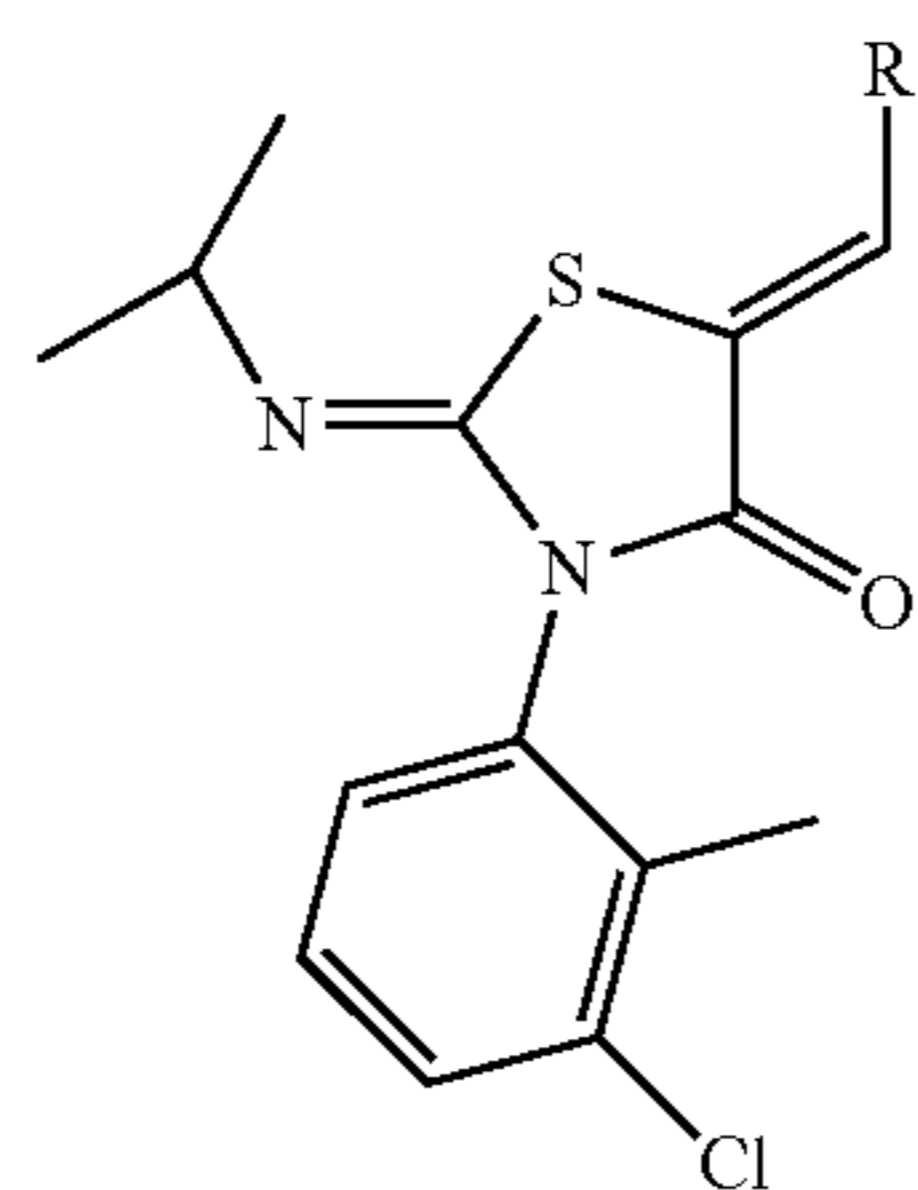
Starting from Scaffold 30, the following examples are prepared:



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
137		E	0.200	1.14	415

81

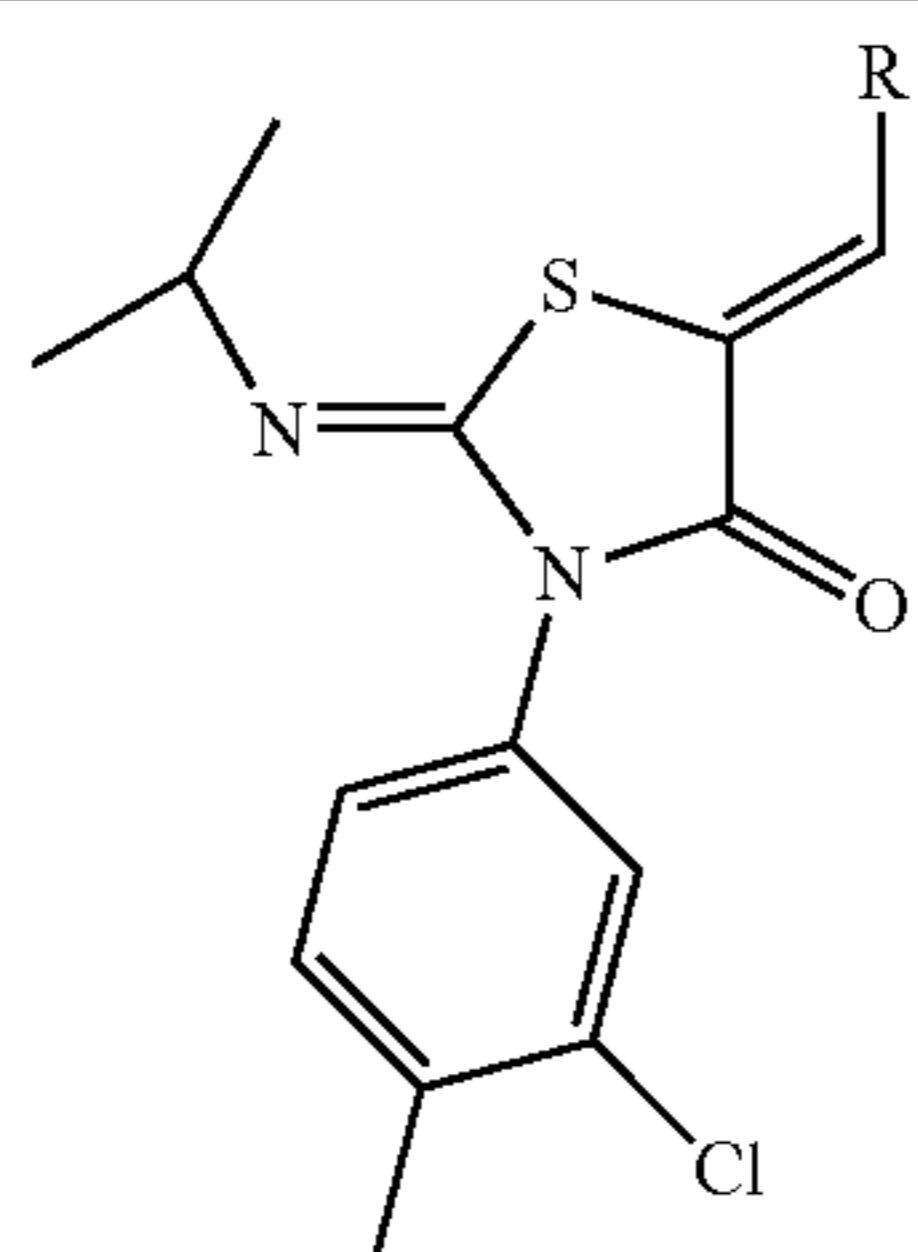
-continued



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
138		E	0.200	1.15	429
139		E	0.200	1.12	414

Examples 140 to 142

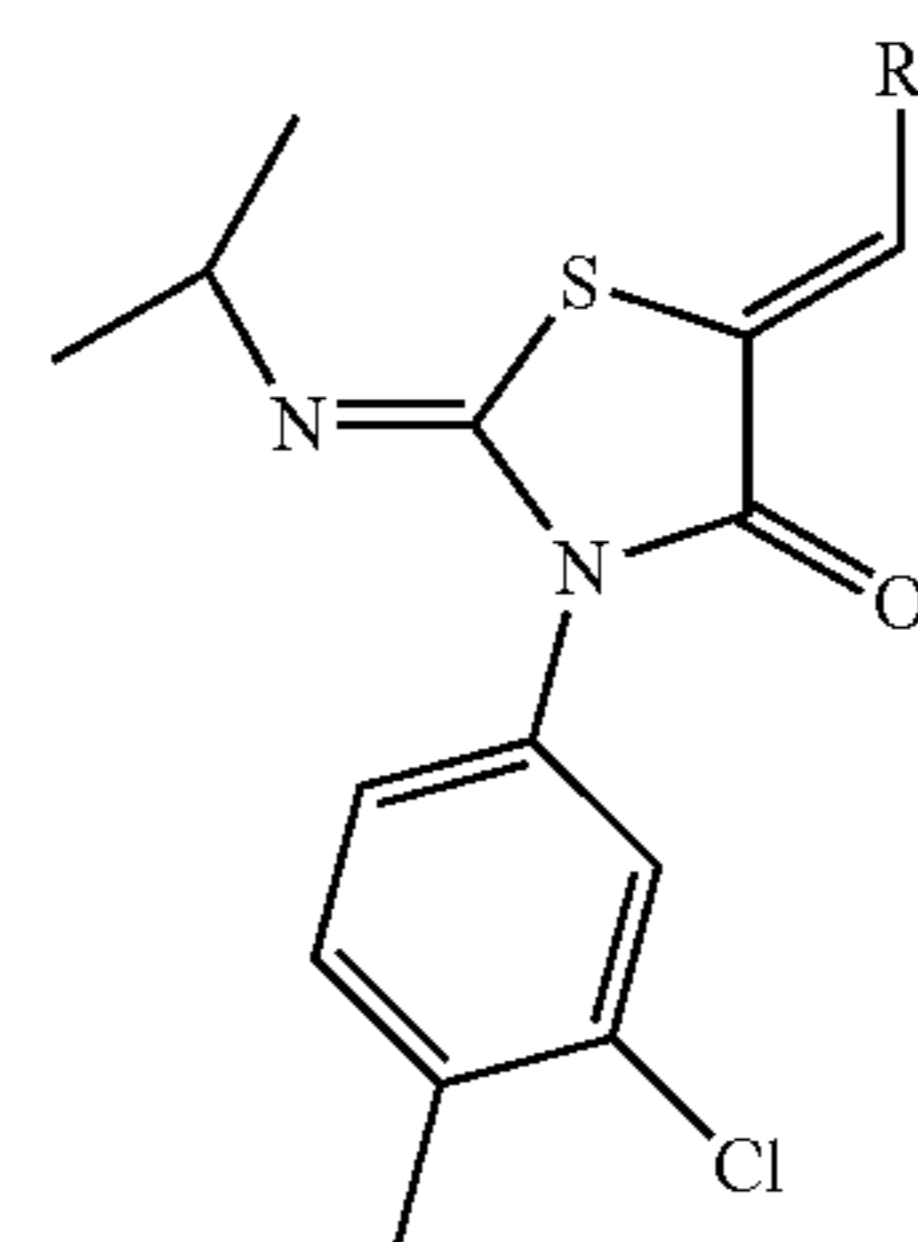
Starting from Scaffold 31, the following examples are prepared:



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
140		E	0.200	1.14	415

82

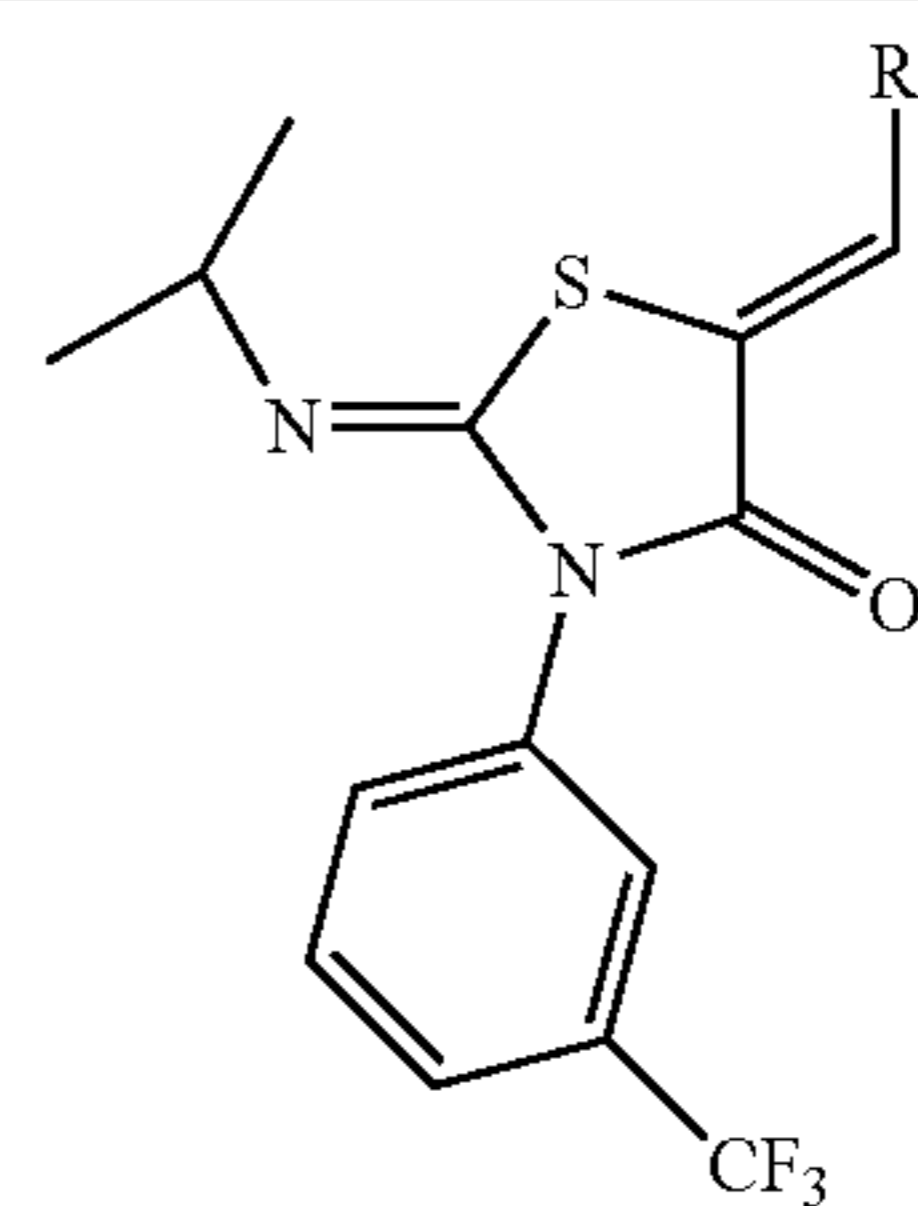
-continued



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
141		E	0.200	1.15	429
142		E	0.200	1.10	414

Examples 143 to 145

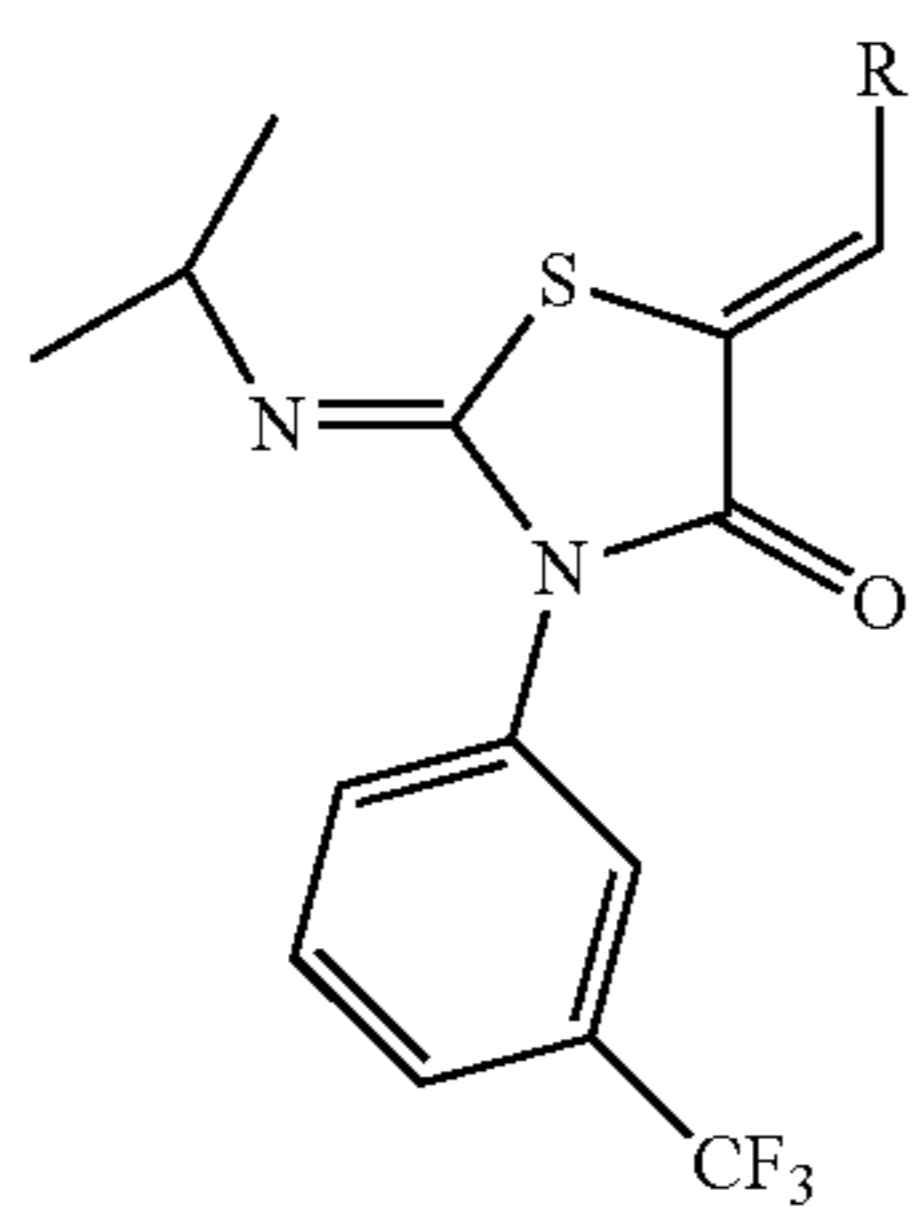
Starting from Scaffold 32, the following examples are prepared:



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
143		E	0.200	1.14	435

83

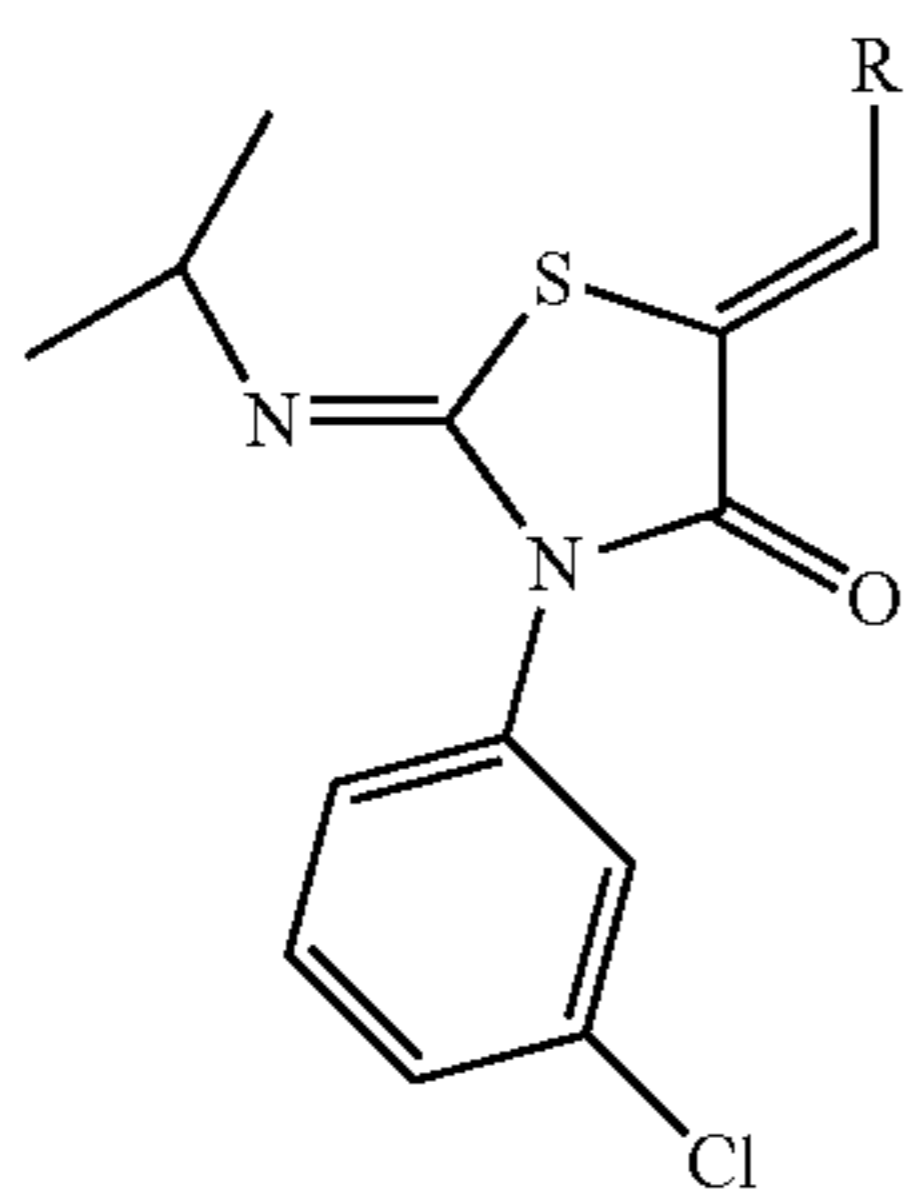
-continued



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
144		E	0.200	1.15	449
145		E	0.200	1.13	434

Examples 146 to 148

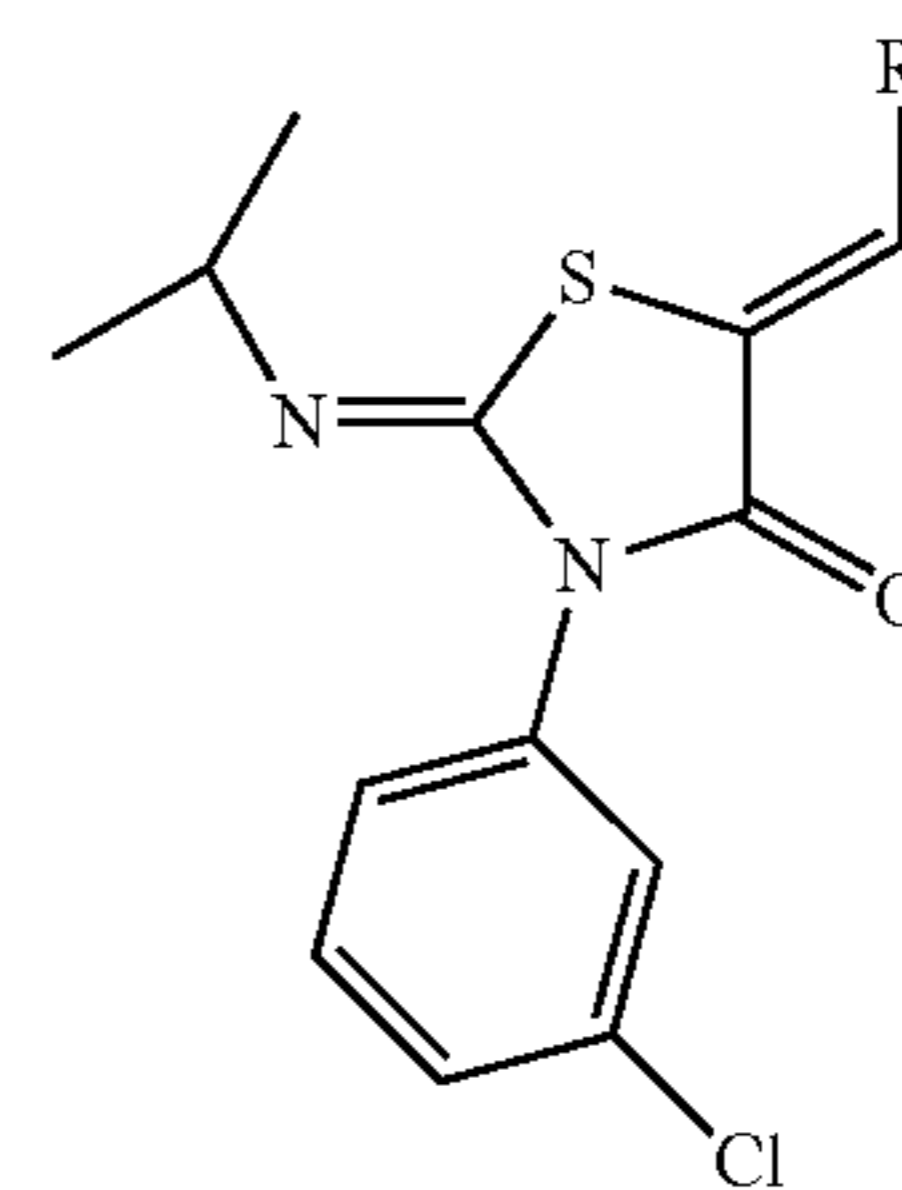
Starting from Scaffold 33, the following examples are prepared:



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
146		E	0.200	1.12	401

84

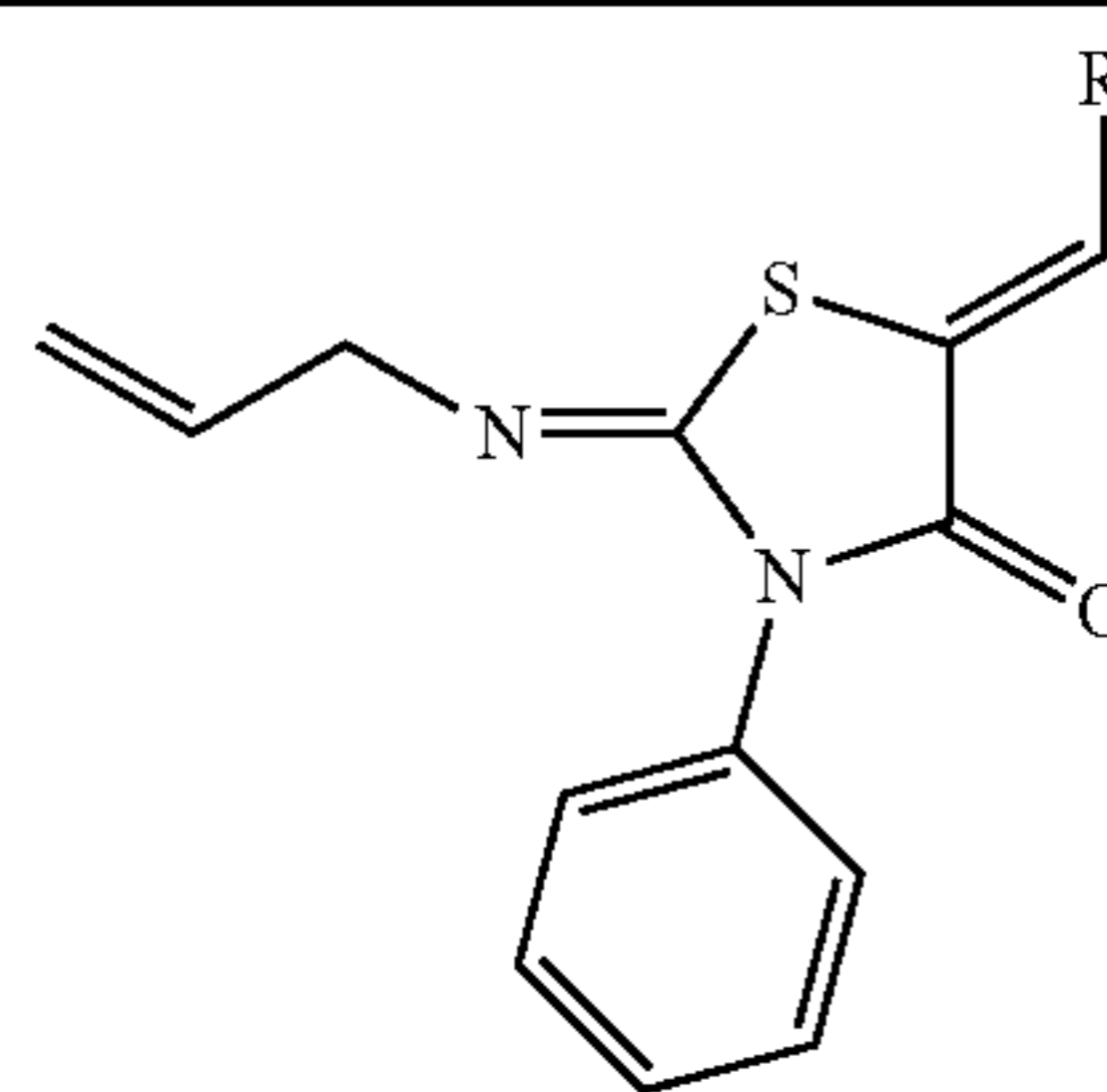
-continued



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
147		E	0.200	1.12	415
148		E	0.200	1.09	400

Examples 149 and 150

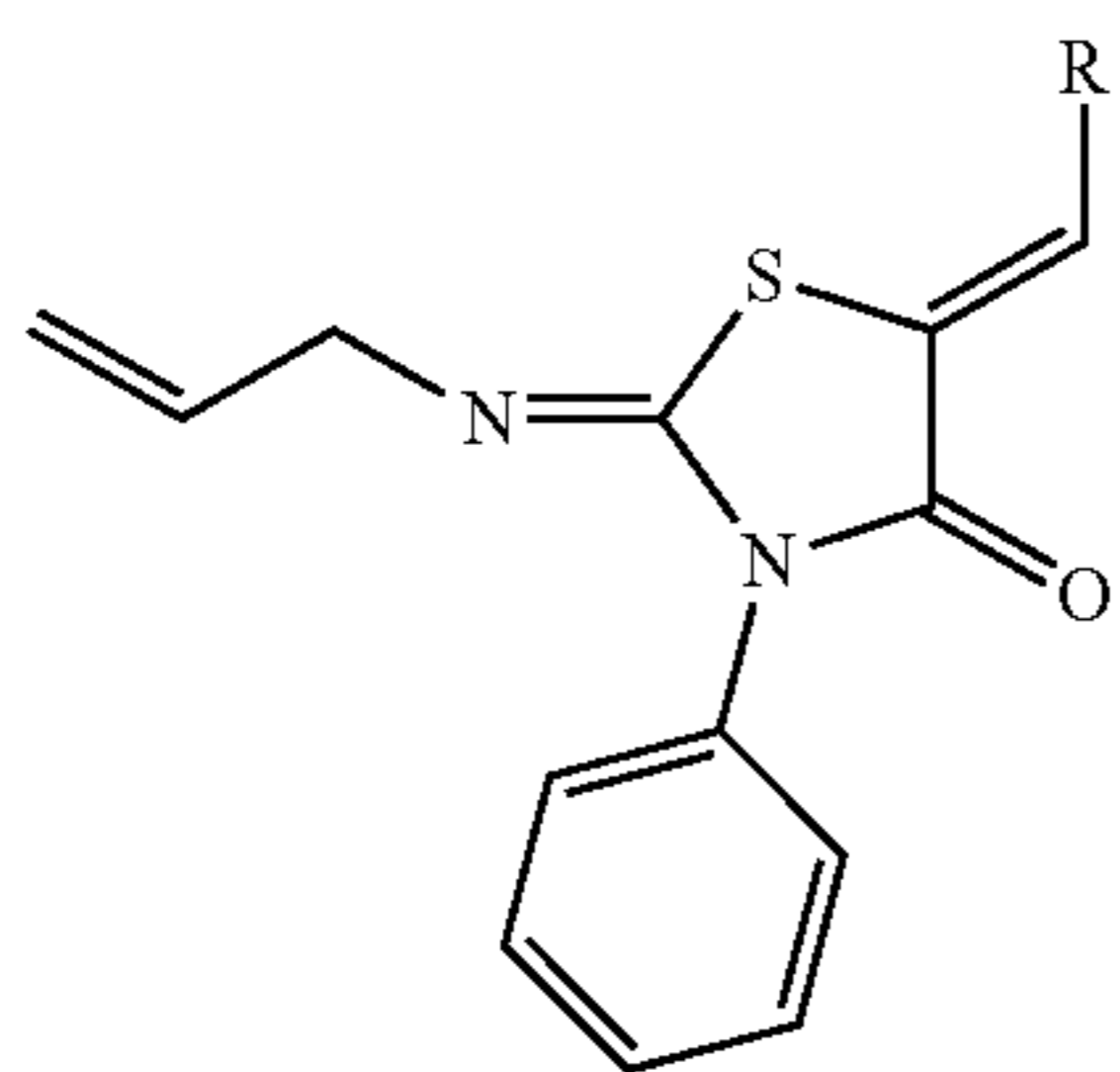
Starting from Scaffold 34, the following examples are prepared:



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$
149		D	0.650	0.95	381

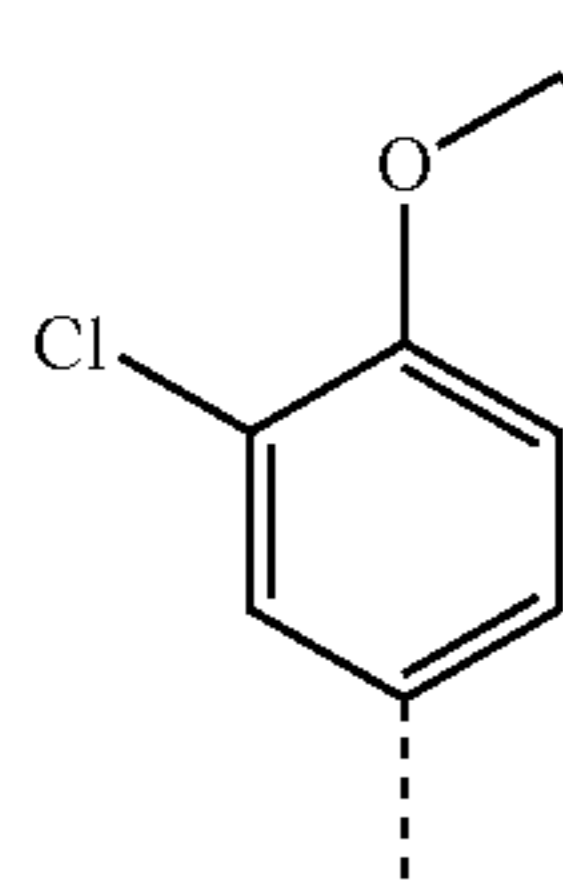
85

-continued



Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$

150		D	0.650	1.01	415
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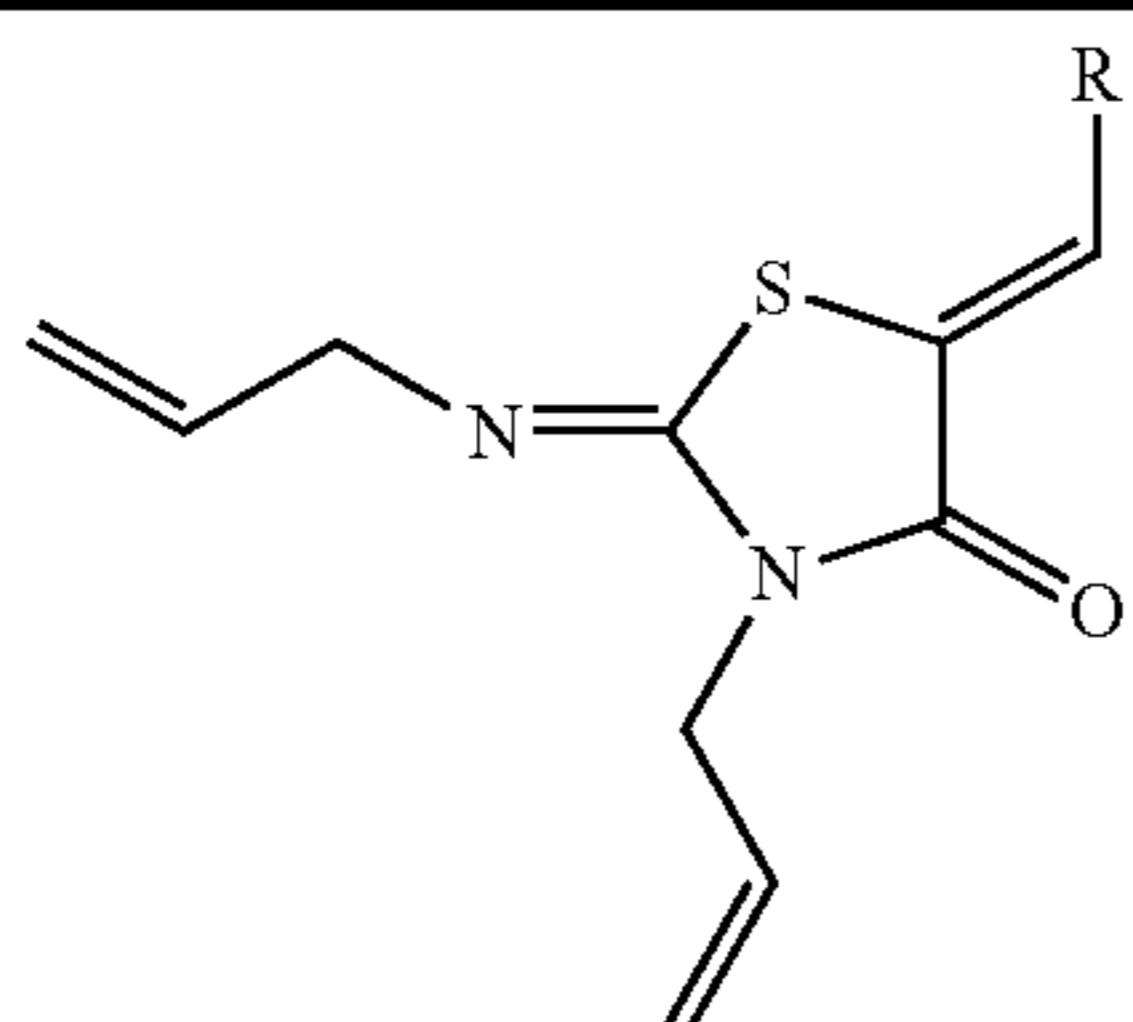


Example 150

$^1\text{H NMR}$ (CDCl_3): δ 7.69 (s, 1H), 7.62 (d, $J=2.3$ Hz, 1H), 7.55-7.34 (m, 4H), 7.05 (d, $J=8.2$ Hz, 1H), 6.01-5.88 (m, 1H), 5.25-5.10 (m, 2H), 4.26-4.20 (m, 2H), 4.12-4.08 (m, 2H), 4.07-4.02 (m, 2H).

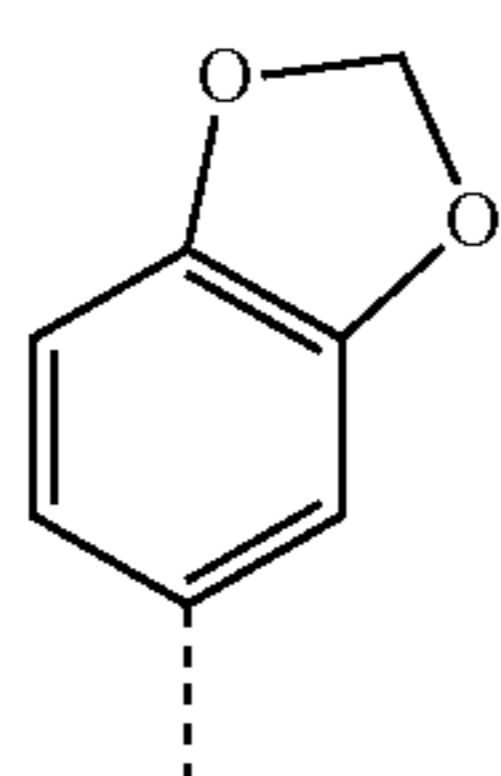
Examples 151 to 155

Starting from Scaffold 35, the following examples are prepared:



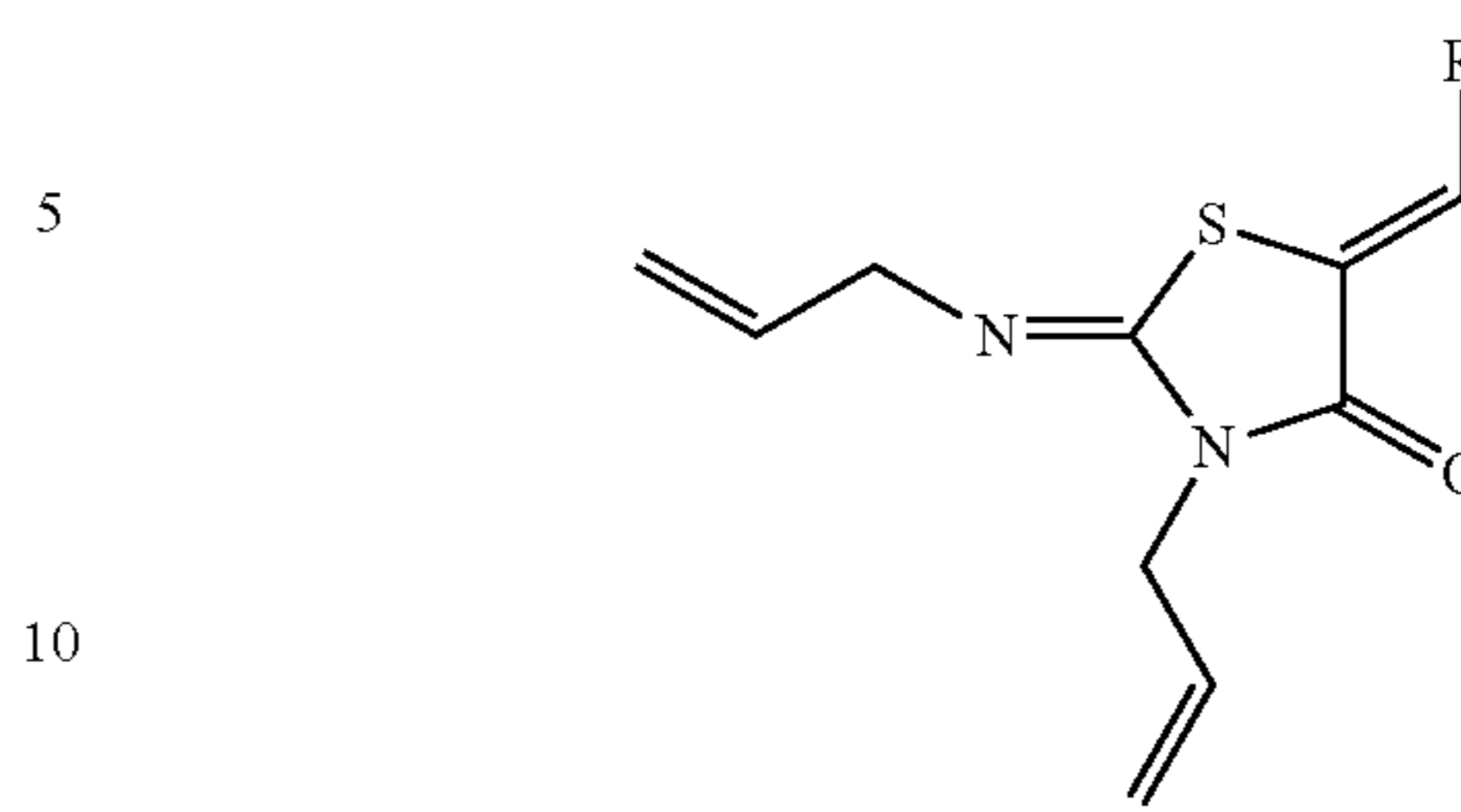
Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$

151		E	0.200	1.06	329
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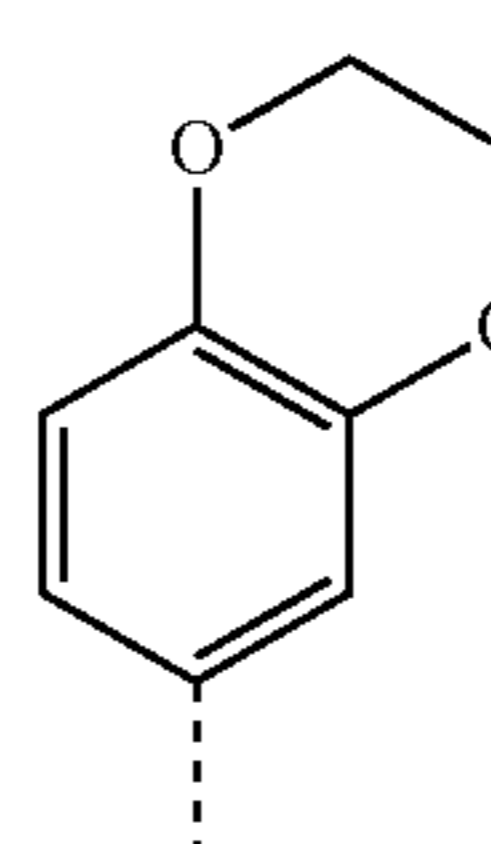
86

-continued

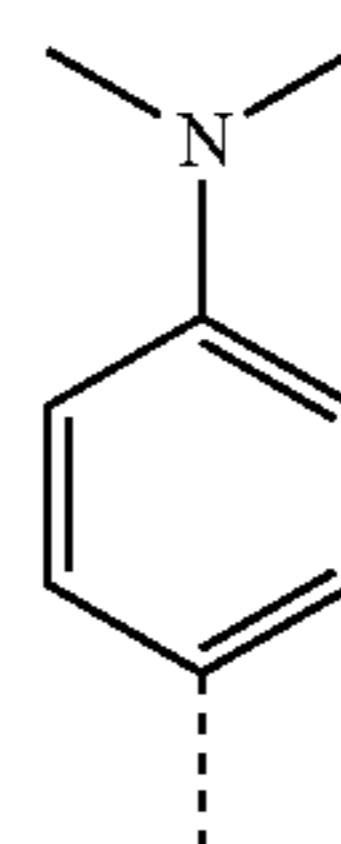


Ex- am- ple	R	Method	Scale (mmol)	LC-MS	
				t_R	$[M + 1]^{++}$

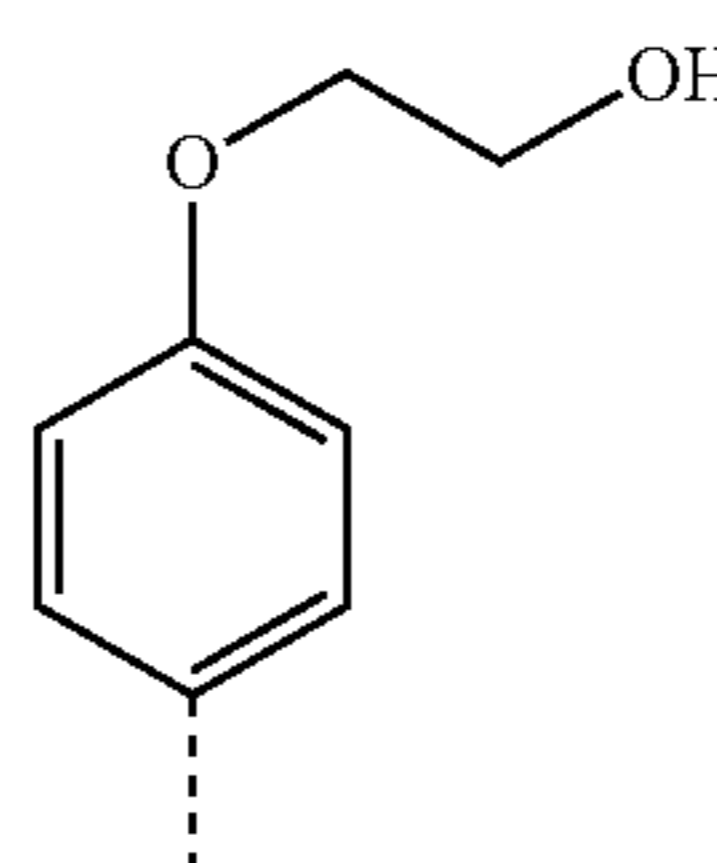
152		E	0.200	1.07	343
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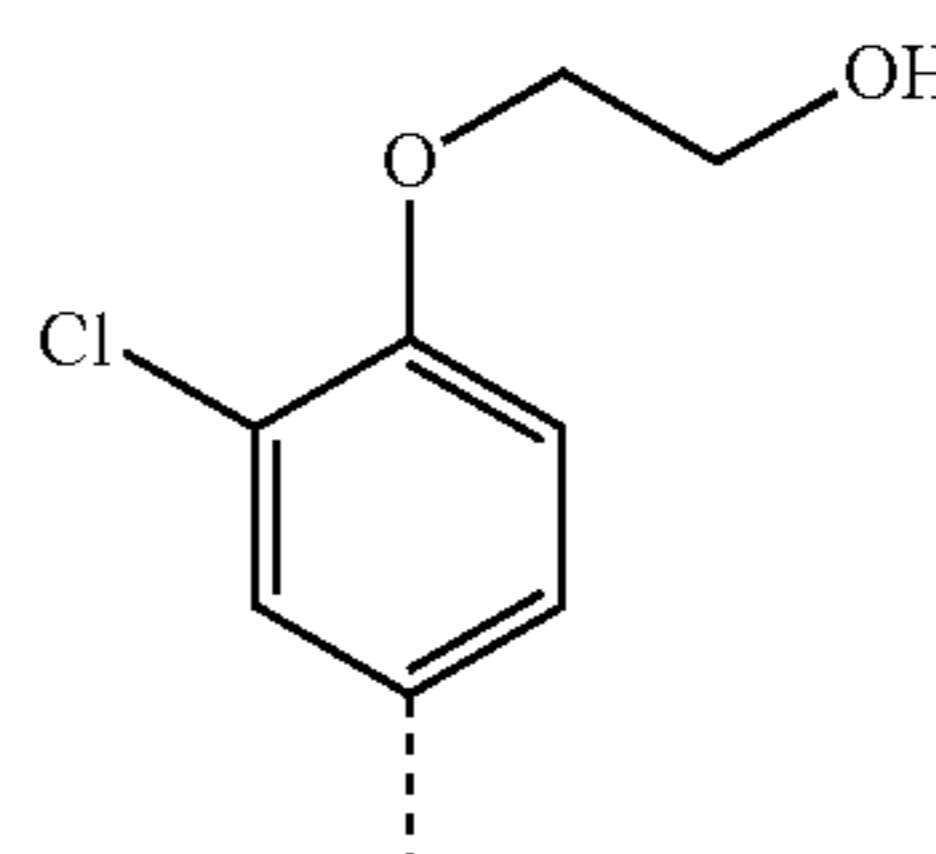
153		E	0.200	1.05	328
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154		D	0.200	0.95	345
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155		D	0.764	1.01	379
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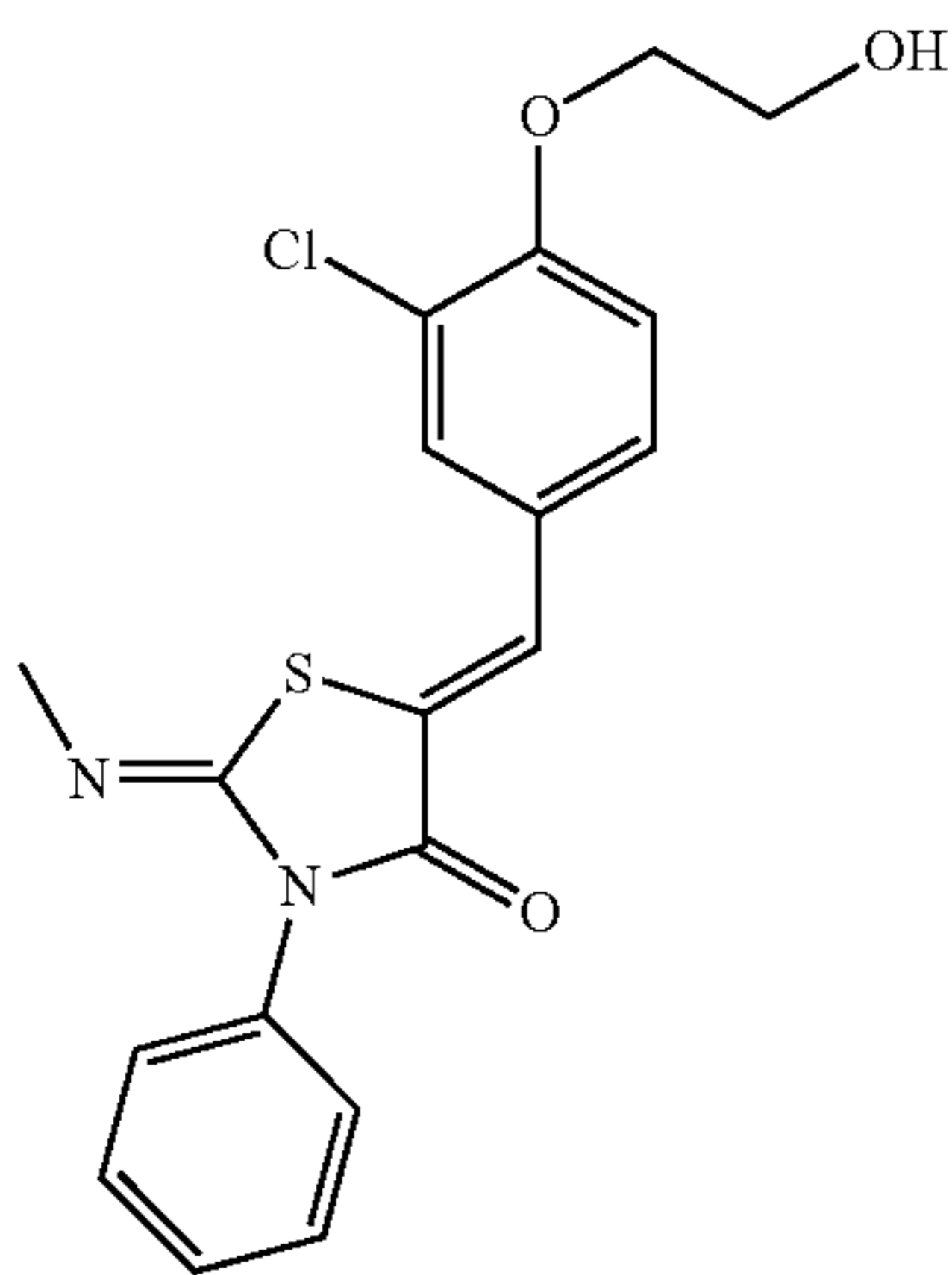


Example 155

$^1\text{H NMR}$ (CDCl_3): δ 7.62 (s, 1H), 7.57 (d, $J=2.3$ Hz, 1H), 7.41 (dd, $J=2.3, 8.2$ Hz, 1H), 7.02 (d, $J=8.2$ Hz, 1H), 6.06-5.85 (m, 2H), 5.33-5.15 (m, 4H), 4.55-4.50 (m, 2H), 4.24-4.19 (m, 2H), 4.10-4.08 (m, 2H), 4.07-4.01 (m, 2H), 2.13 (s br, 1H).

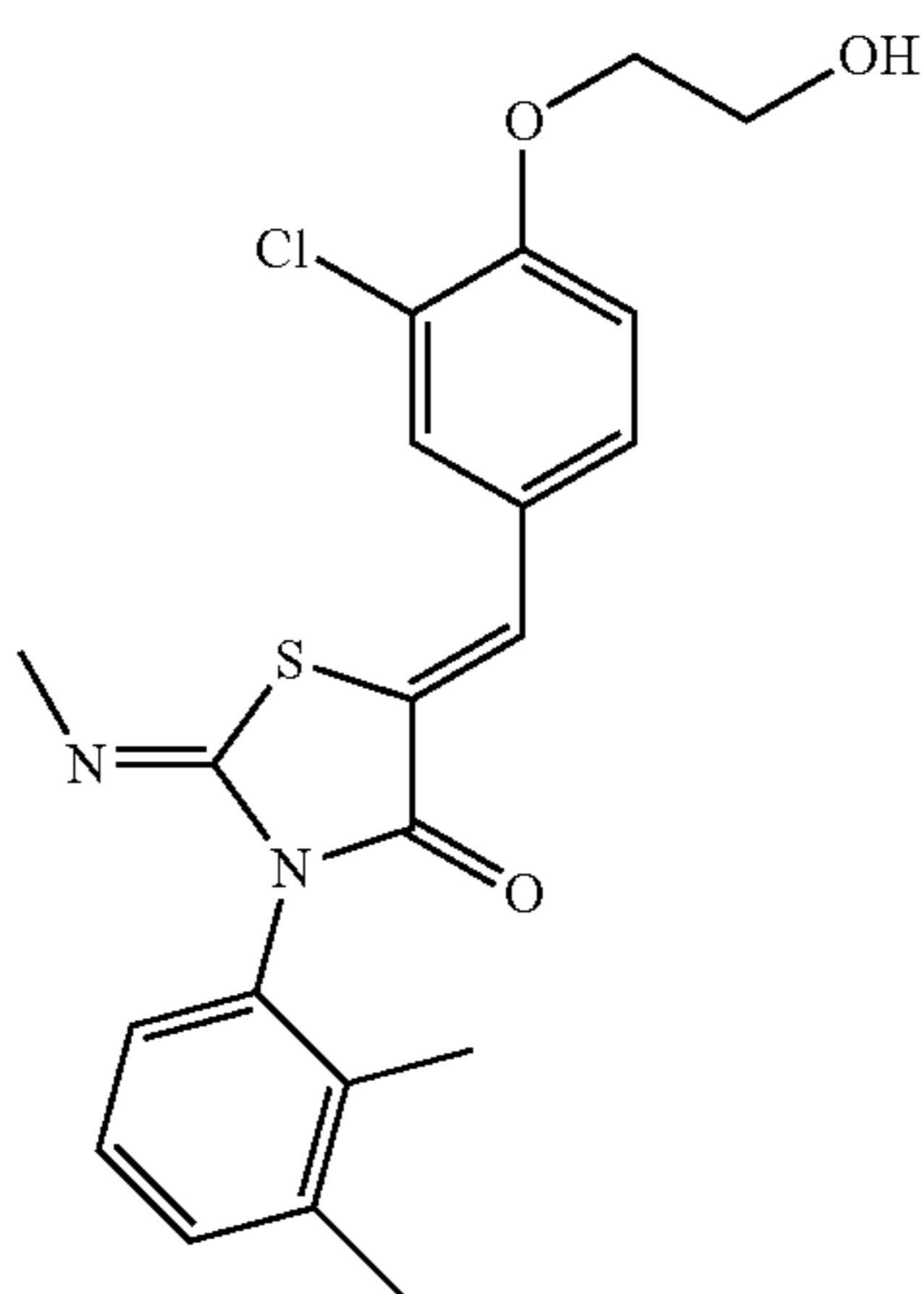
87

Example 156



5-[3-Chloro-4-(2-hydroxy-ethoxy)-benz-(Z)-ylidene]-2-[(Z)-methylimino]-3-phenyl-thiazolidin-4-one is obtained as an off-white powder starting from Scaffold 36 (150 mg, 0.727 mmol) and 3-chloro-4-(2-acetoxy-ethoxy)-benzaldehyde (353 mg, 1.45 mmol) following Method D. LC-MS: $t_R=0.91$ min, $[M+1]^+=389$. 1H NMR ($CDCl_3$): δ 7.69 (s, 1H), 7.63 (d, $J=2.3$ Hz, 1'-1), 7.55-7.40 (m, 4H), 7.35-7.30 (m, 2H), 7.05 (d, $J=8.2$ Hz, 1H), 4.25-4.20 (m, 2H), 4.08-4.00 (m, 2H), 3.27 (s, 3H).

Example 157



5-[3-Chloro-4-(2-hydroxy-ethoxy)-benz-(Z)-ylidene]-2-[(Z)-methylimino]-3-(2,3-dimethylphenyl)-thiazolidin-4-one is obtained as a pale yellow powder starting from Scaffold 37 (150 mg, 0.640 mmol) and 3-chloro-4-(2-acetoxy-ethoxy)-benzaldehyde (311 mg, 1.28 mmol) following Method D. LC-MS: $t_R=0.97$ min, $[M+1]^+=417$. 1H NMR ($CDCl_3$): δ 7.69 (s, 1H), 7.64 (d, $J=2.3$ Hz, 1H), 7.47 (dd, $J=2.3, 8.8$ Hz, 1H), 7.25-7.20 (m, 2H), 7.06-7.01 (m, 2H), 4.25-4.20 (m, 2H), 4.07-4.02 (m, 2H), 3.25 (s, 3H), 2.35 (s, 3H), 2.07 (s, 3H).

88

The invention claimed is:

1. A pharmaceutical composition containing at least one thiazolidin-4-one derivative of the Formula (I)

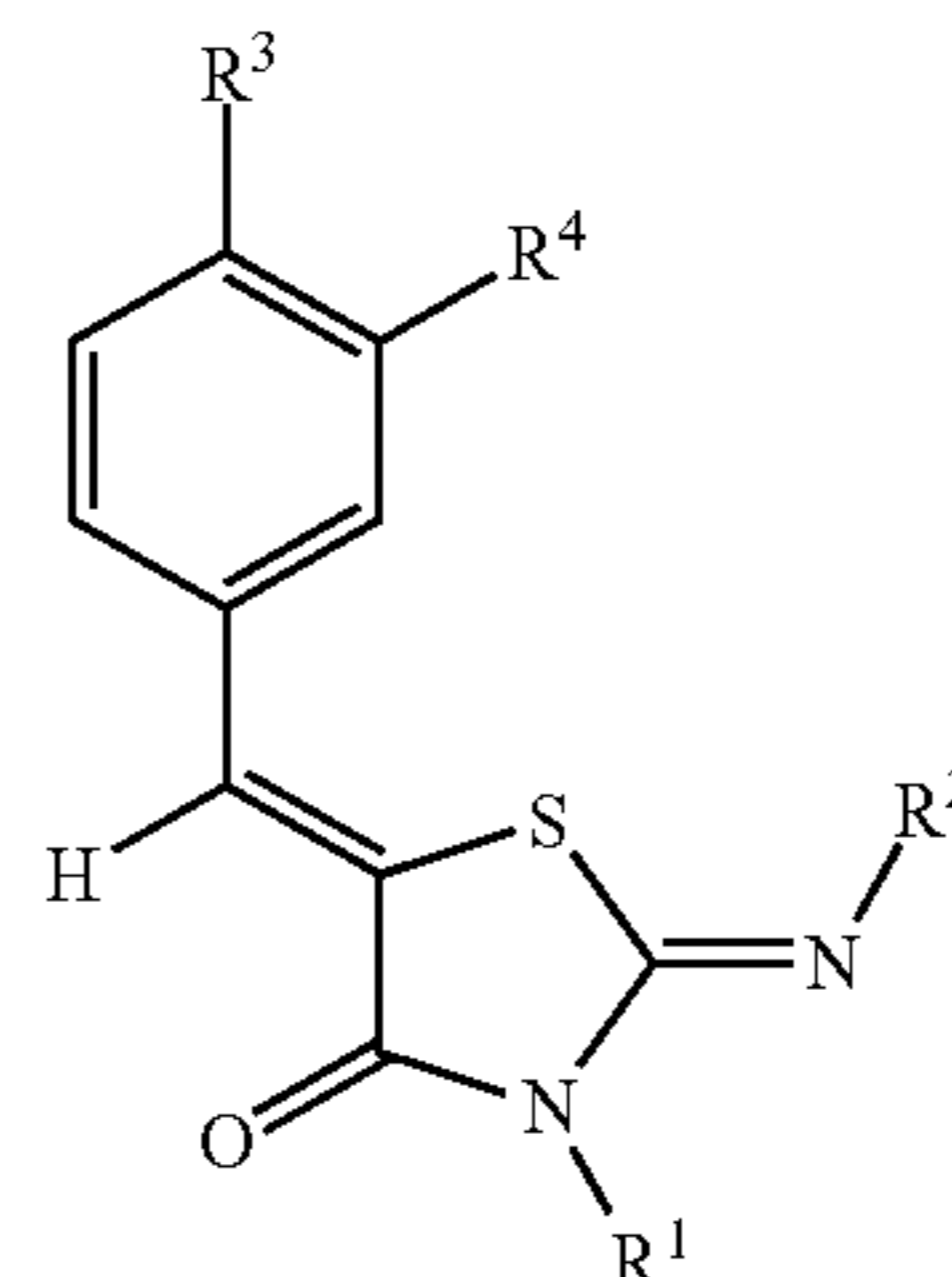
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Formula (I)



wherein:

R^1 represents lower alkenyl; cycloalkyl; 5,6,7,8-tetrahydronaphth-1-yl; 5,6,7,8-tetrahydronaphth-2-yl; a phenyl group; or a phenyl group independently mono-, di- or tri-substituted with lower alkyl, halogen, lower alkoxy, or $-CF_3$;

R^2 represents lower alkyl; allyl; cyclopropyl; cyclobutyl; cyclopentyl; or mono- or di-lower alkylamino;

R^3 represents $-NR^5R^6$;

R^4 represents hydrogen; hydroxy; lower alkoxy; lower alkyl; or halogen; [or R^3 and R^4 together may form a methylenedioxy or ethylenedioxy ring optionally further substituted with a hydroxy-methyl group;]

R^5 and R^6 each represents independently lower alkyl;

or configurational isomers, optically pure enantiomers, mixtures of enantiomers, enantiomeric racemates, diastereomers, mixtures of diastereomers, diastereomeric racemates, or mixtures of diastereomeric racemates, *in free or pharmaceutically acceptable salt form*, and an inert carrier material.

2. The pharmaceutical composition according to claim 1, in which said thiazolidin-4-one derivatives are the (Z,Z)-isomers.

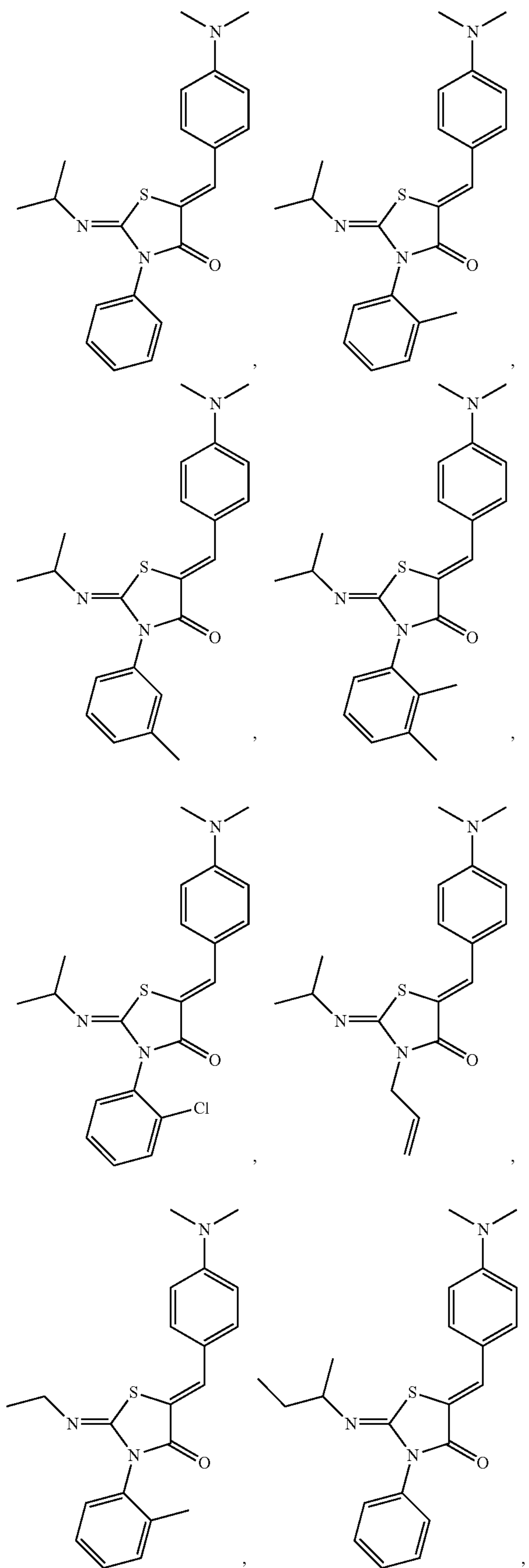
3. The pharmaceutical composition of claim 1 further comprising one or more immunosuppressant compounds.

4. The pharmaceutical composition according to claim 3, wherein said immunosuppressant compound is selected from the group consisting of cyclosporin, daclizumab, basiliximab, everolimus, tacrolimus (FK506), azathiopirine, leflunomide, and 15-deoxyspergualin.

5. A process for the preparation of the pharmaceutical composition of claim 1, comprising mixing one or more thiazolidin-4-one derivatives according to Formula (I) with inert excipients.

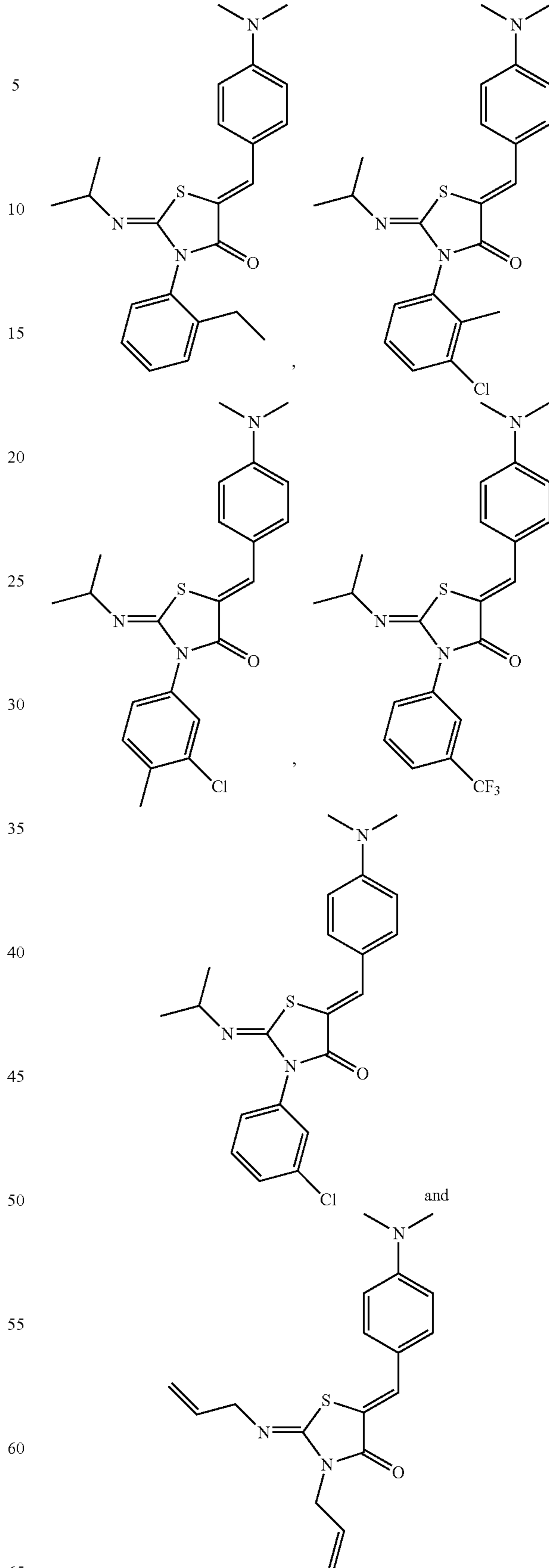
6. The pharmaceutical composition according to claim 1, wherein the thiazolidin-4-one derivative of the Formula (I) is selected from a group consisting of:

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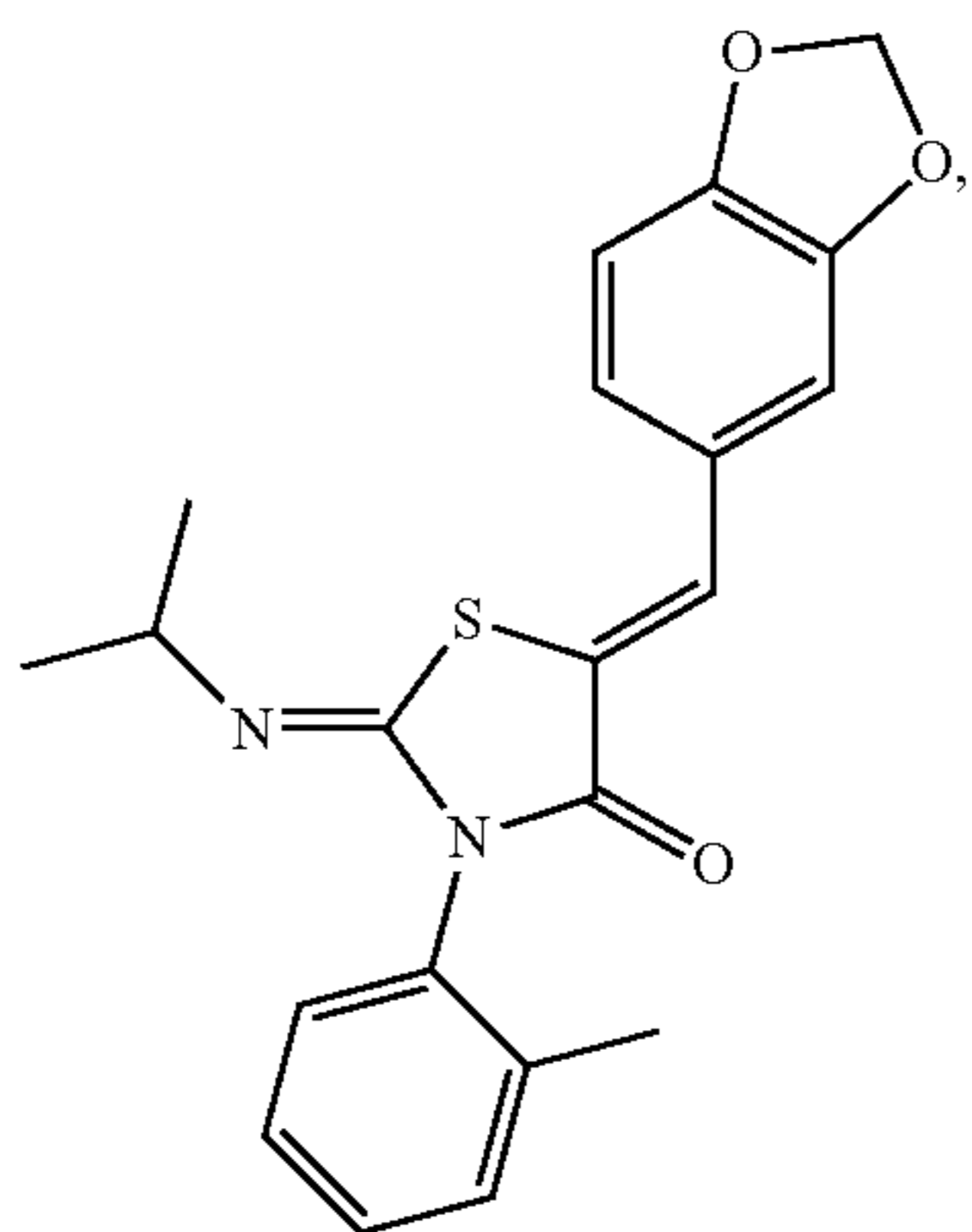
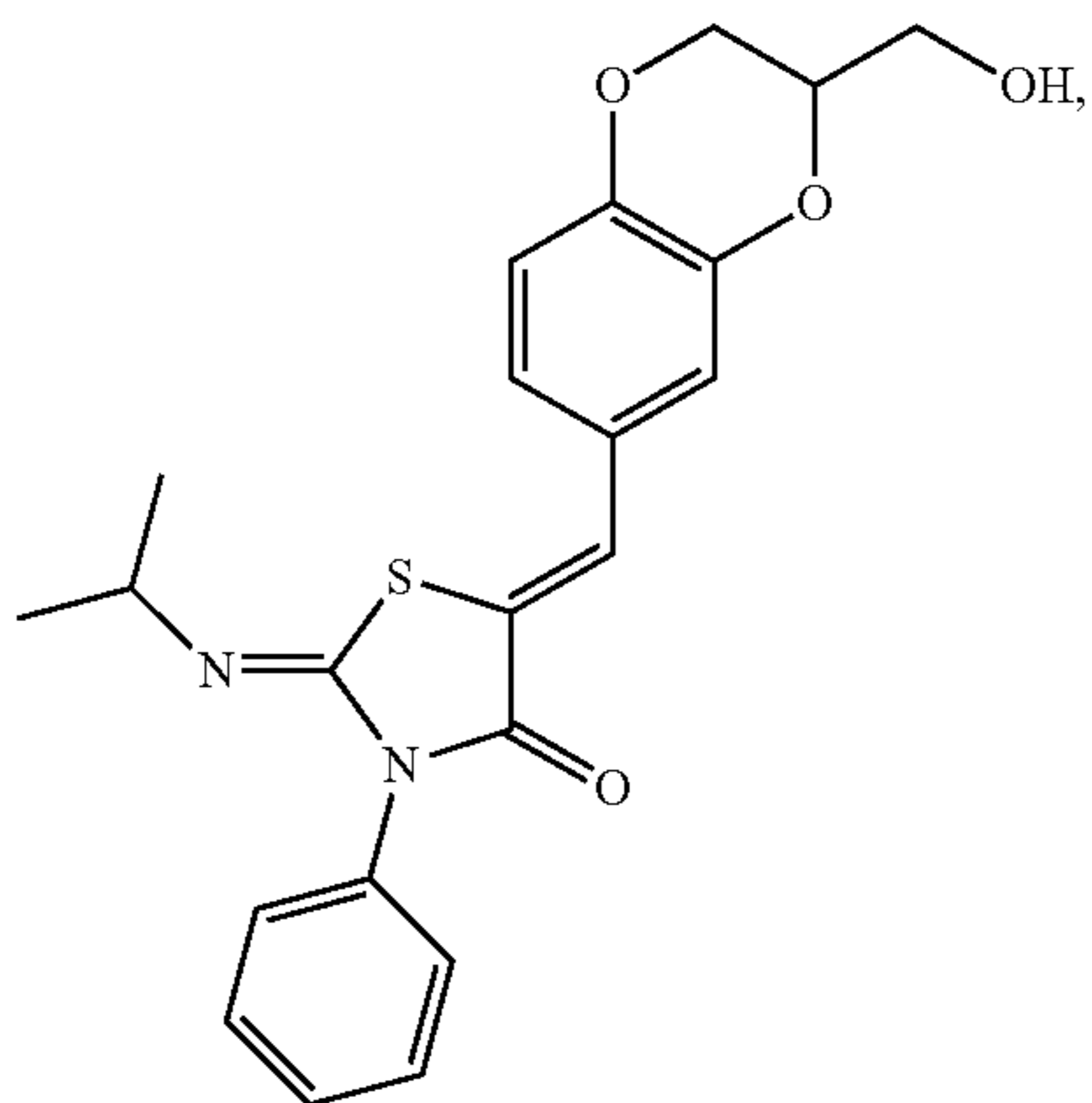
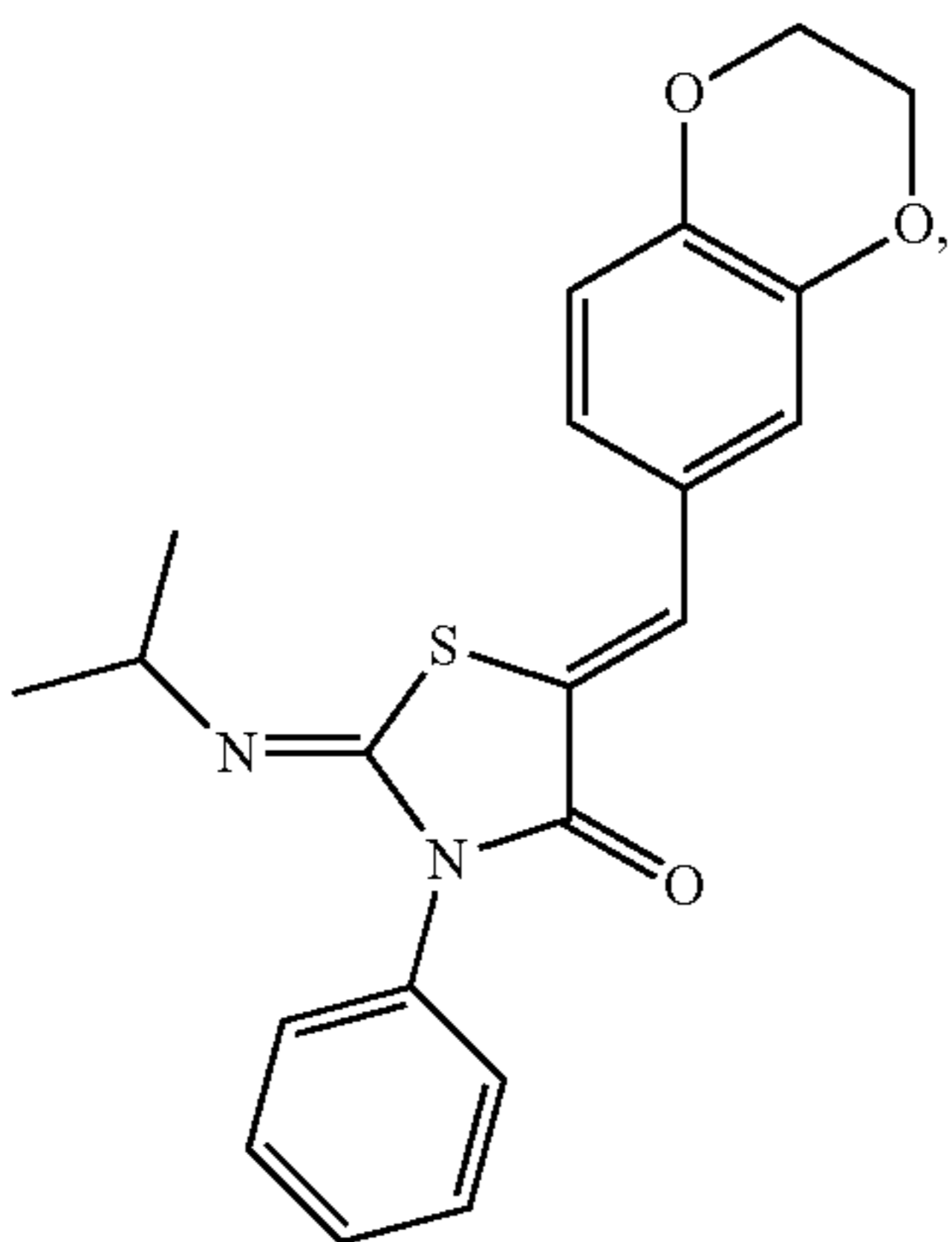
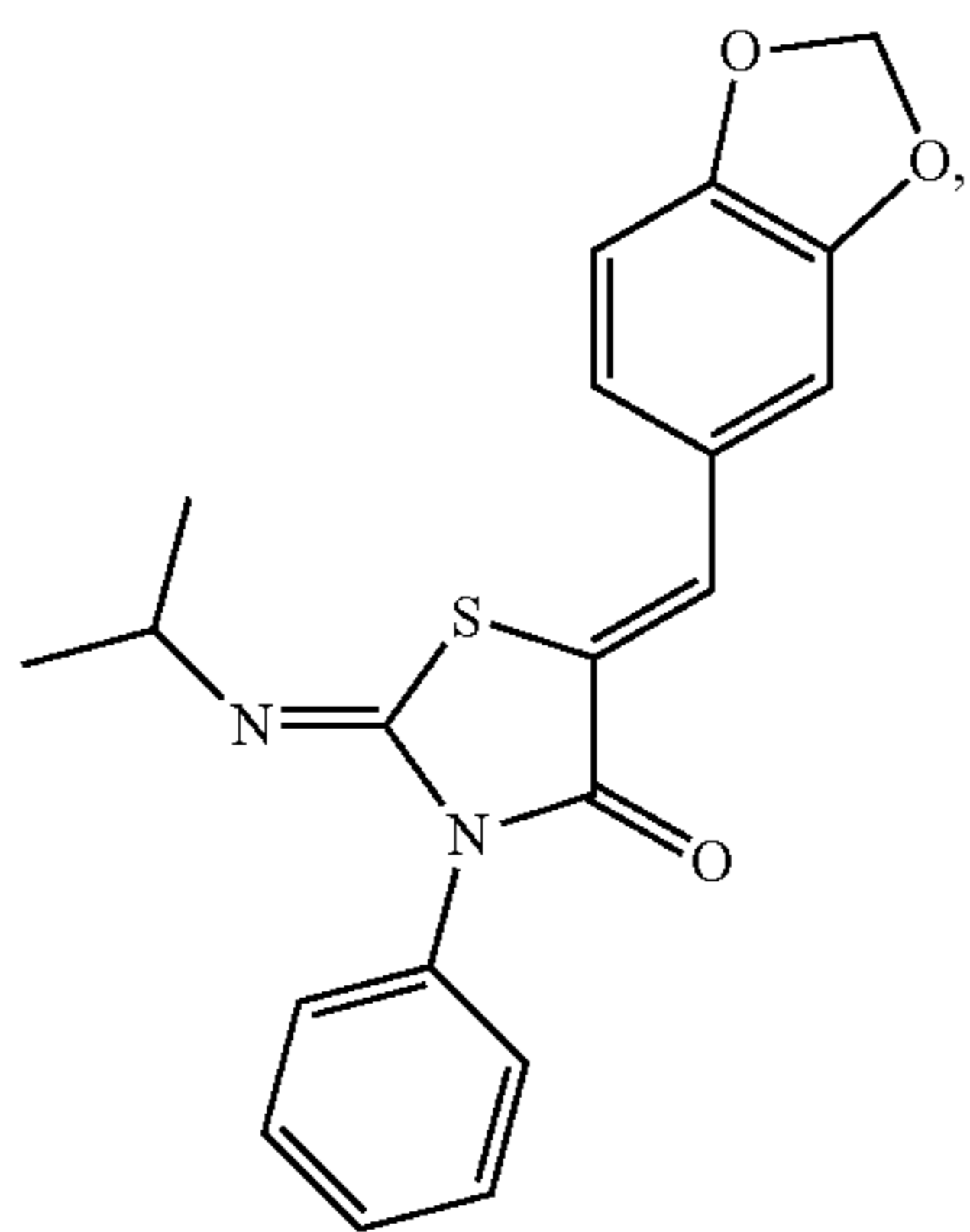
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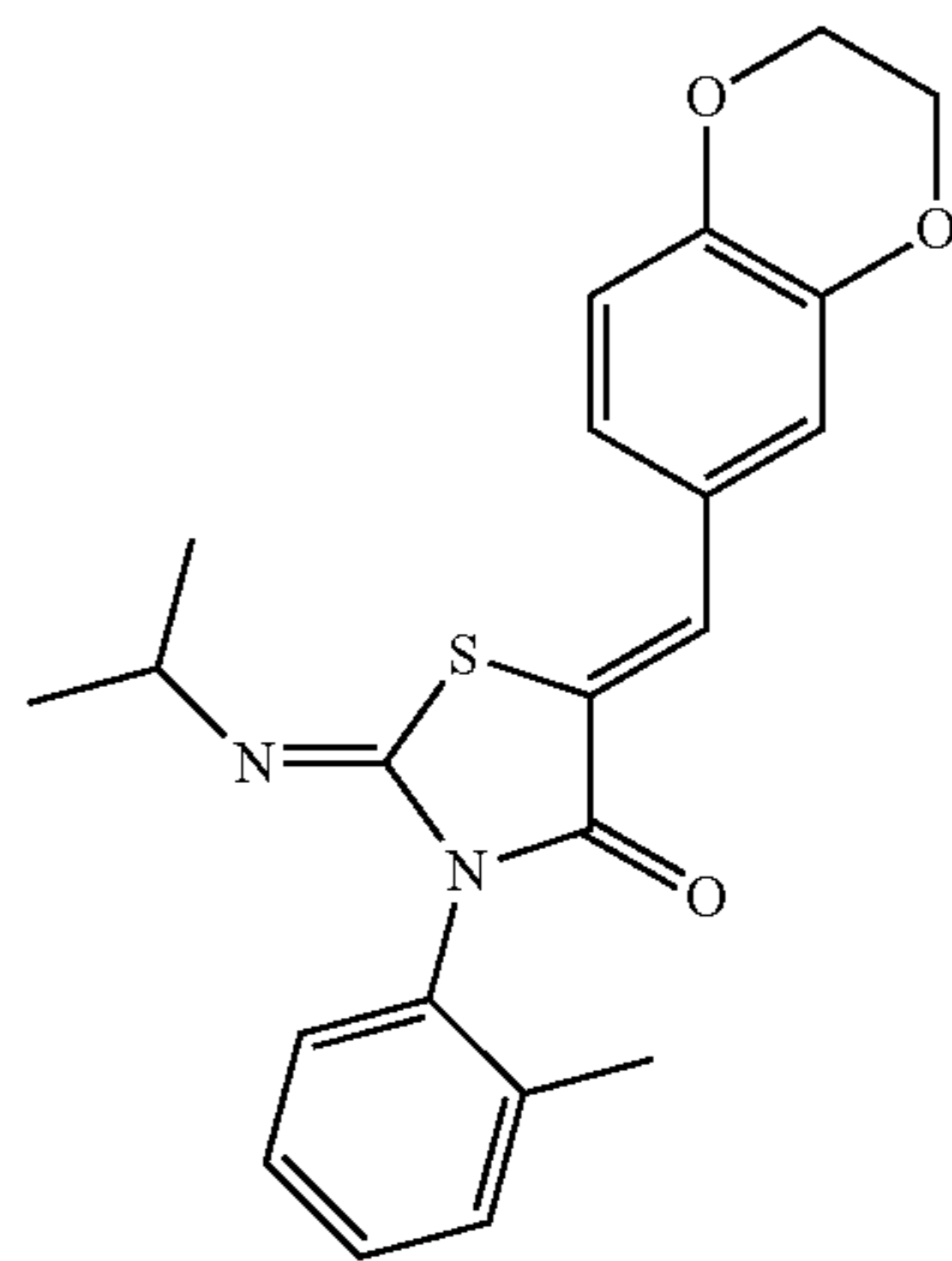
[7. The pharmaceutical composition according to claim 1, wherein the thiazolidin-4-one derivative of the Formula (I) is selected from a group consisting of:



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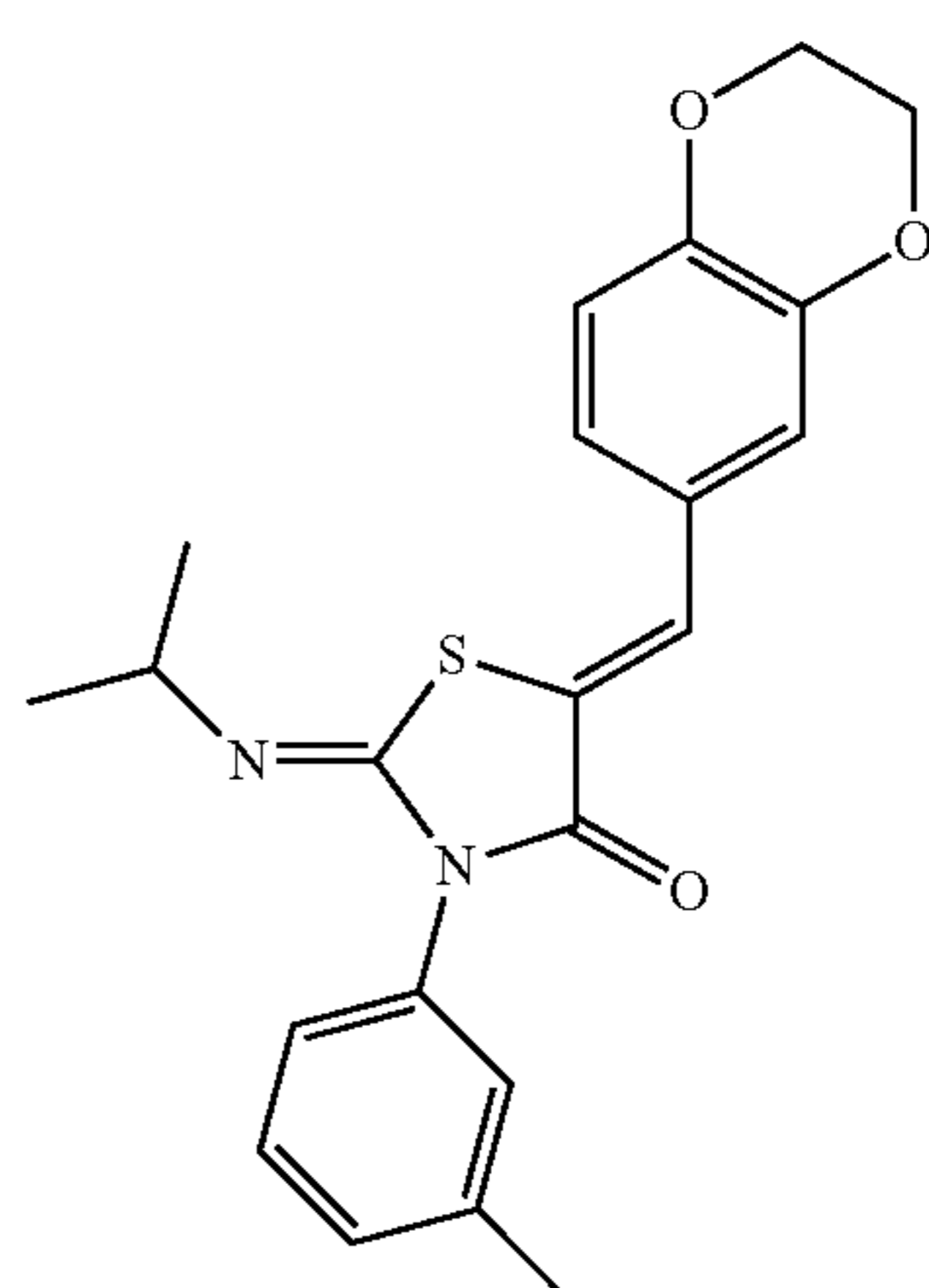
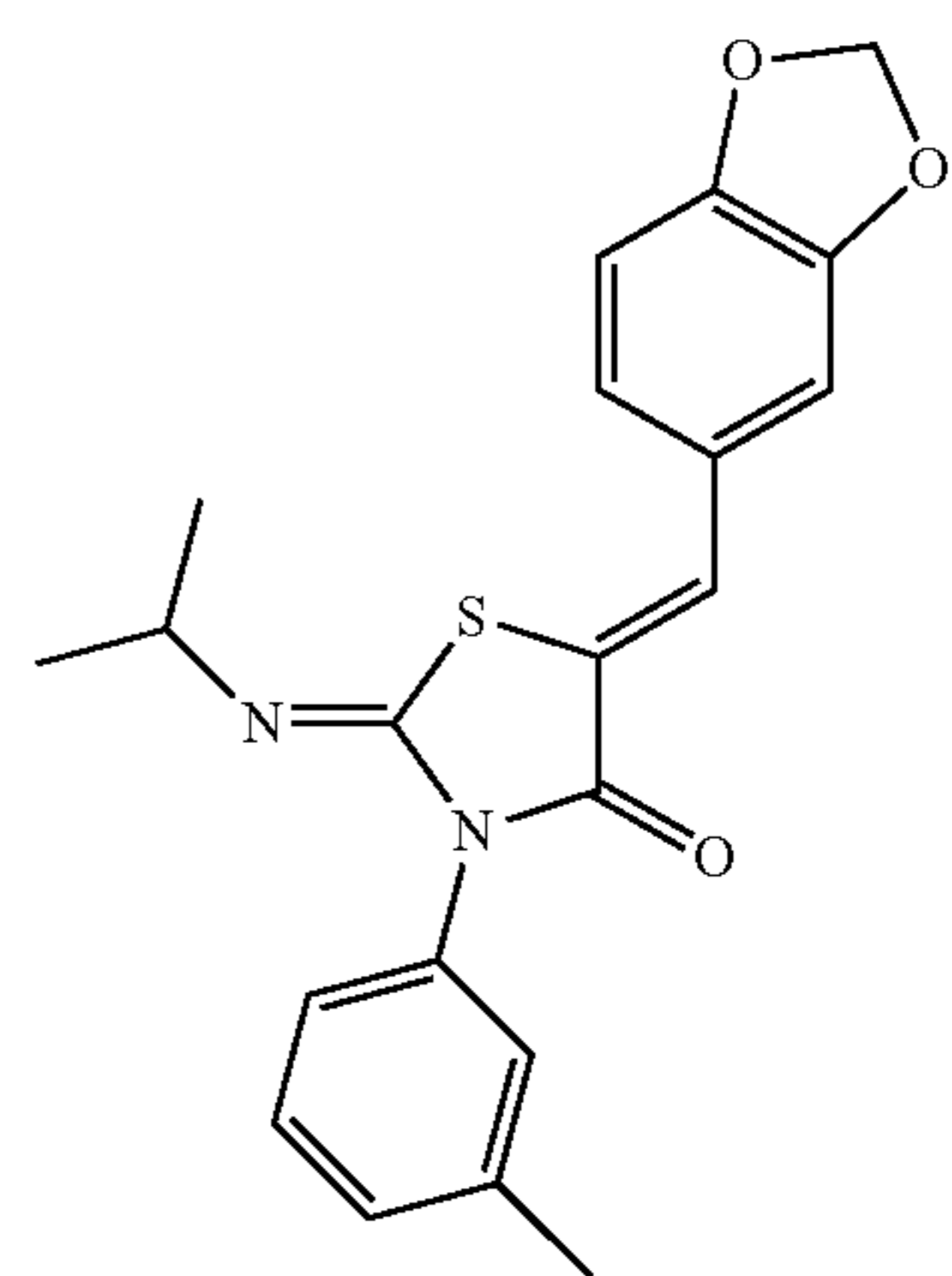
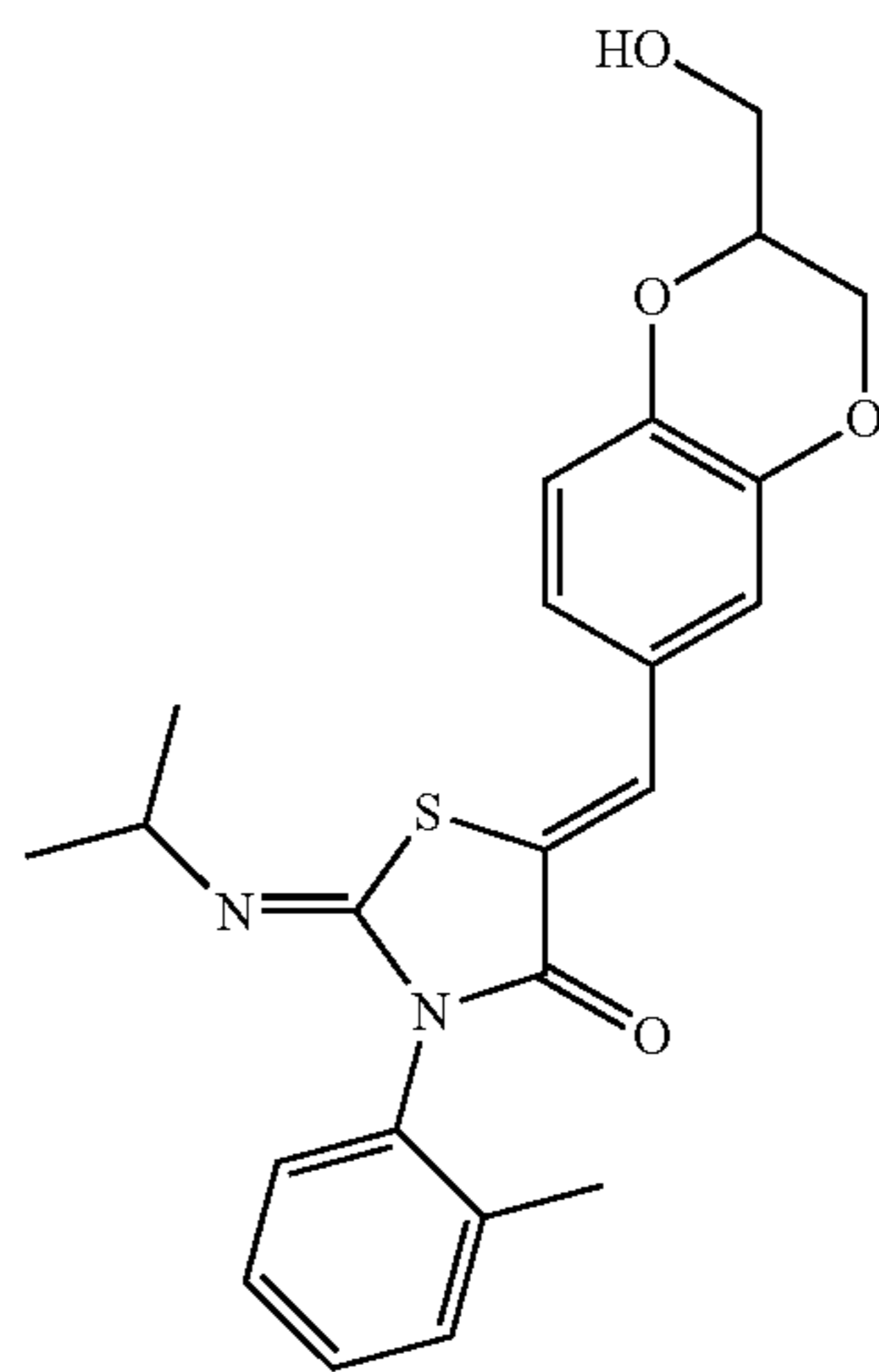
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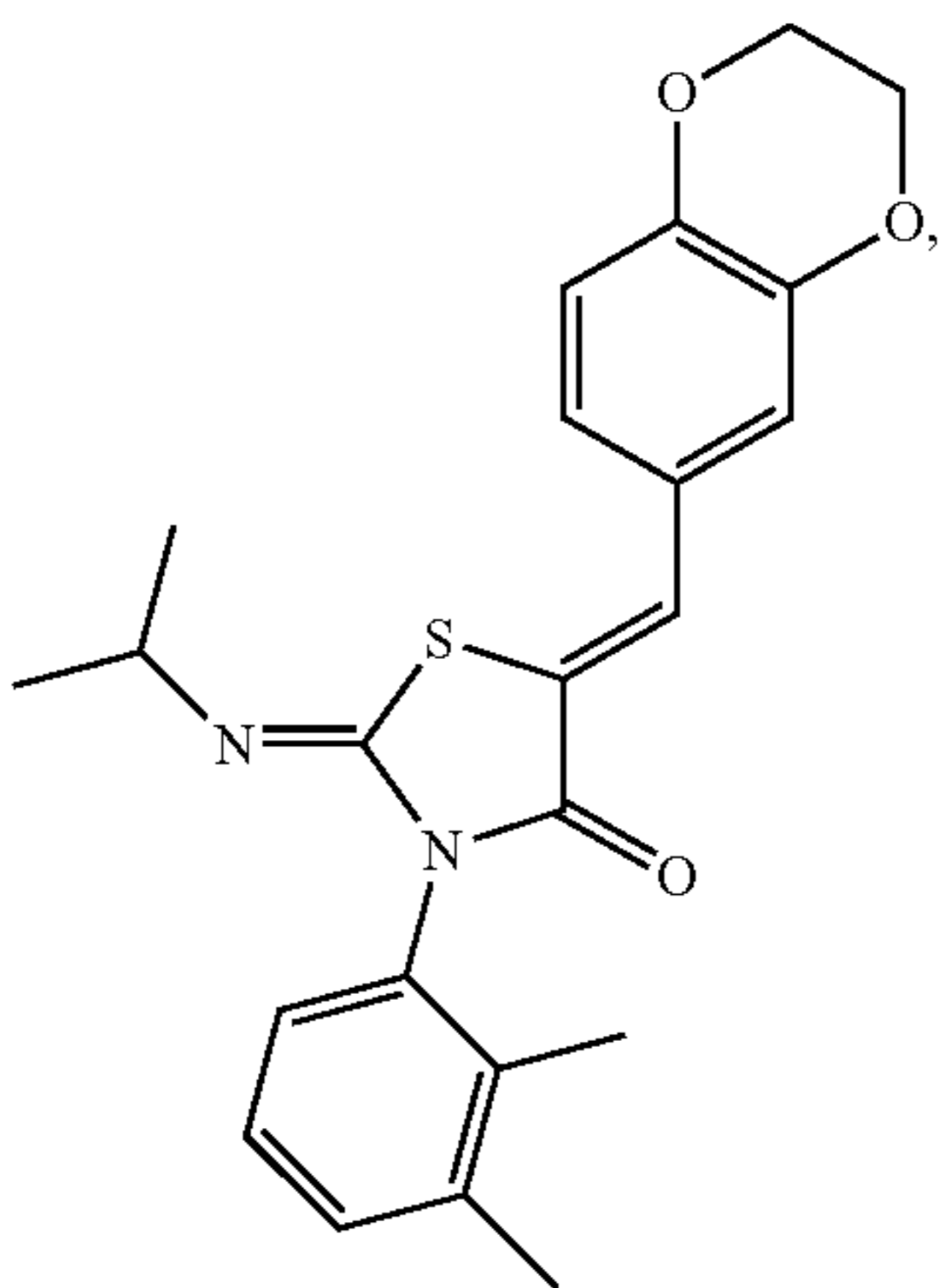
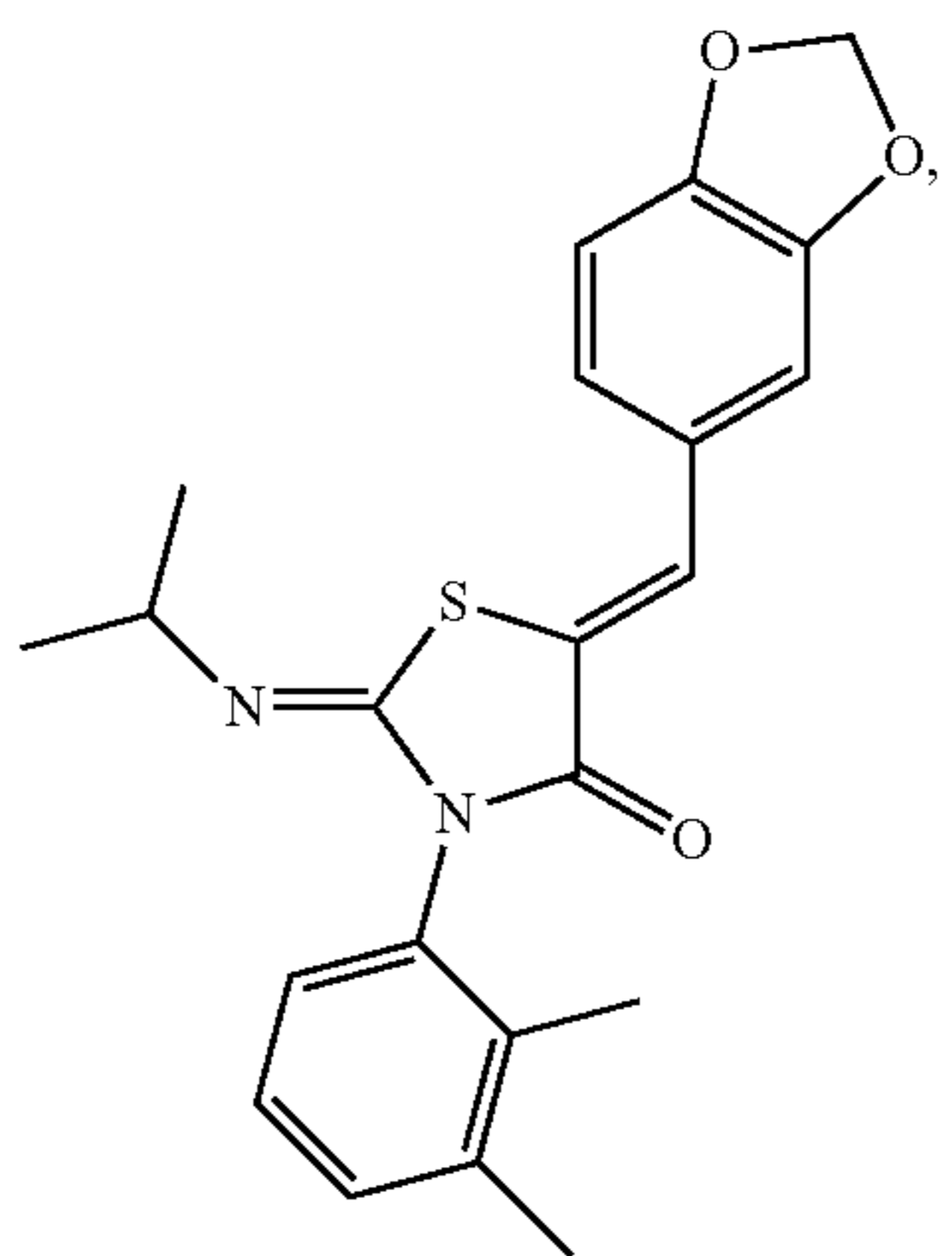
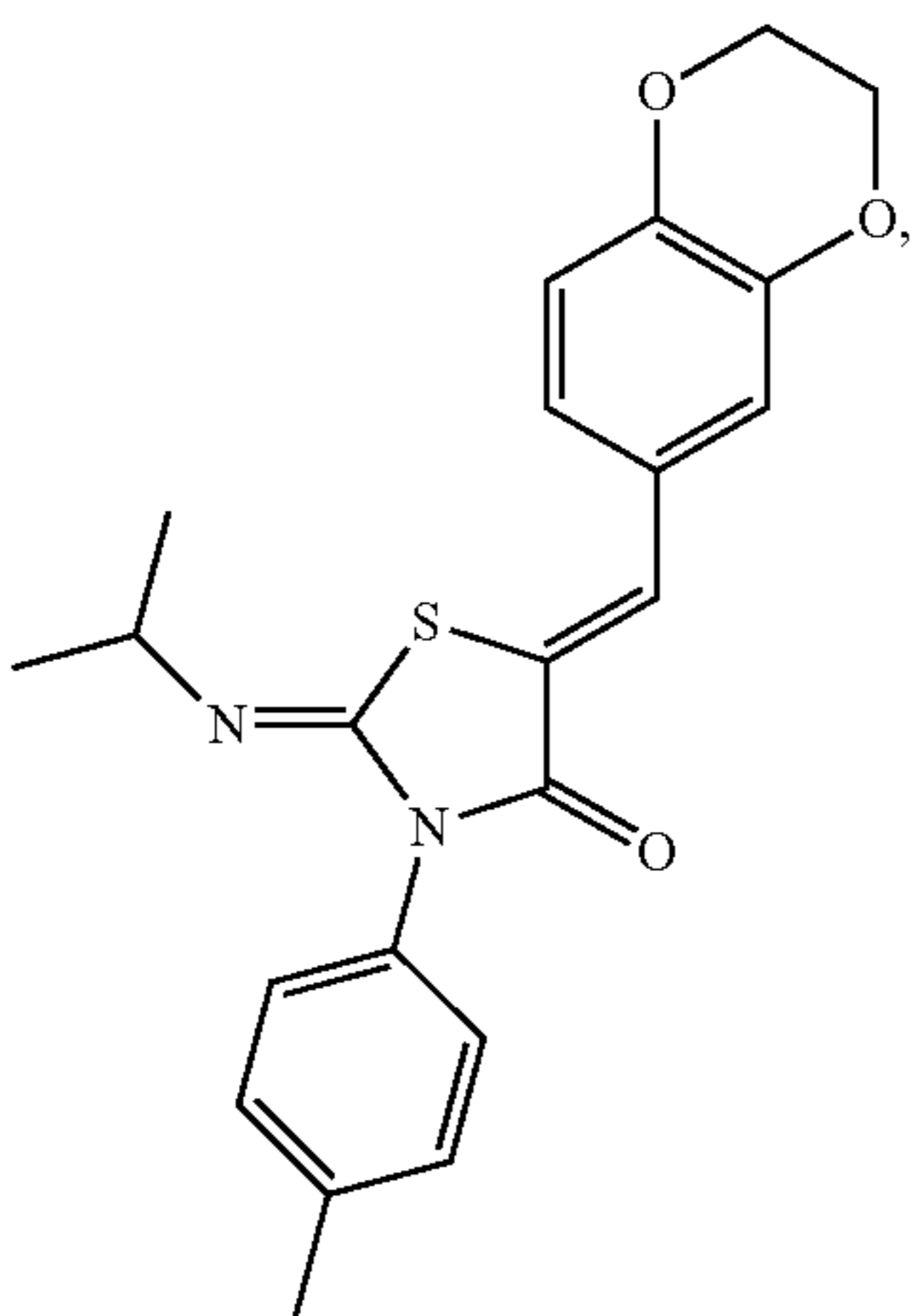
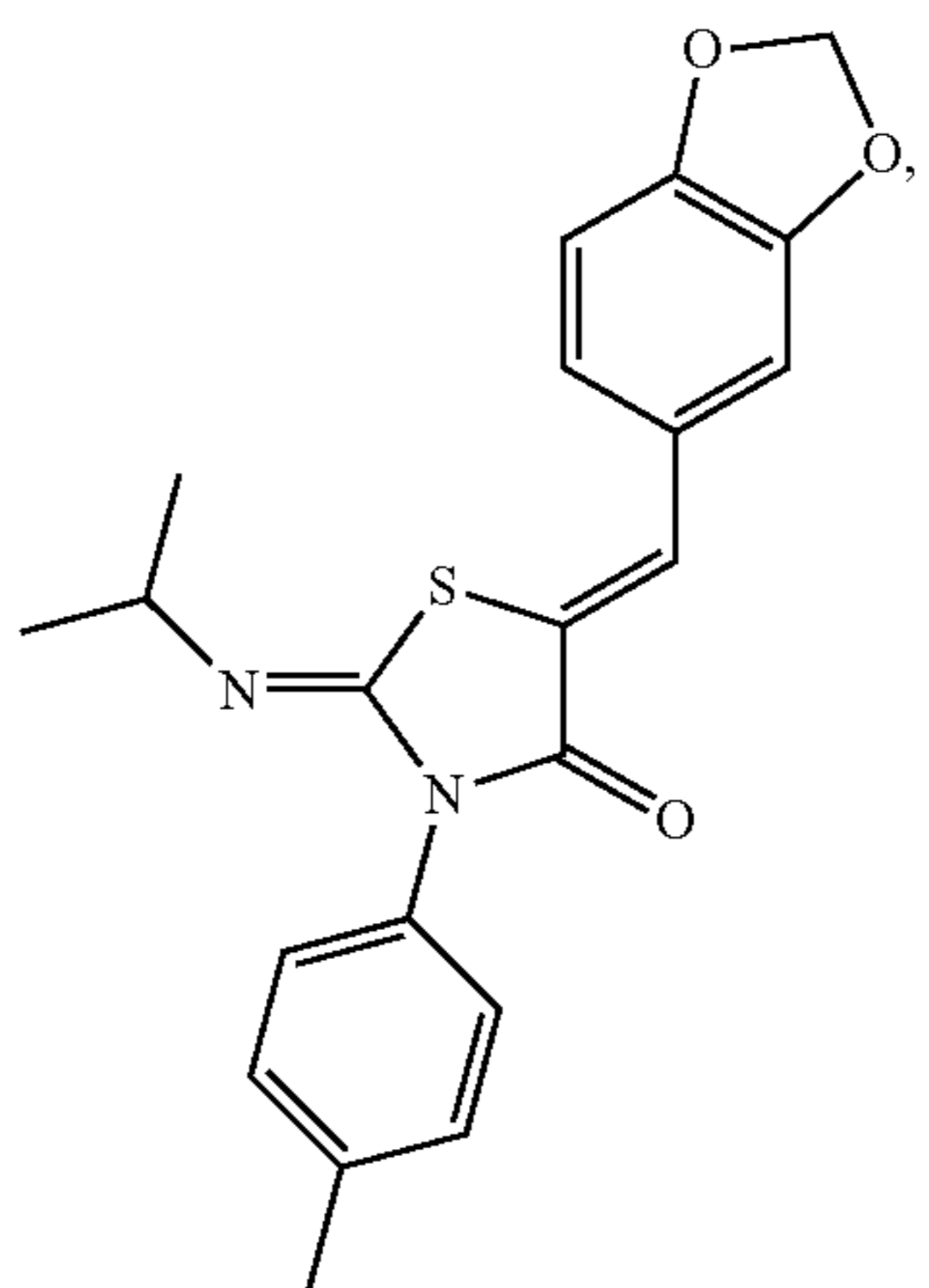
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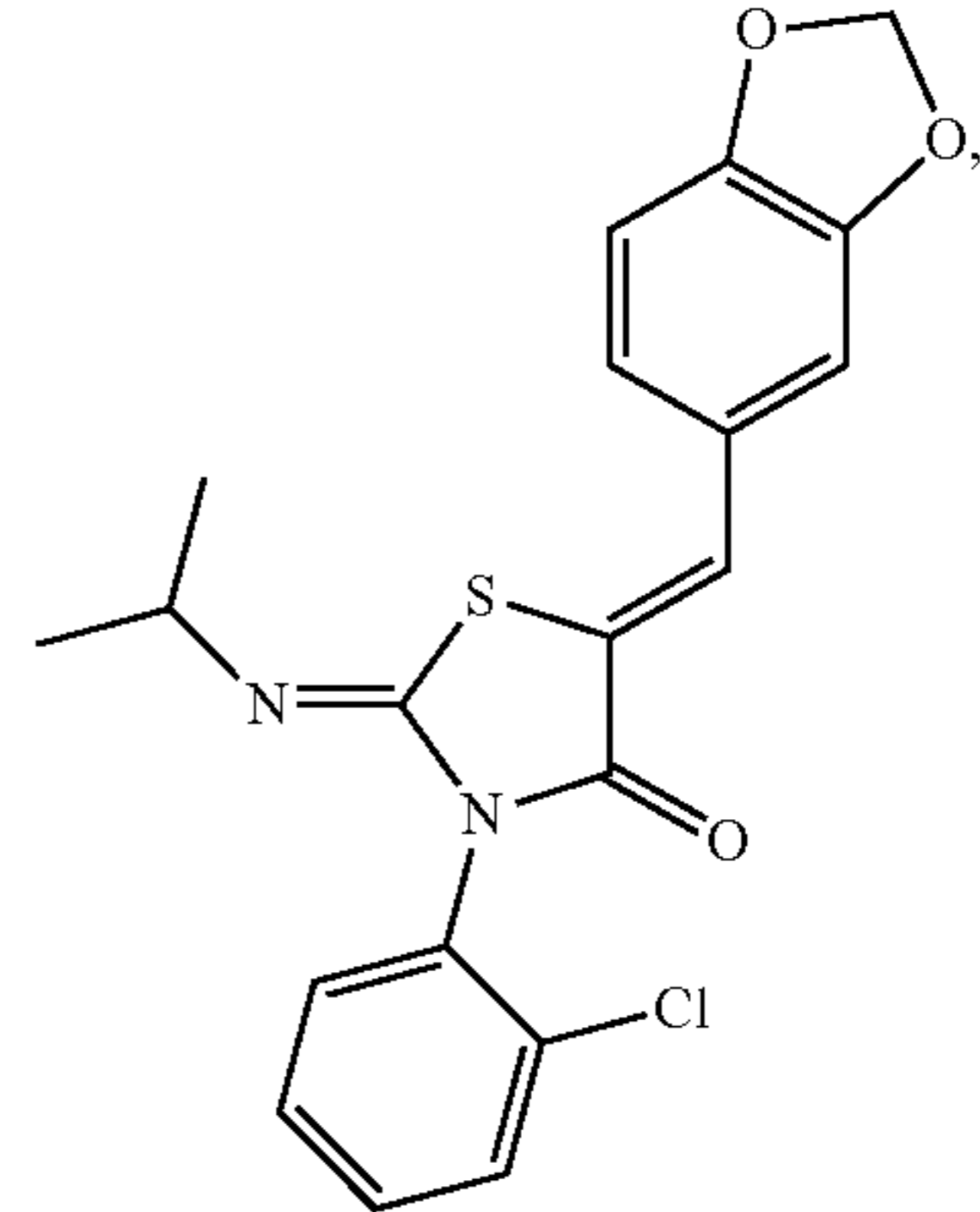
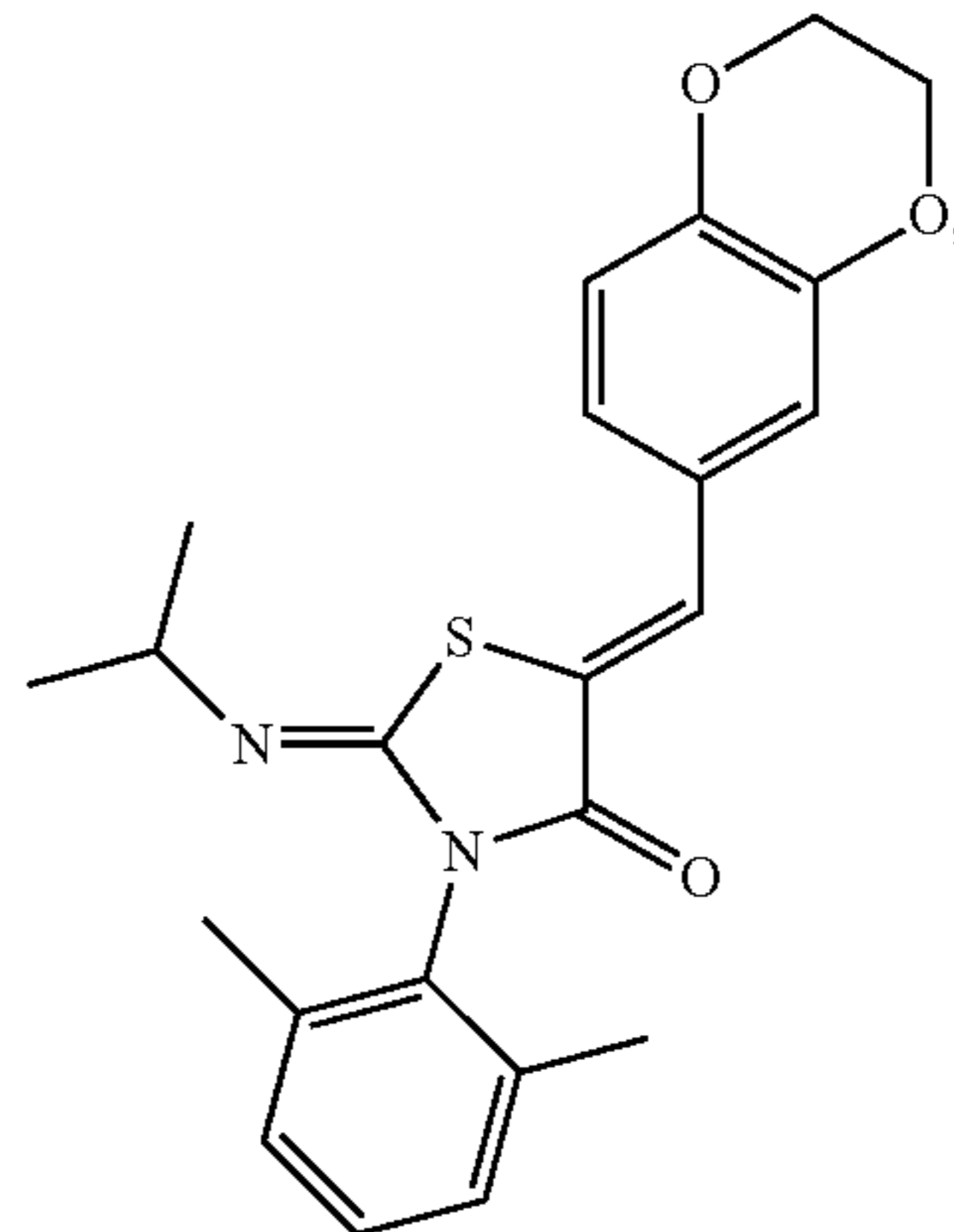
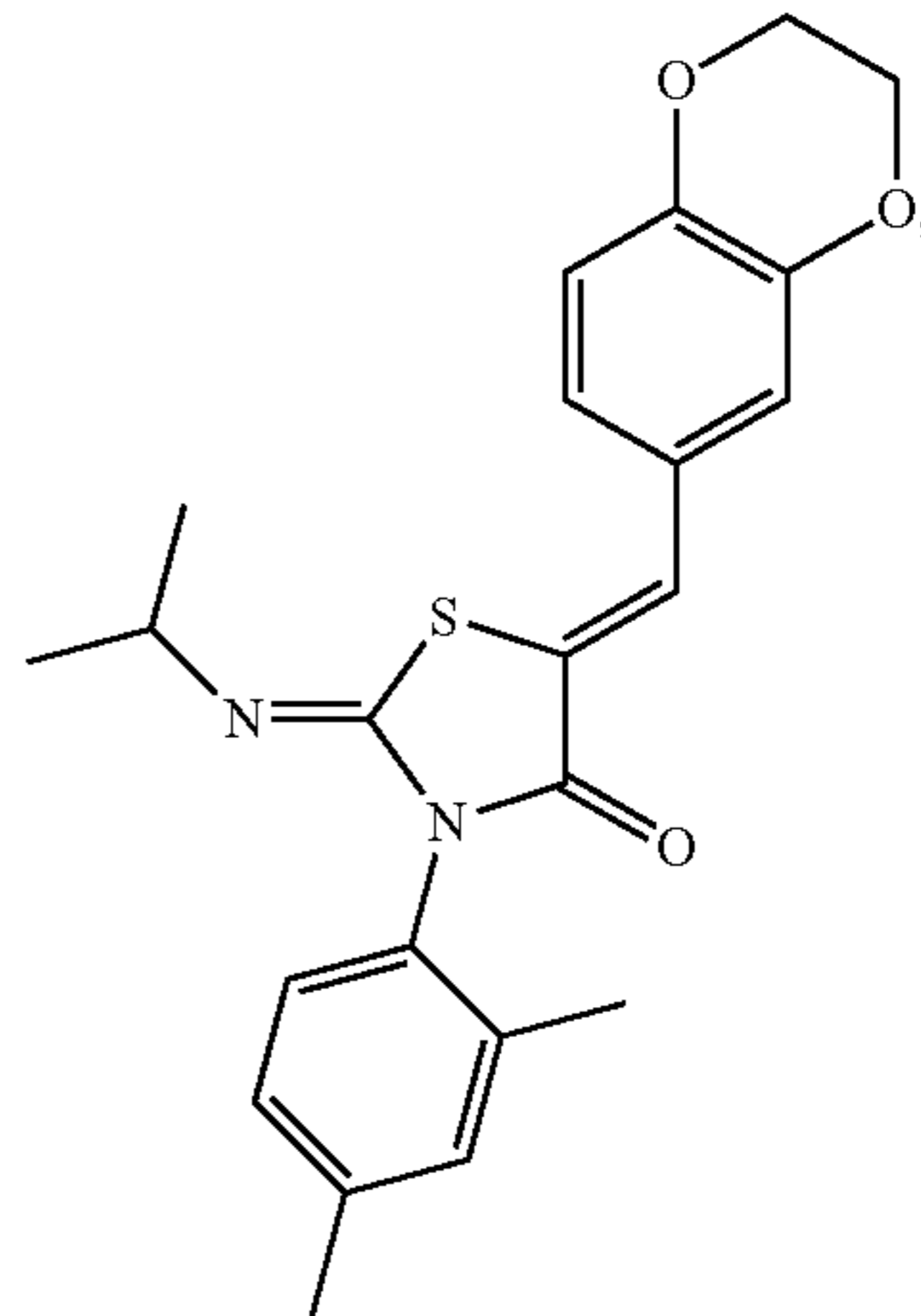
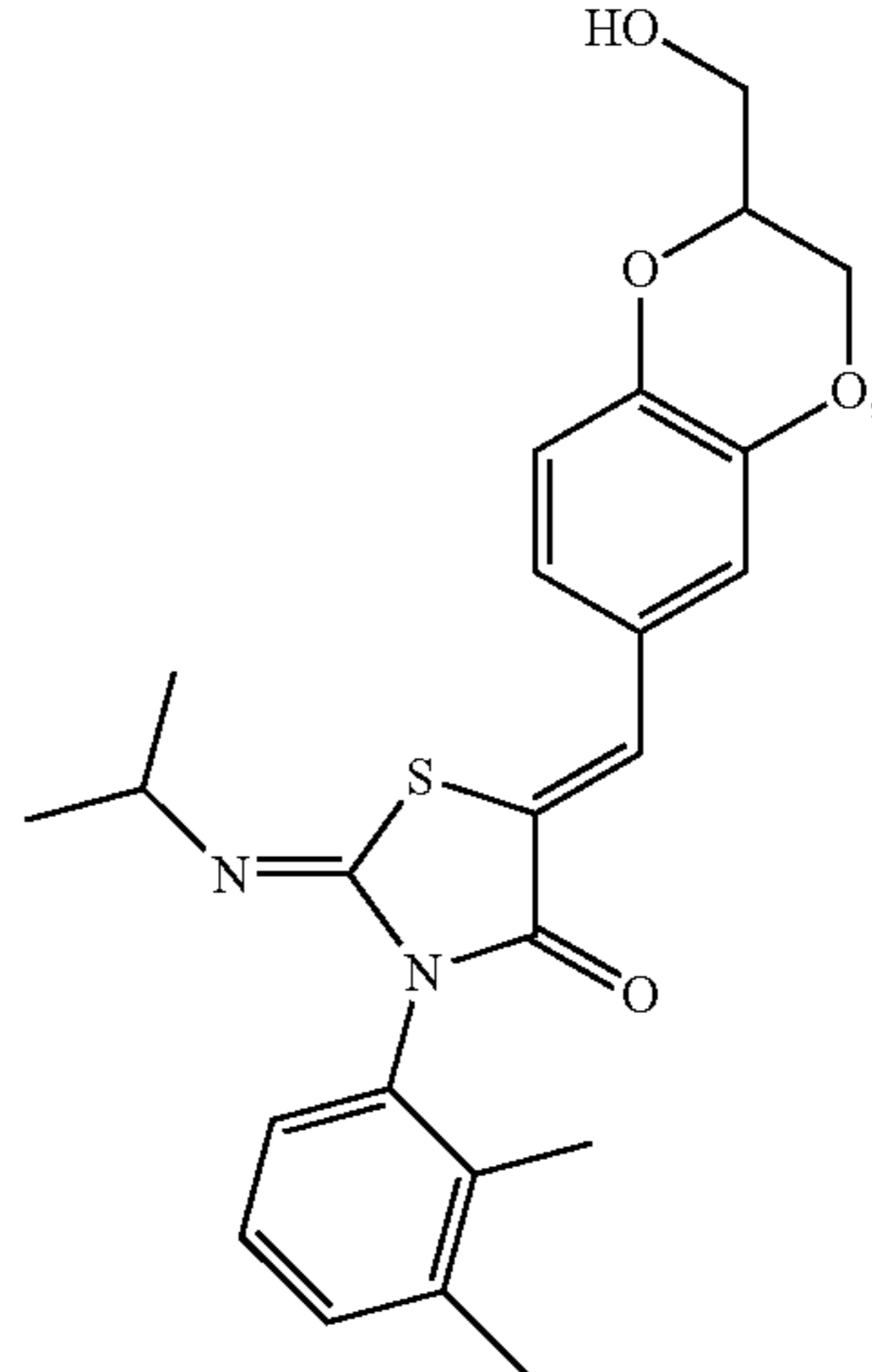
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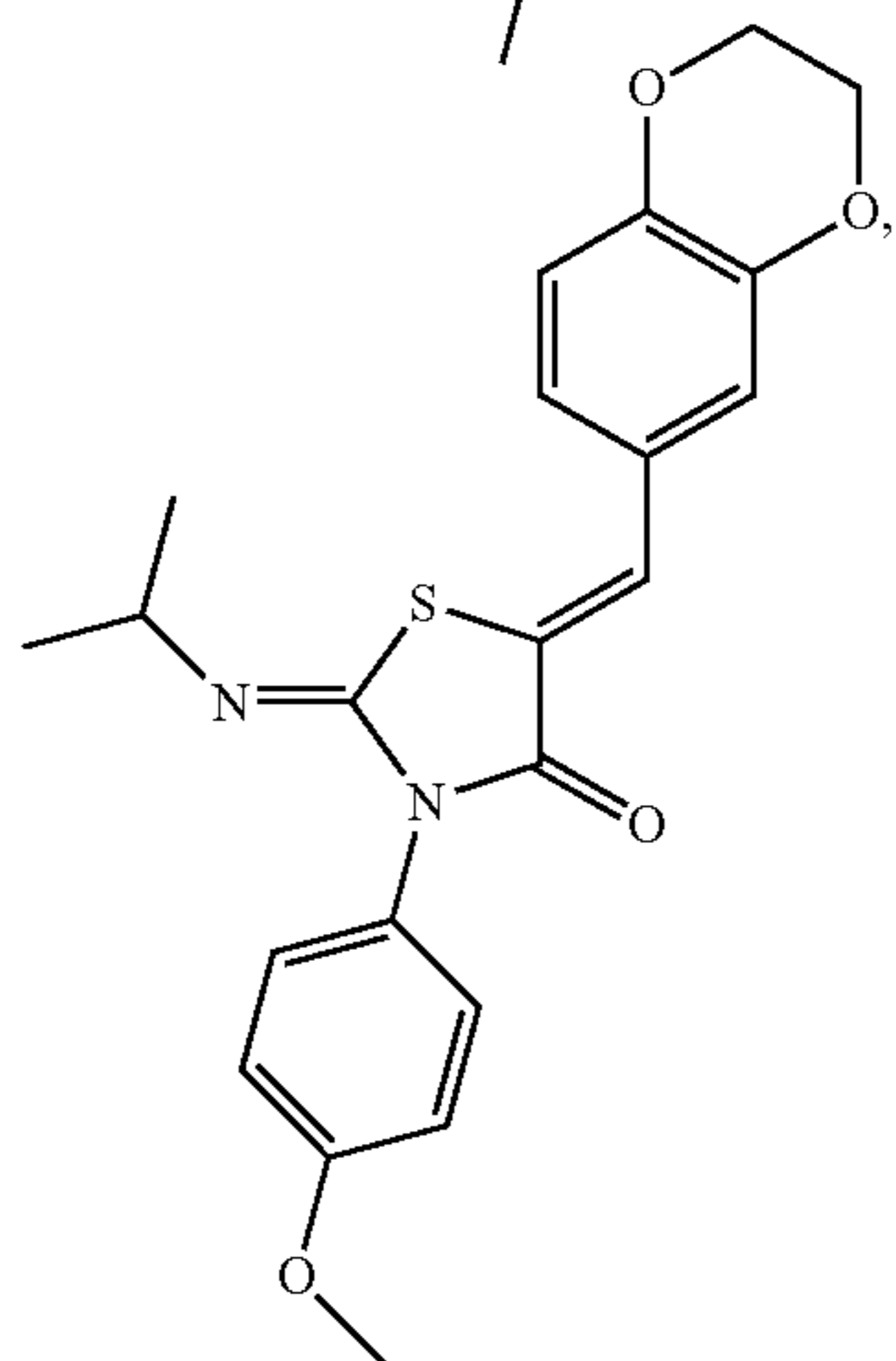
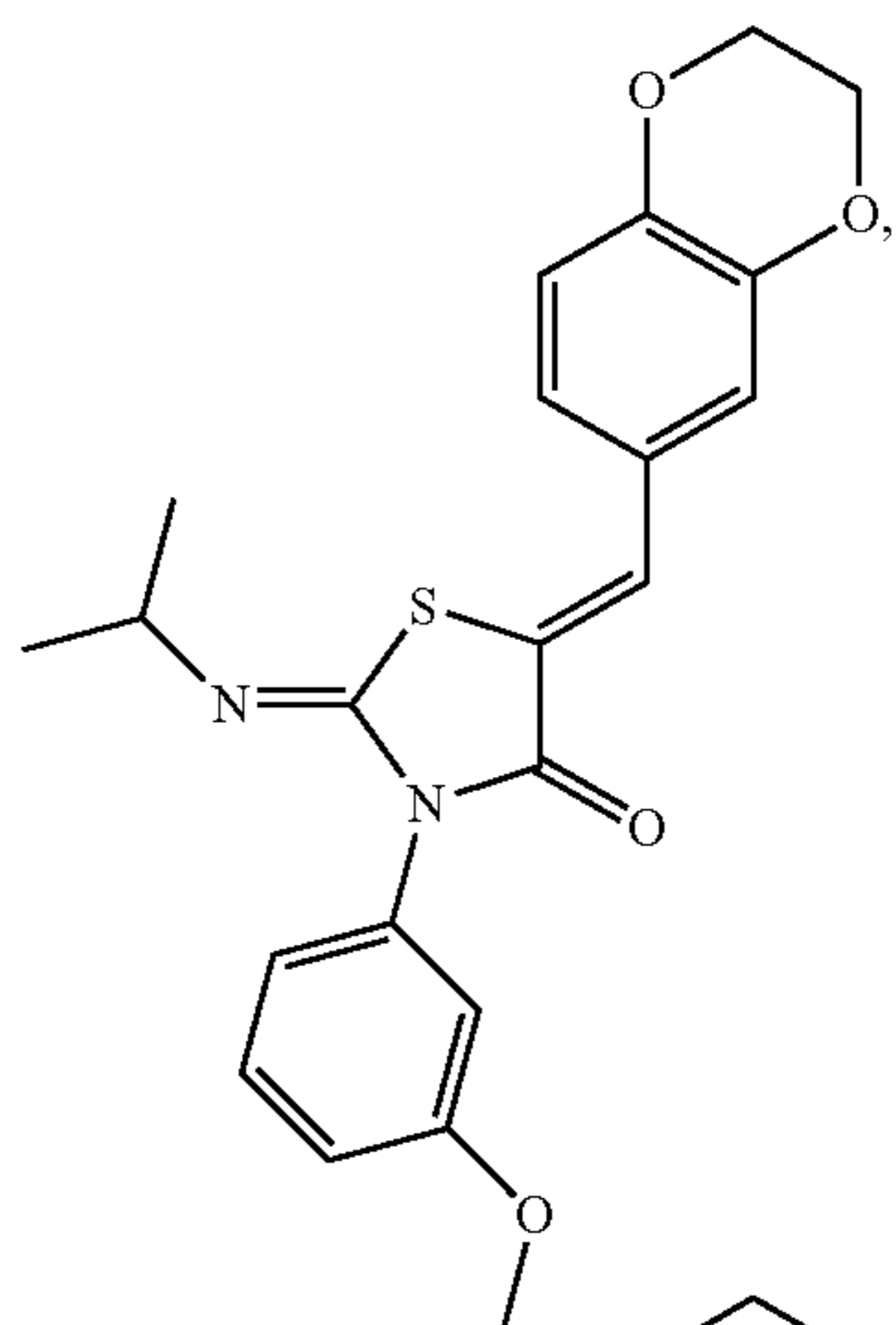
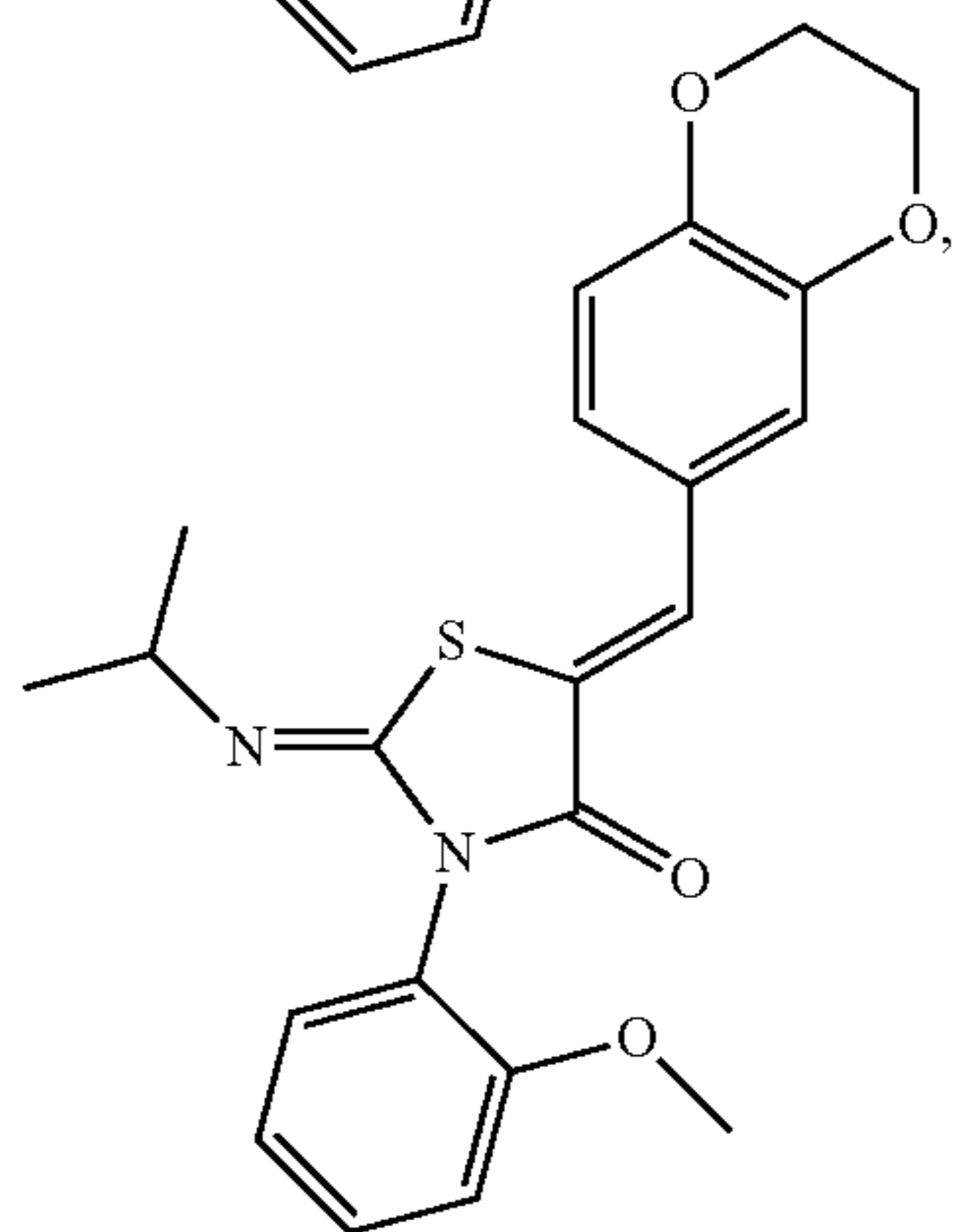
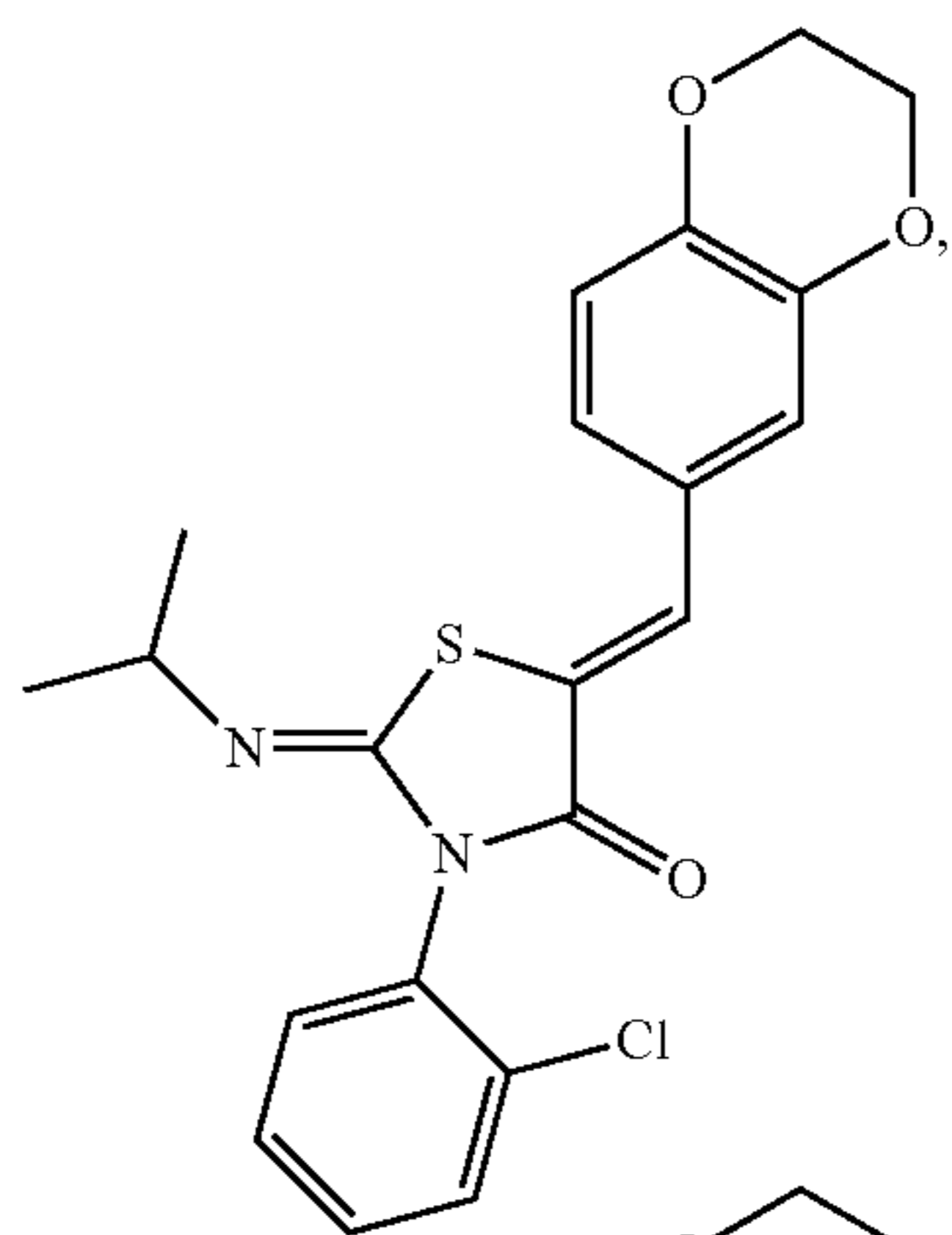
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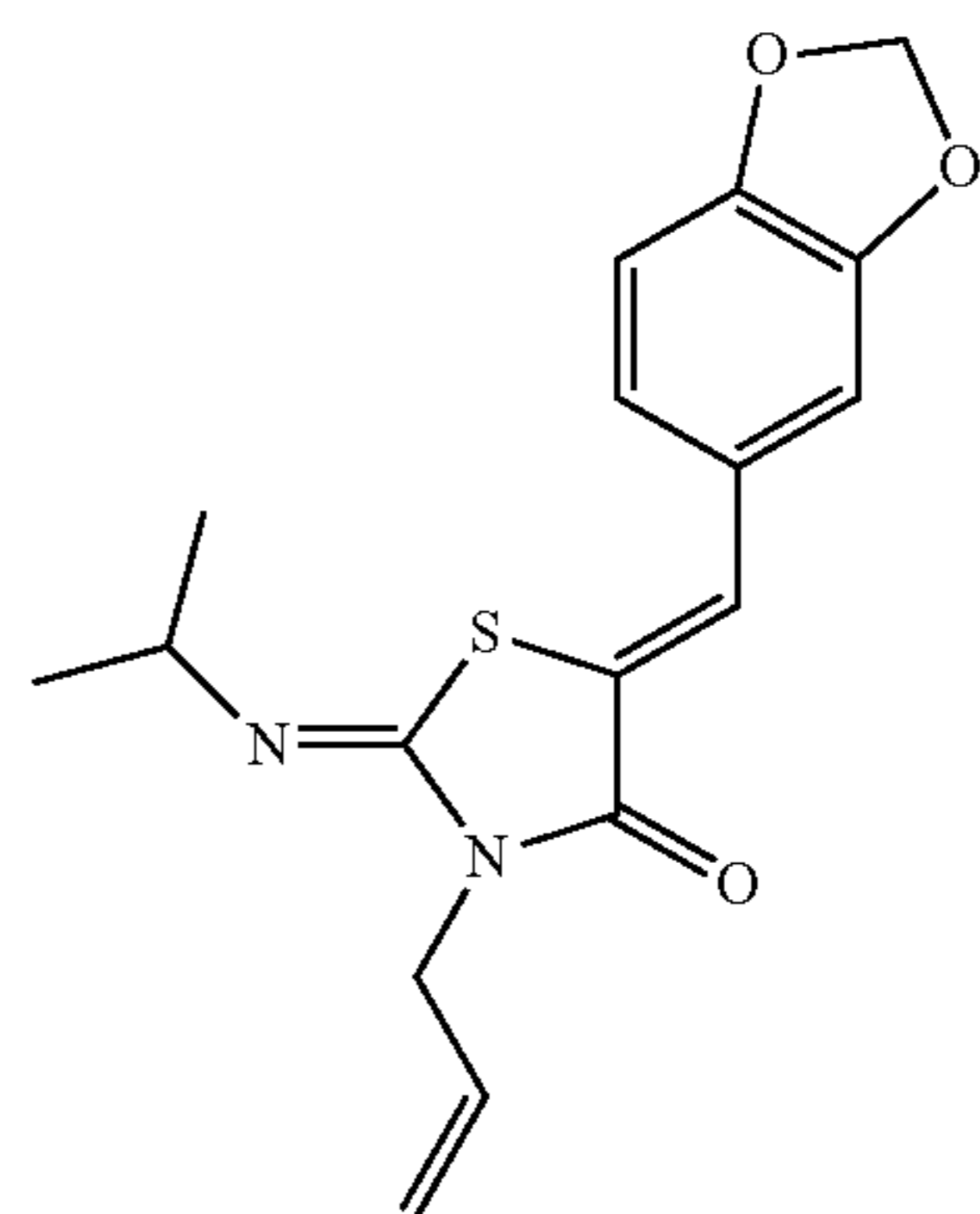
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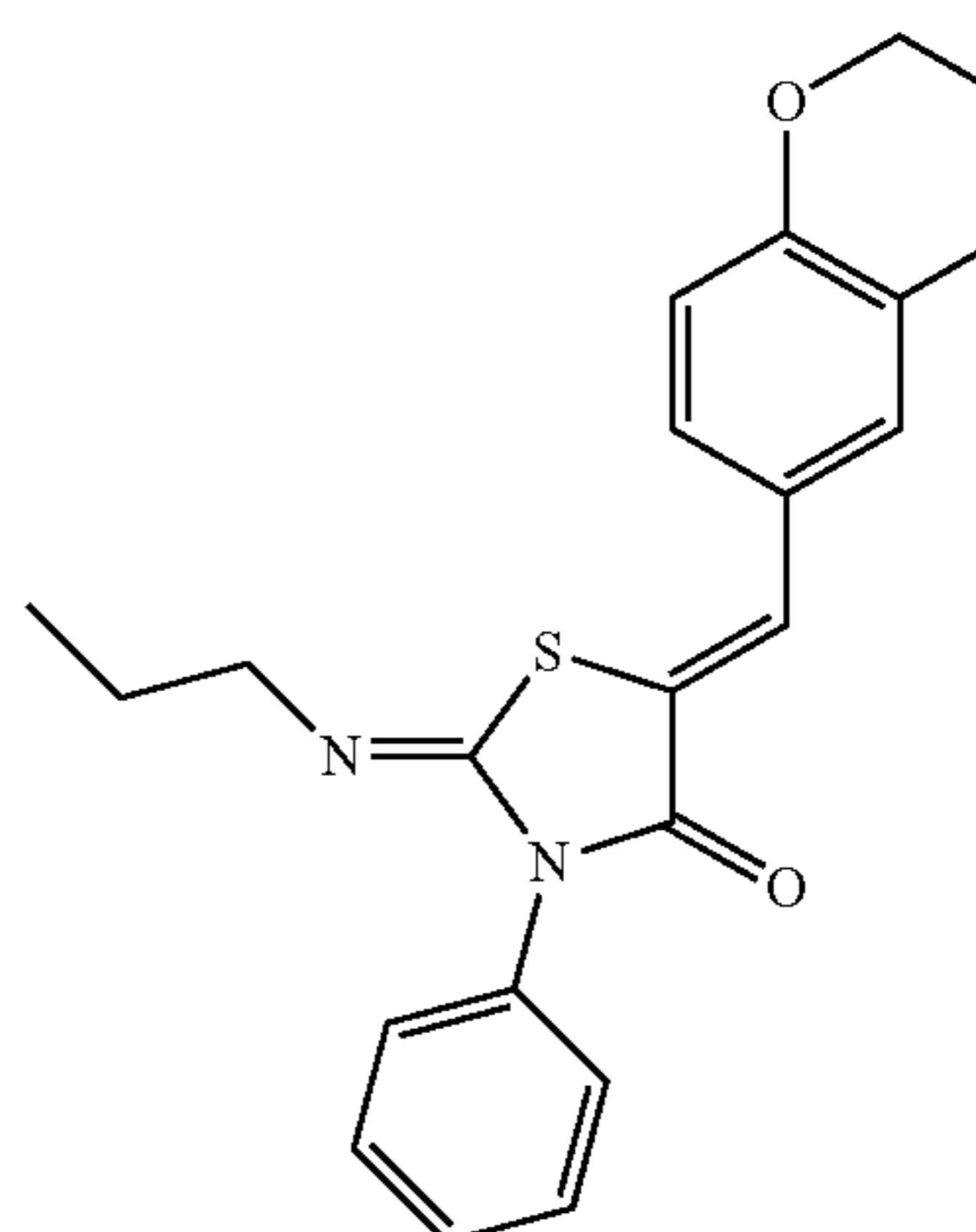
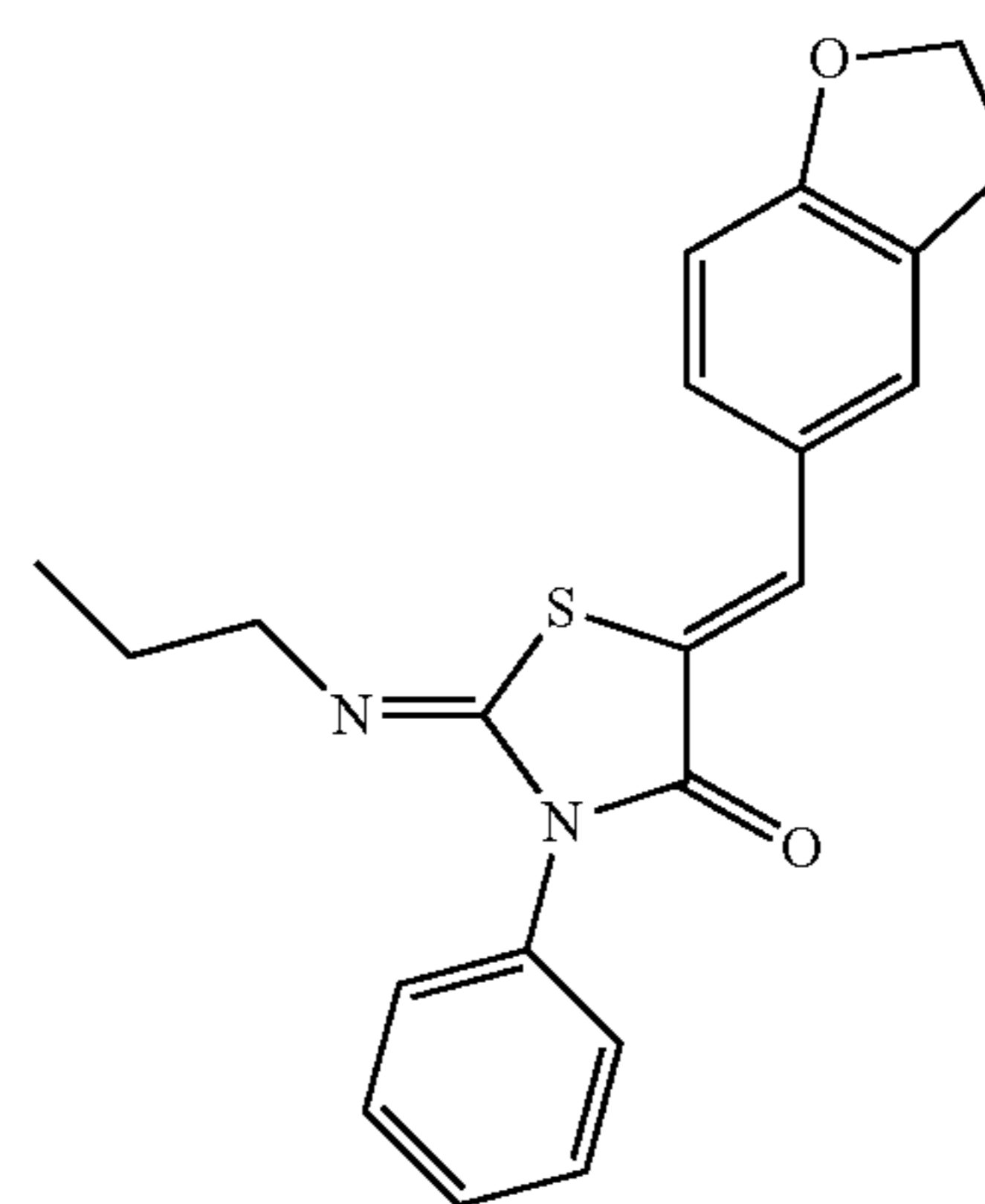
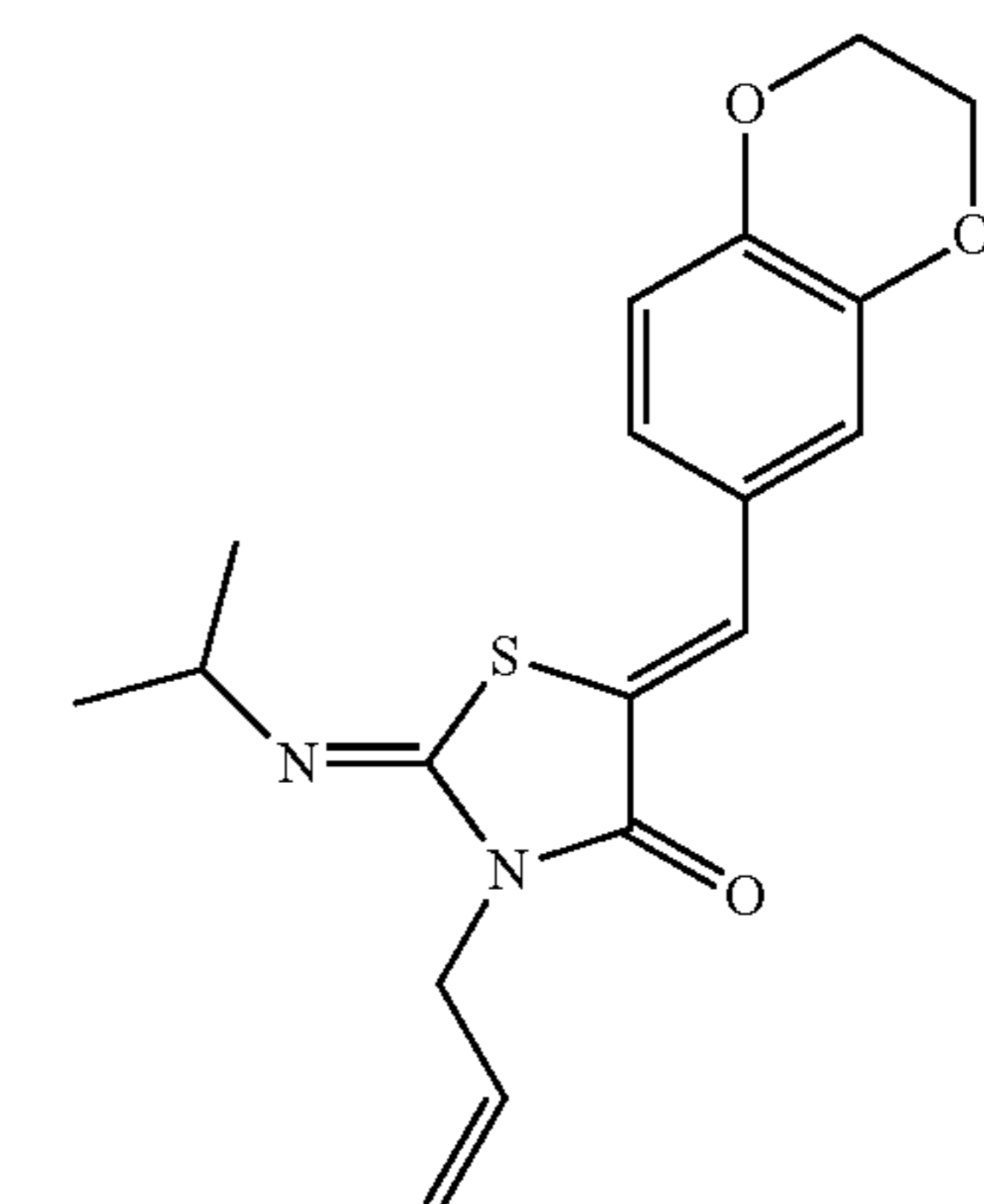
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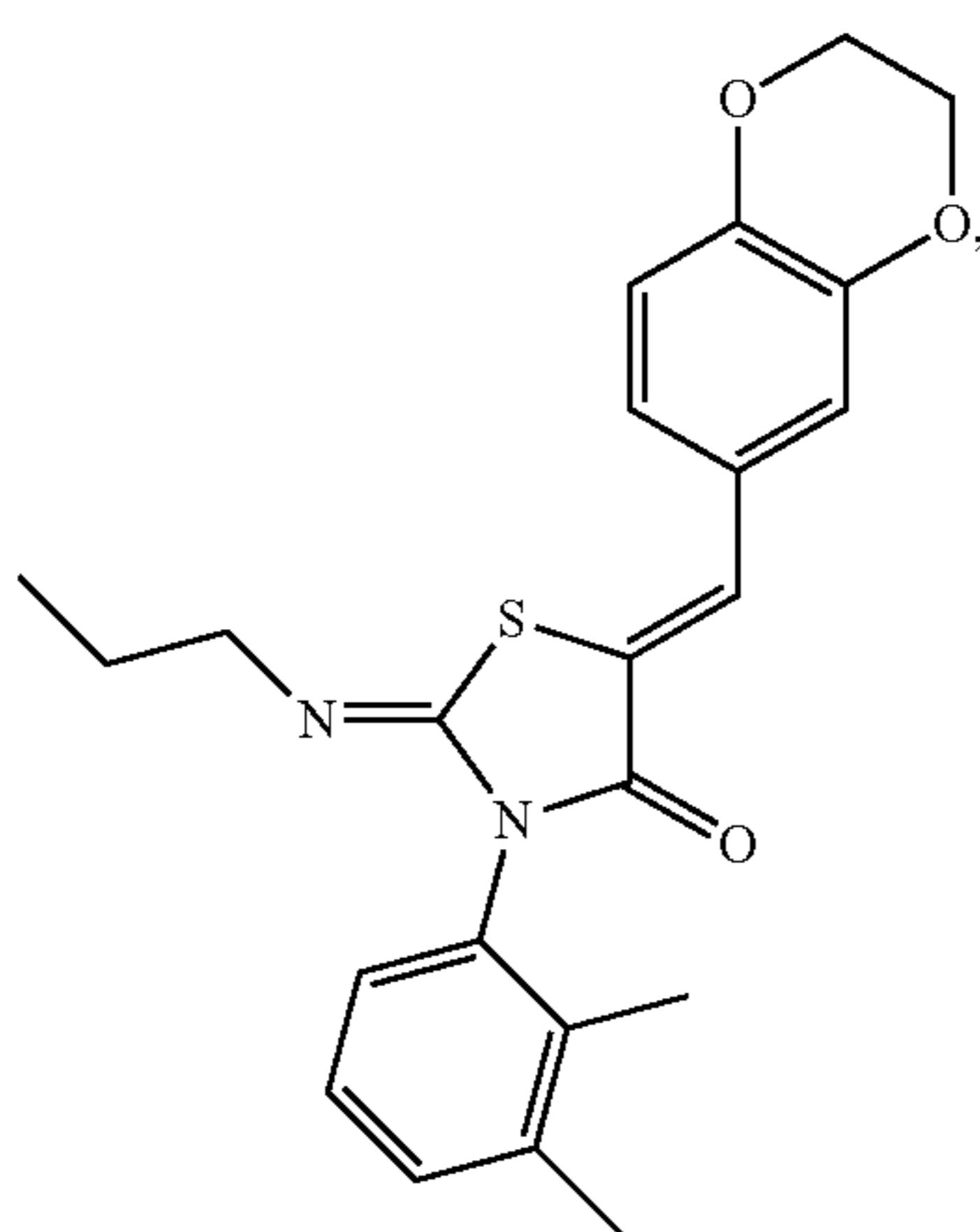
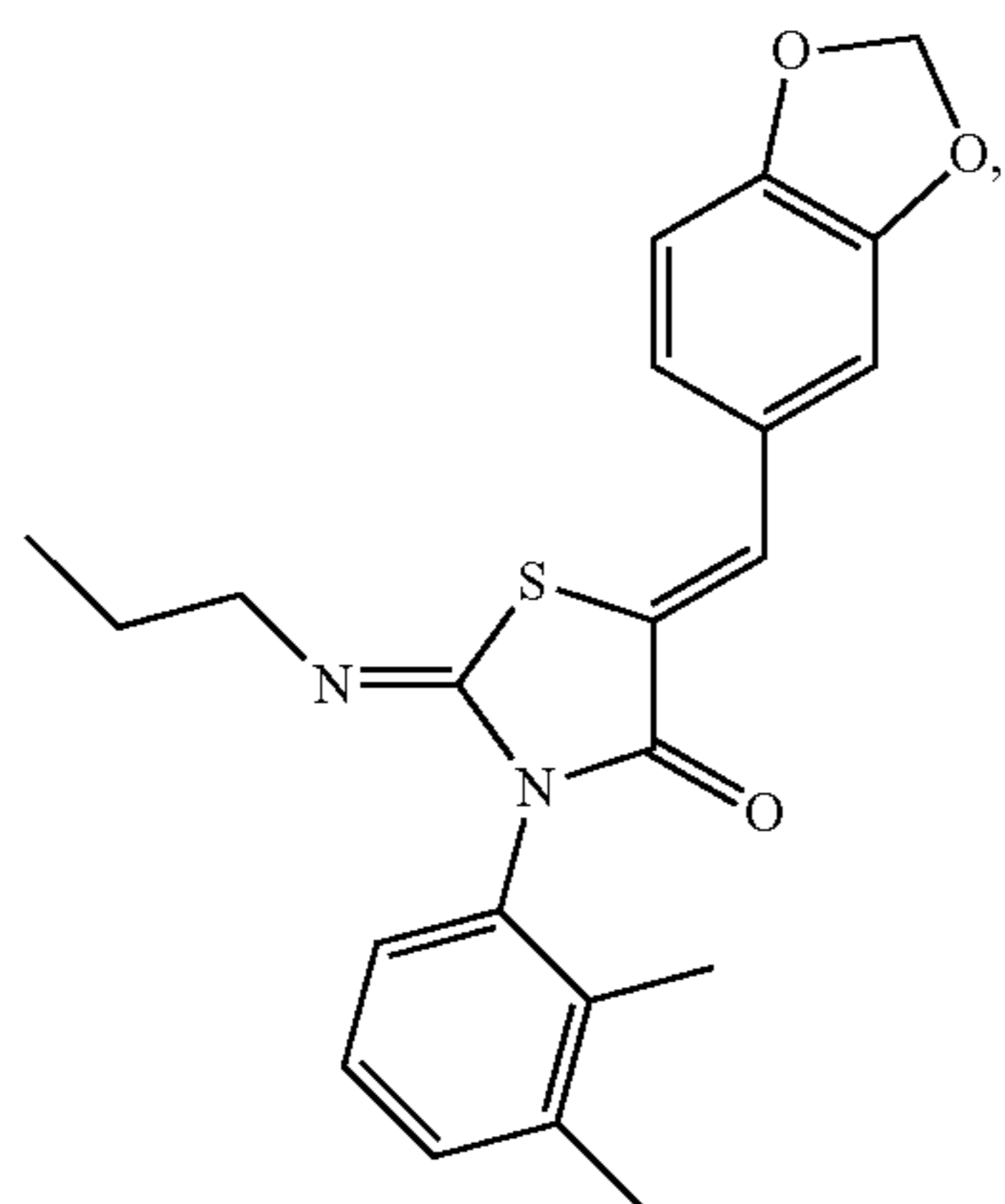
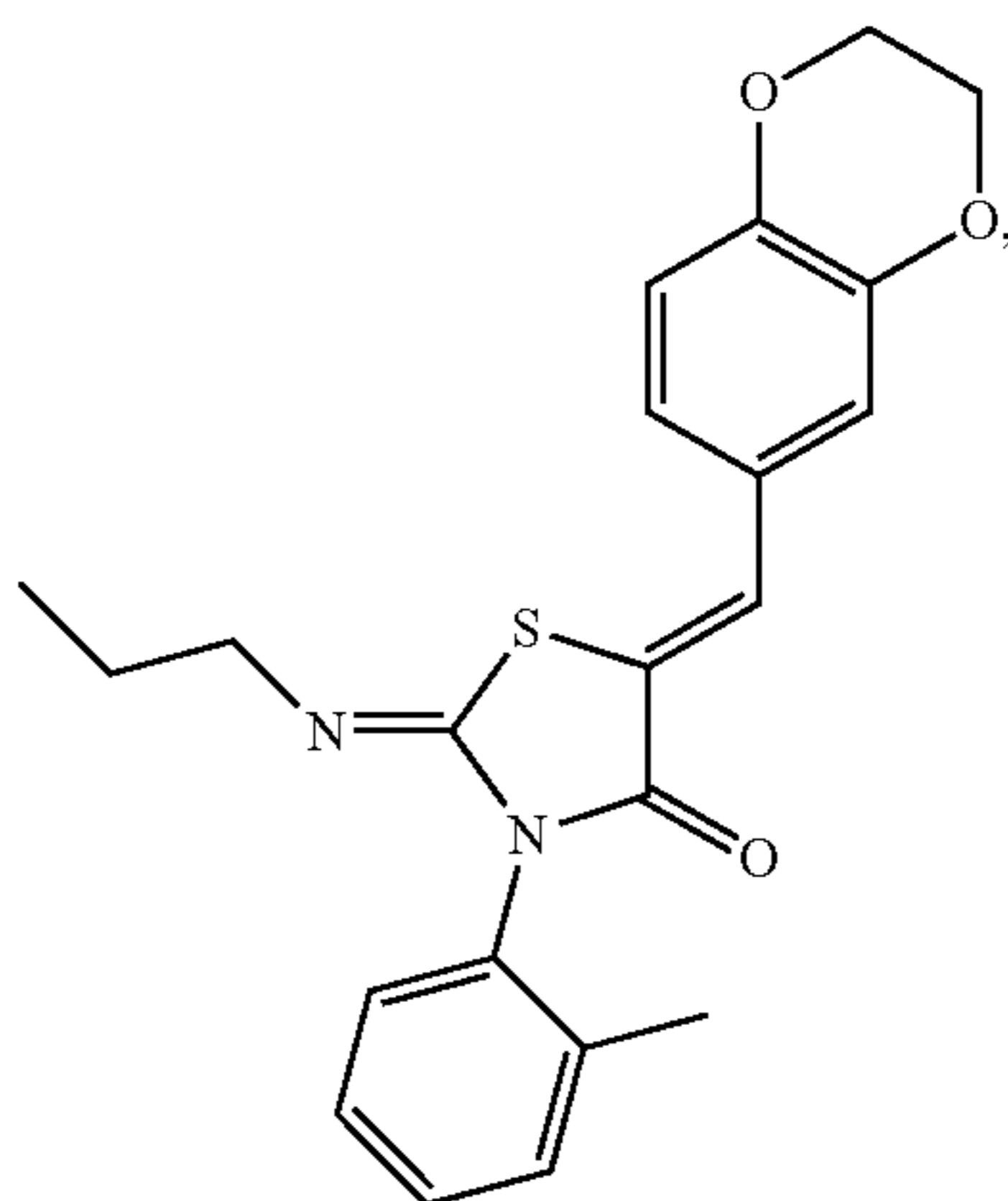
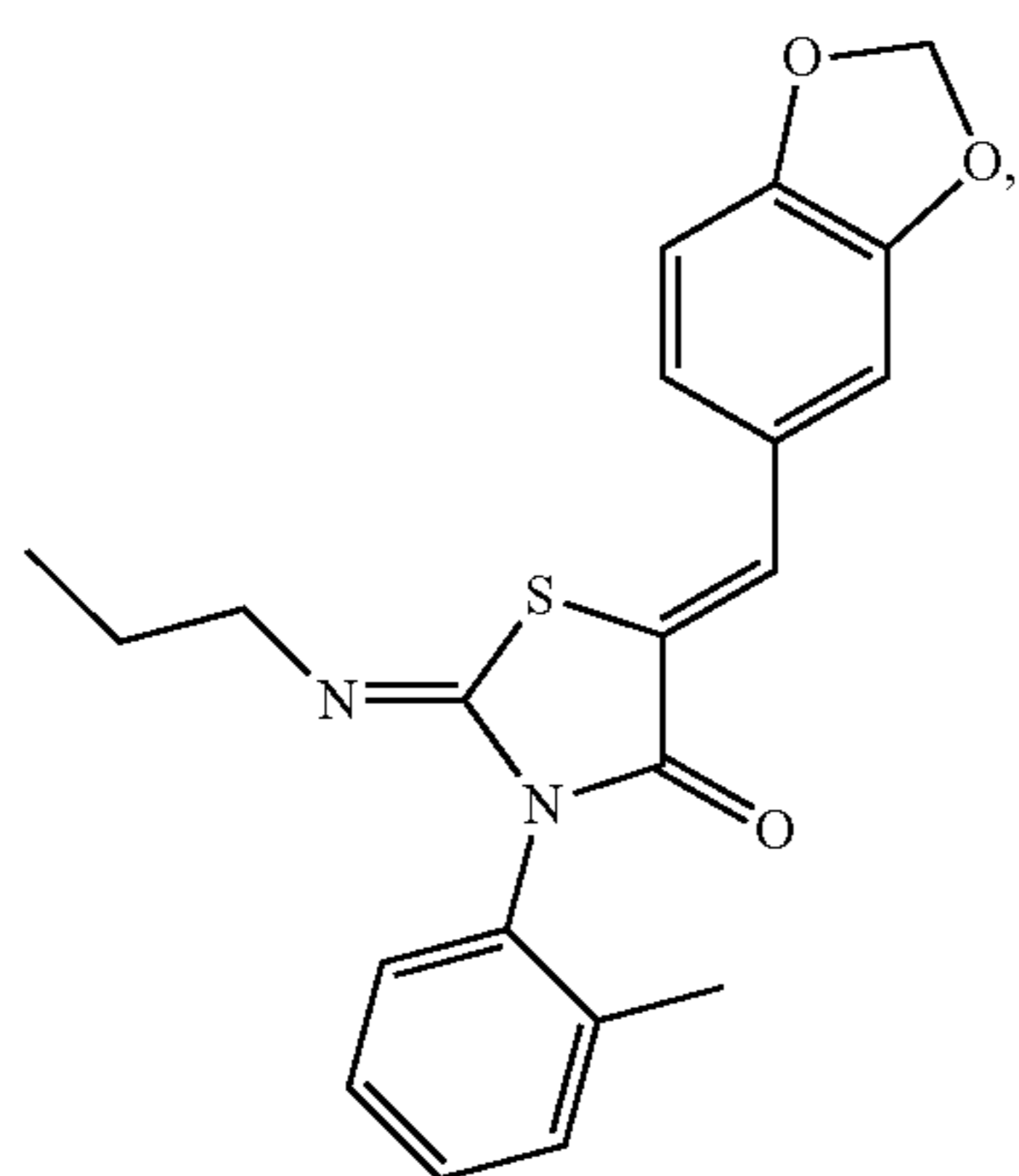
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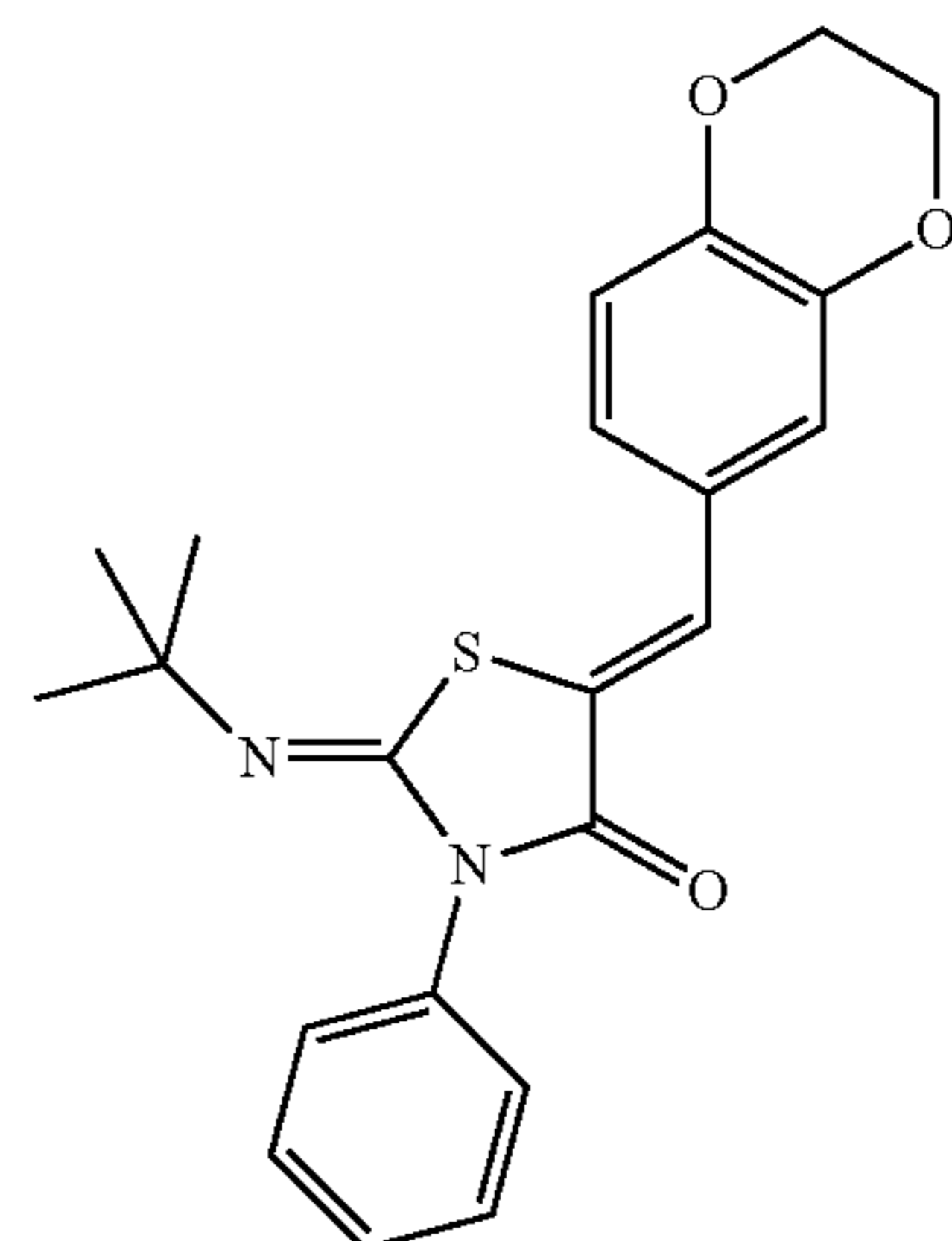
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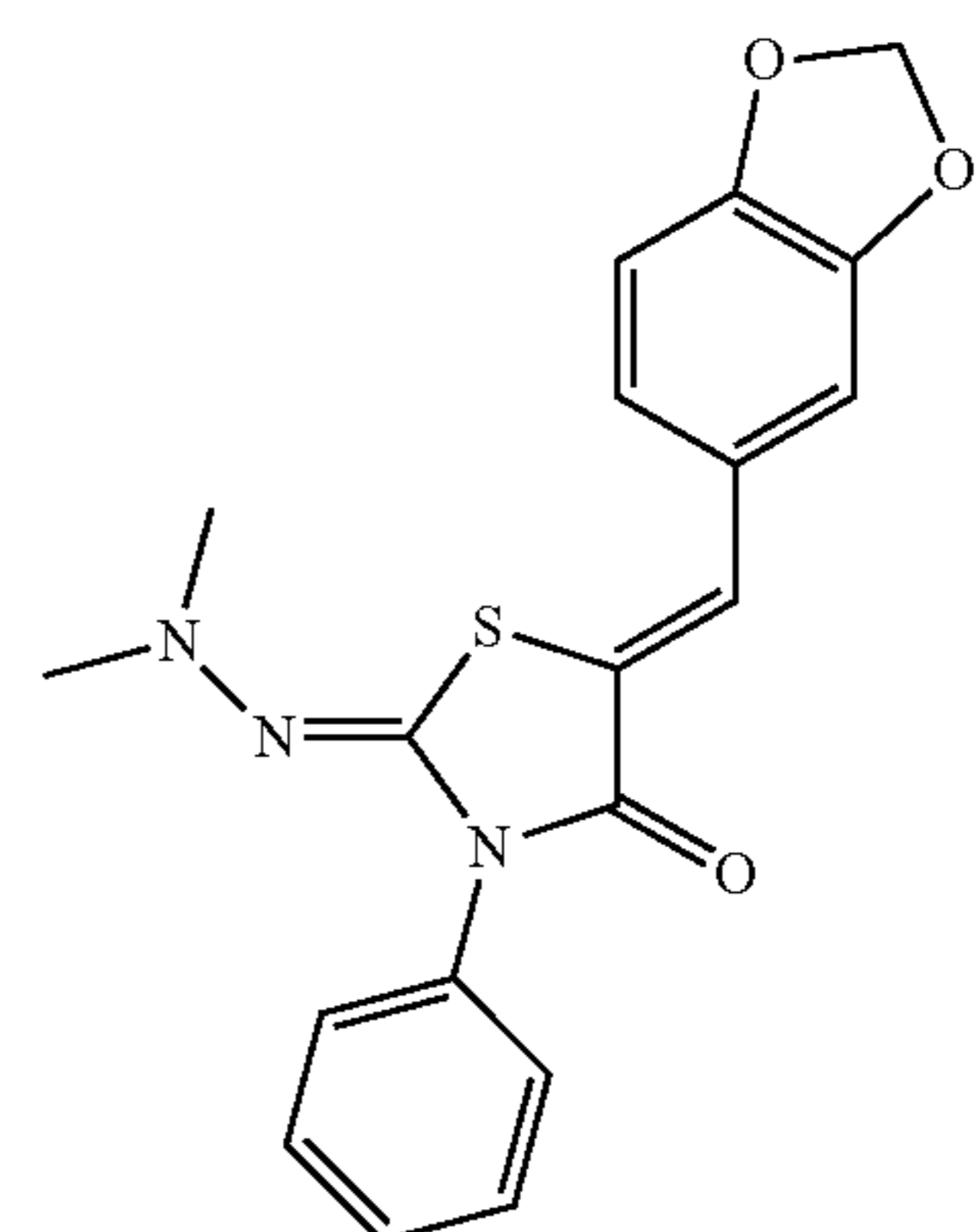
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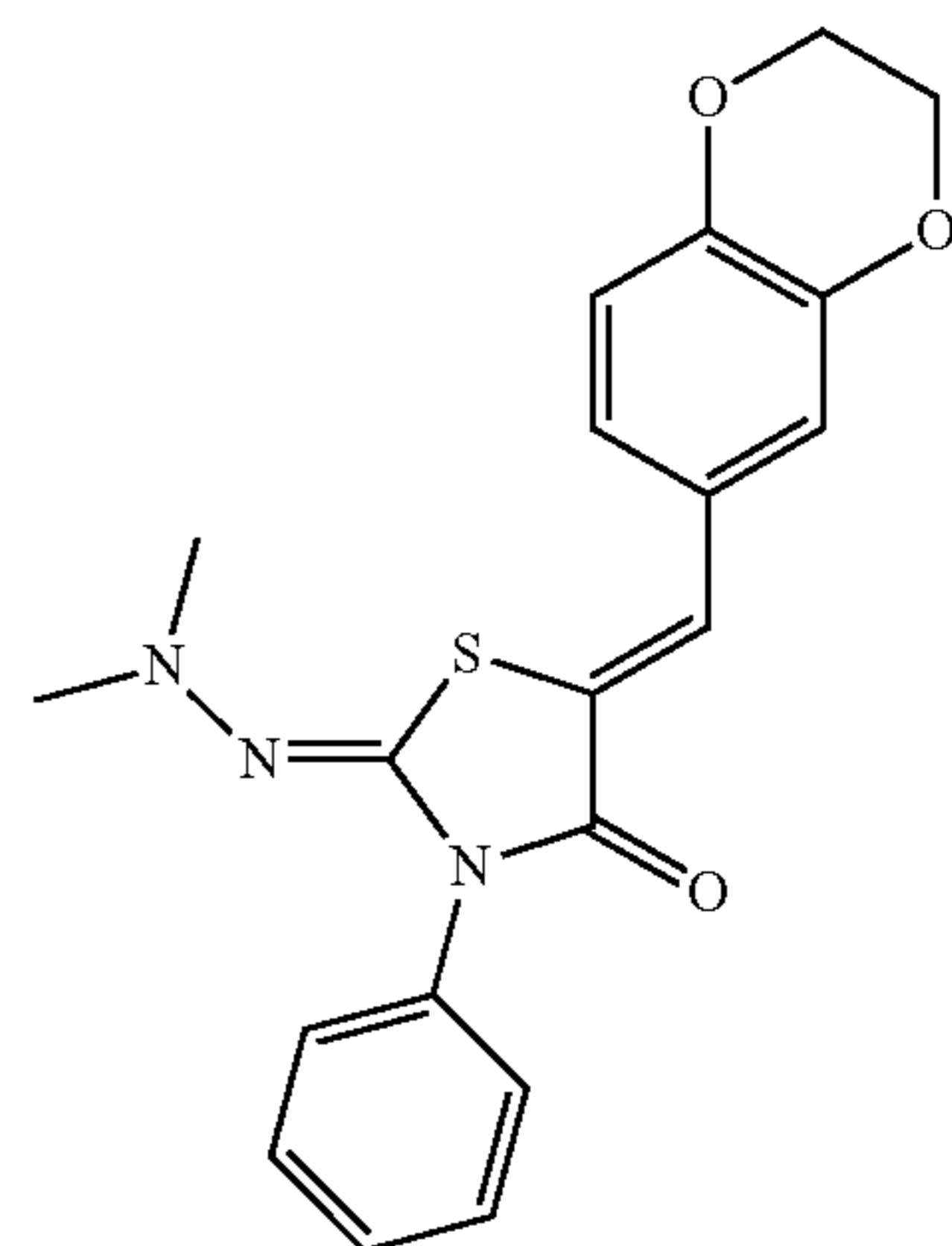


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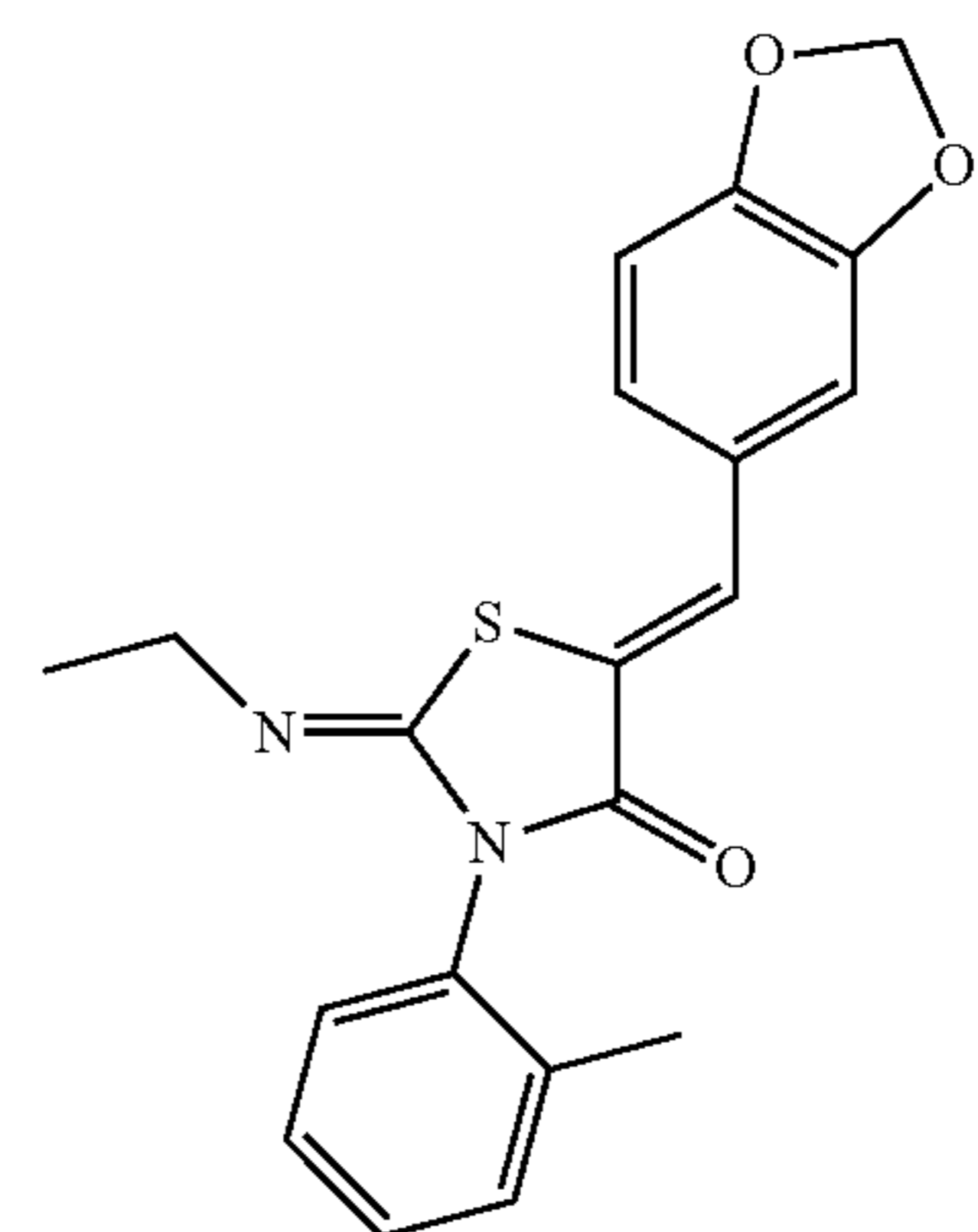
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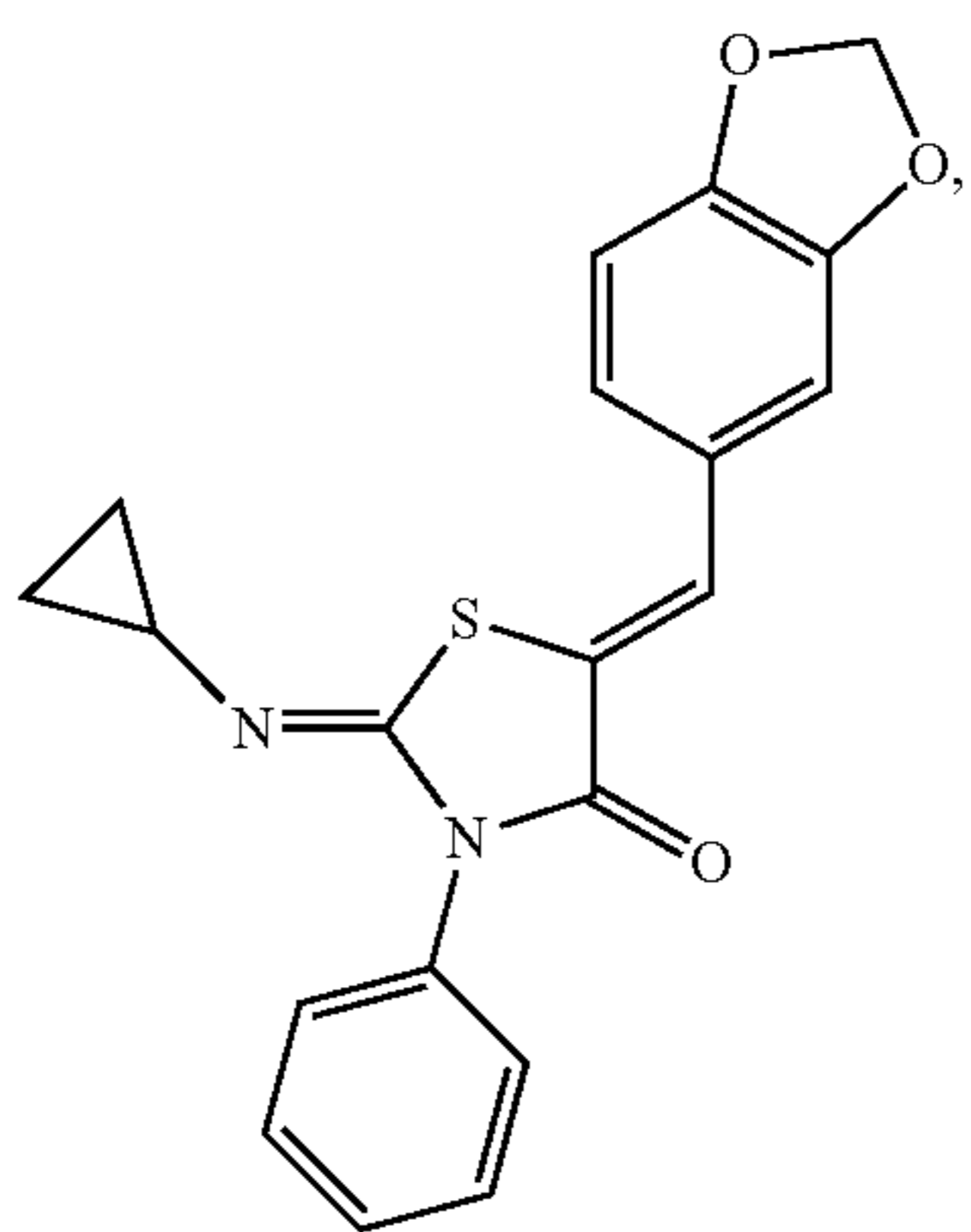
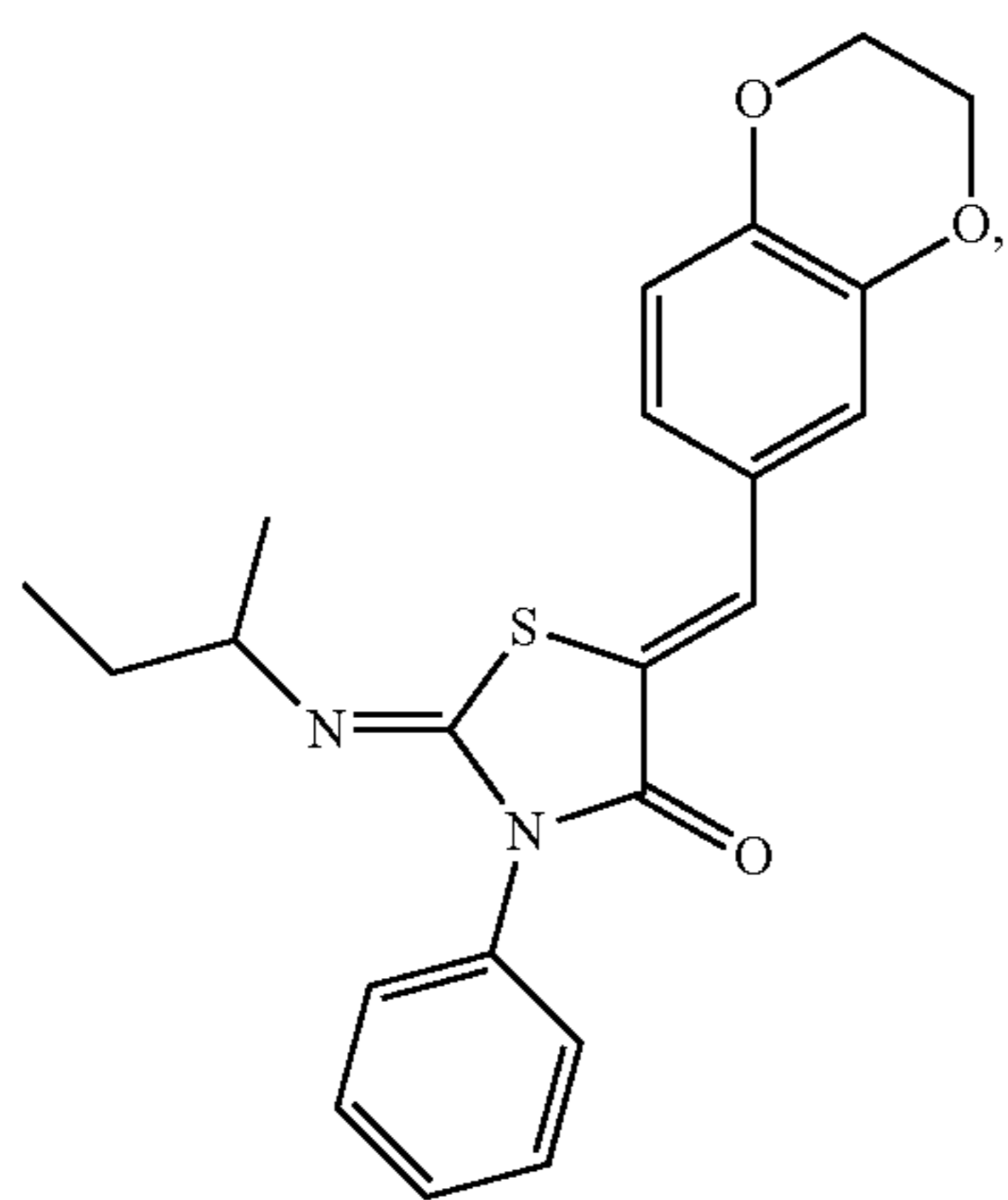
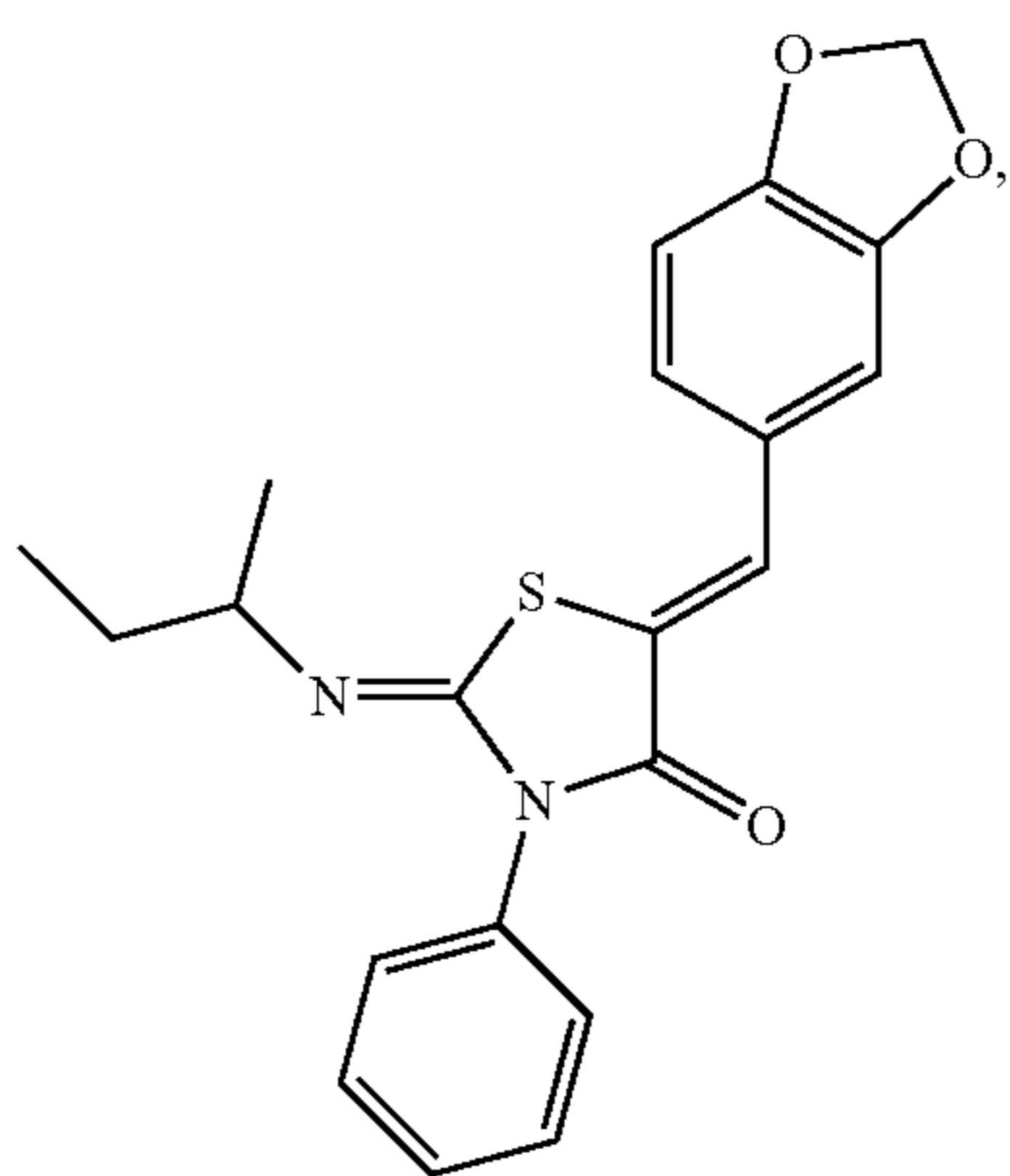
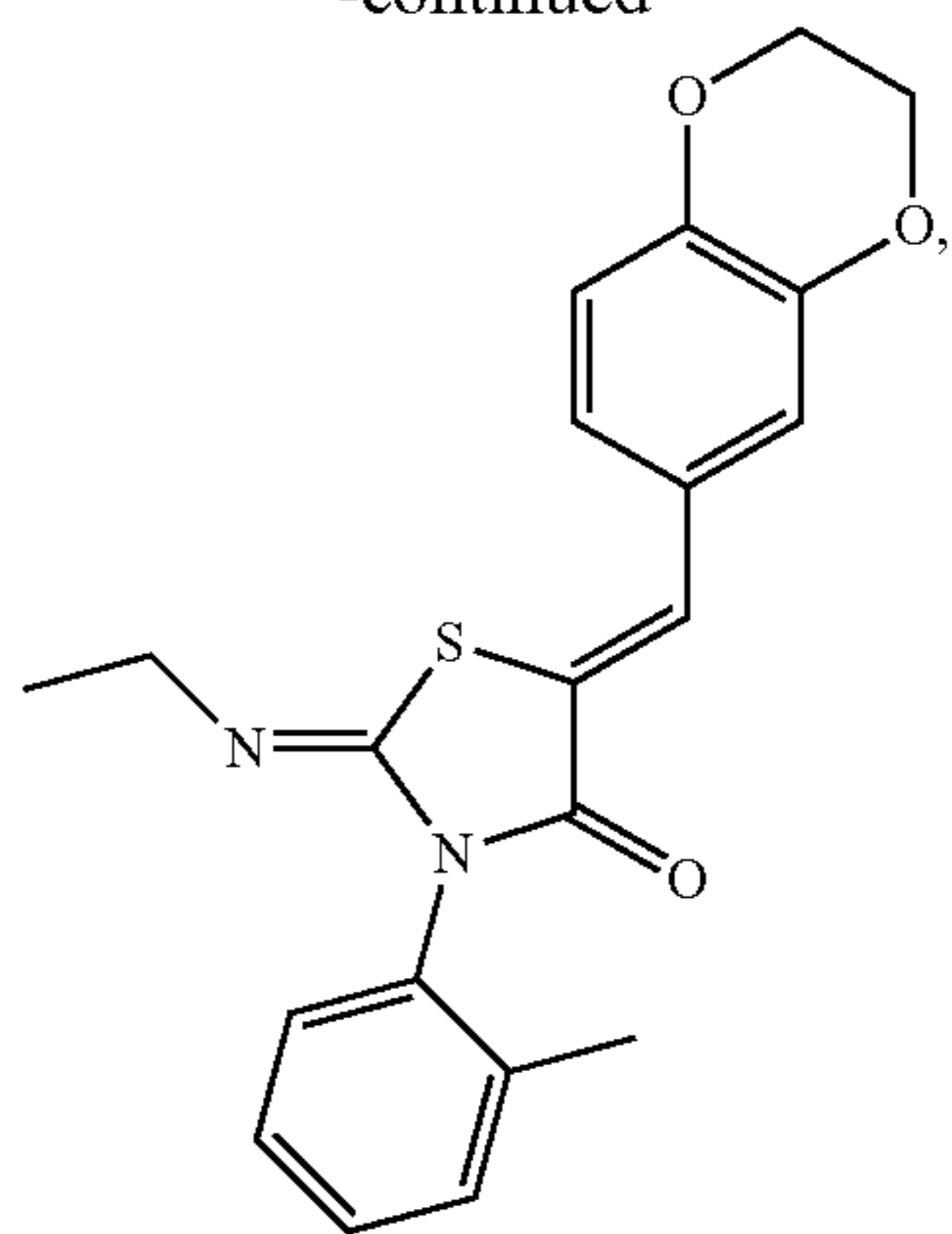
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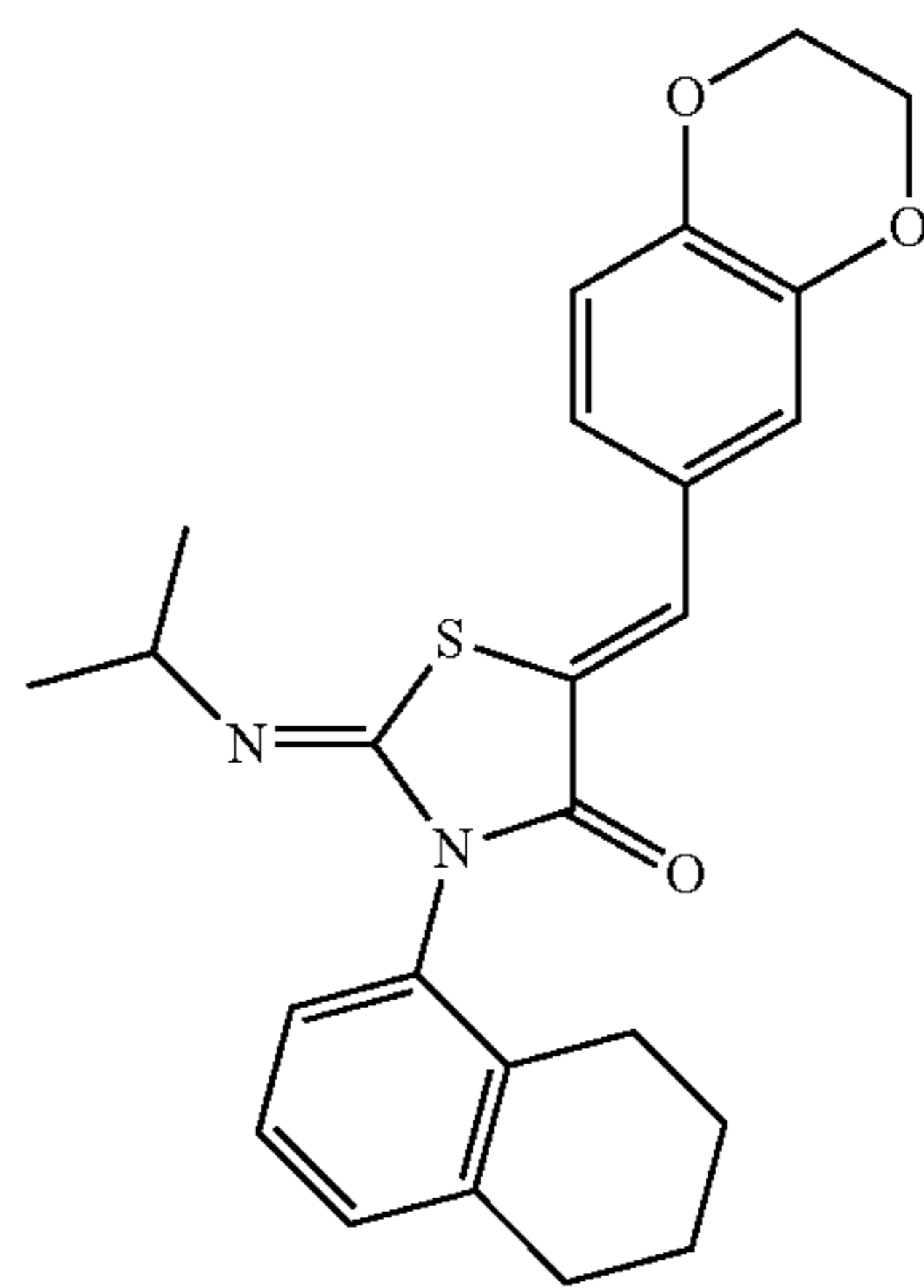
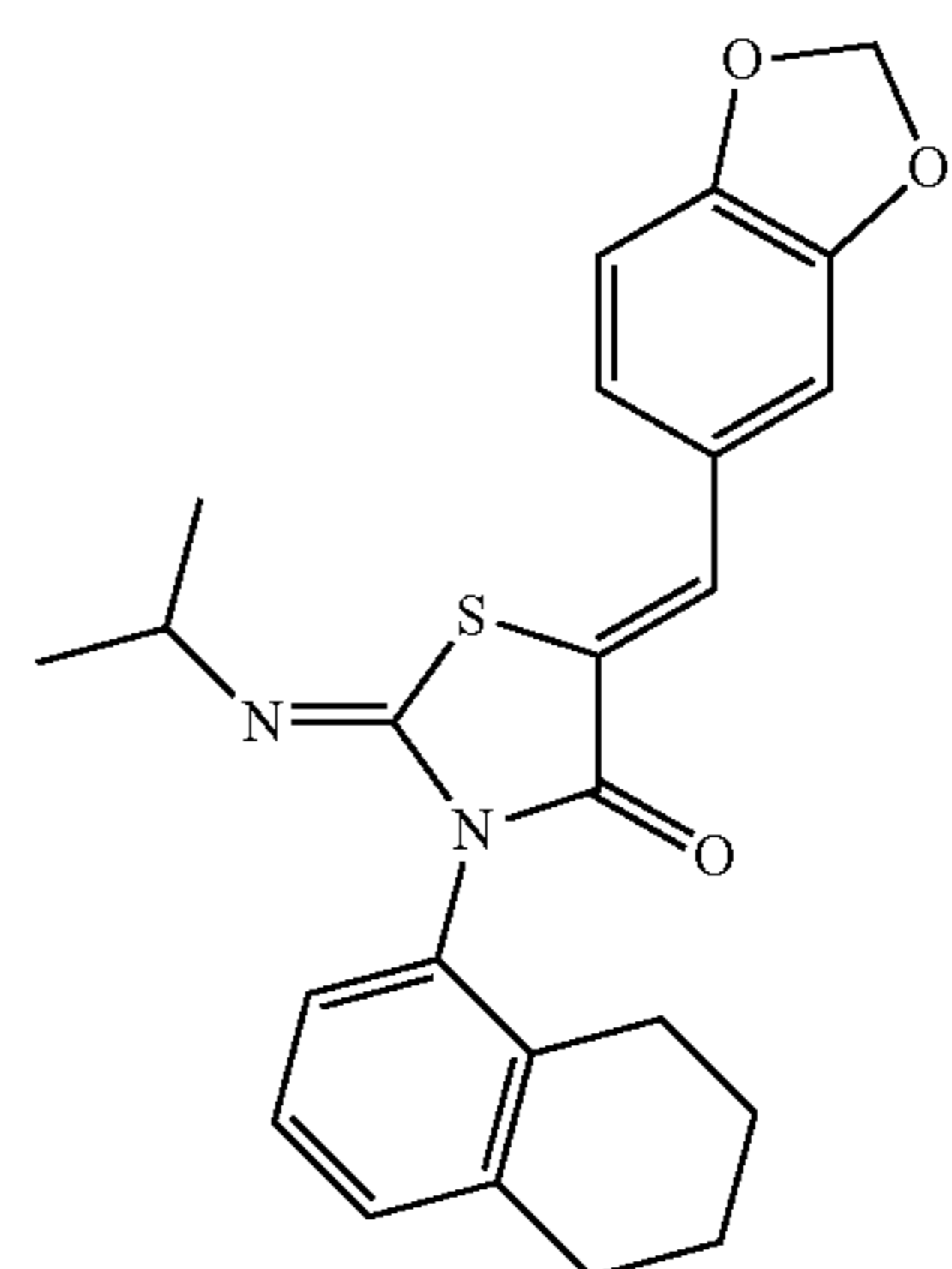
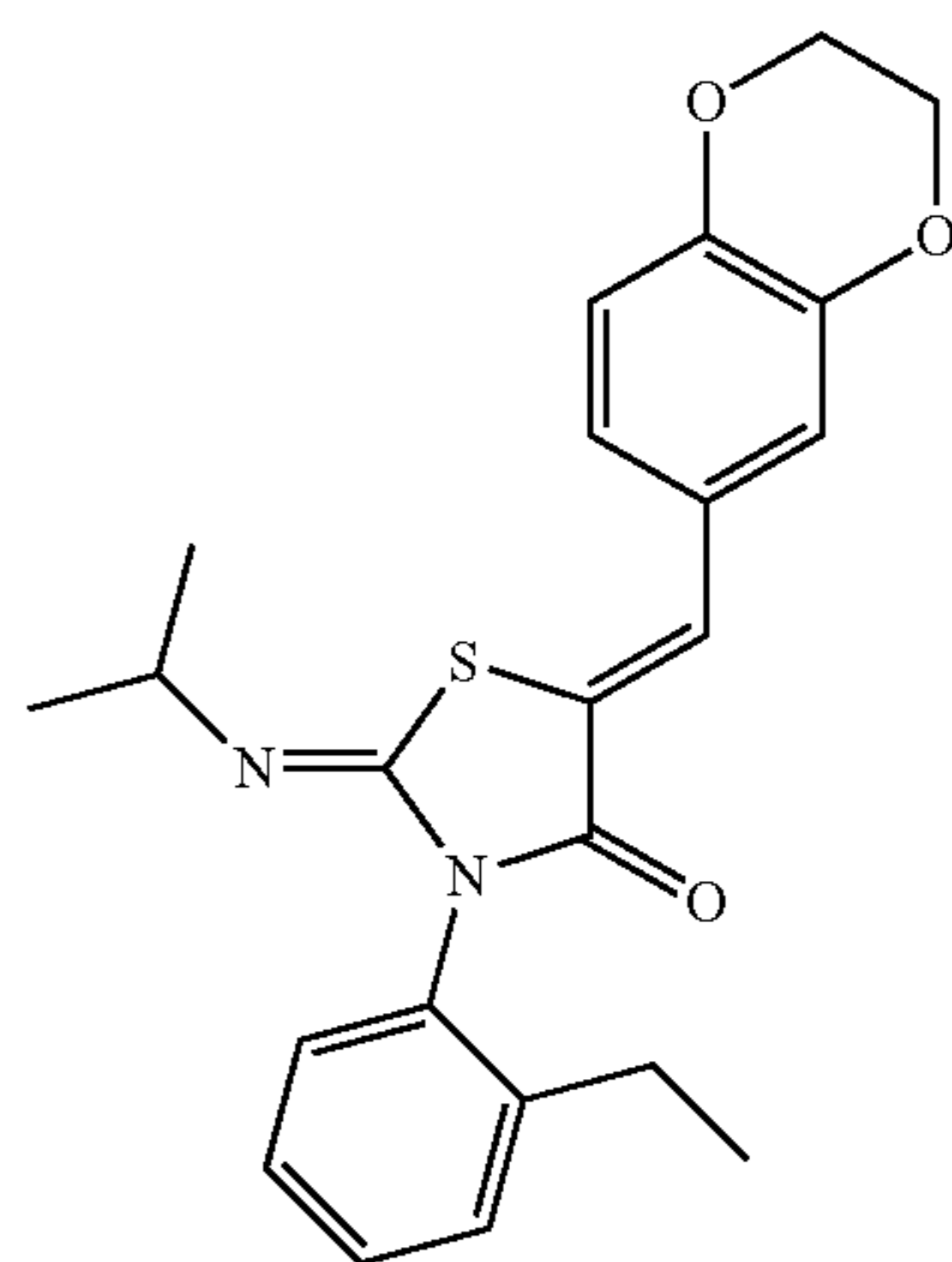
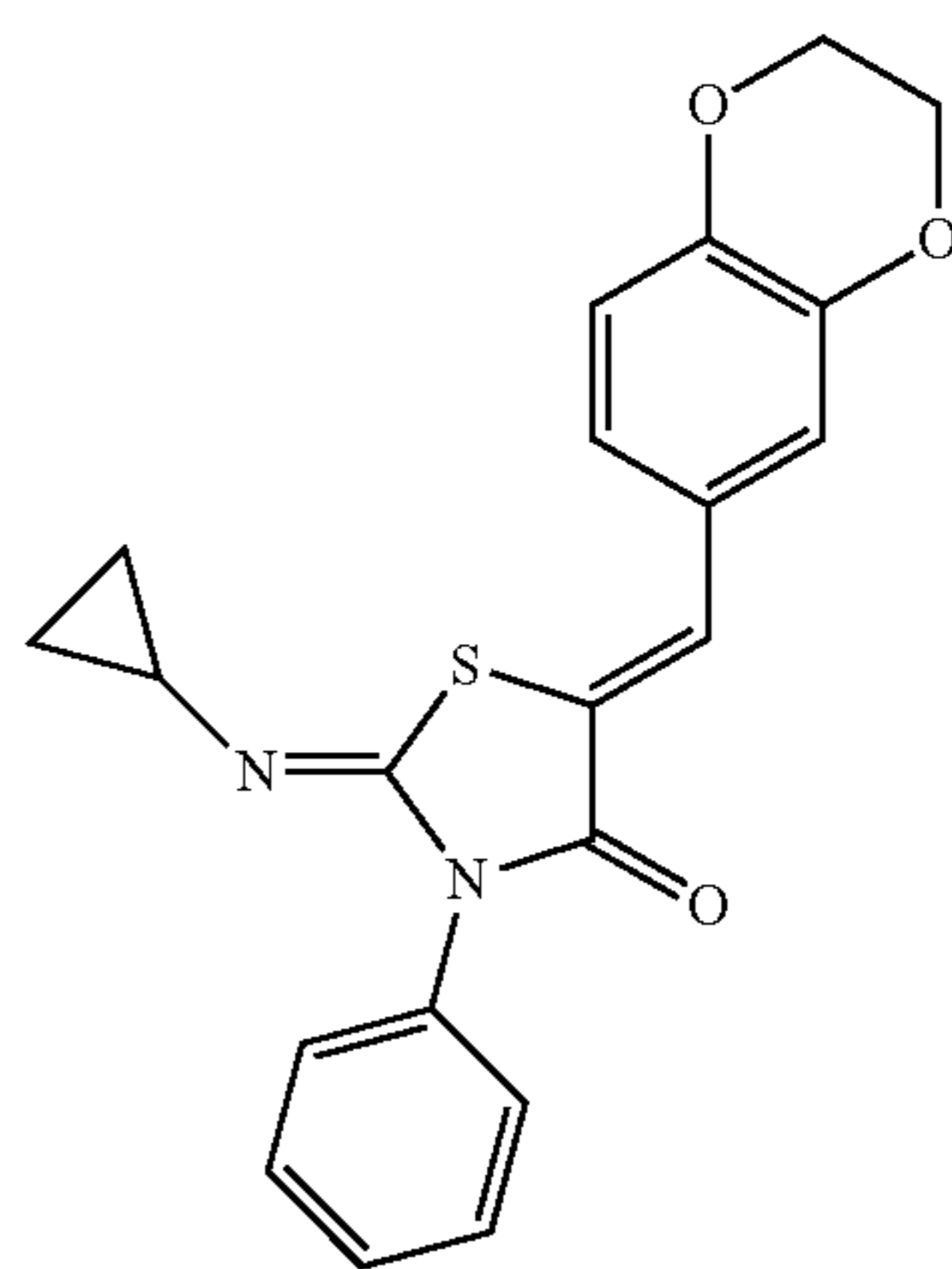
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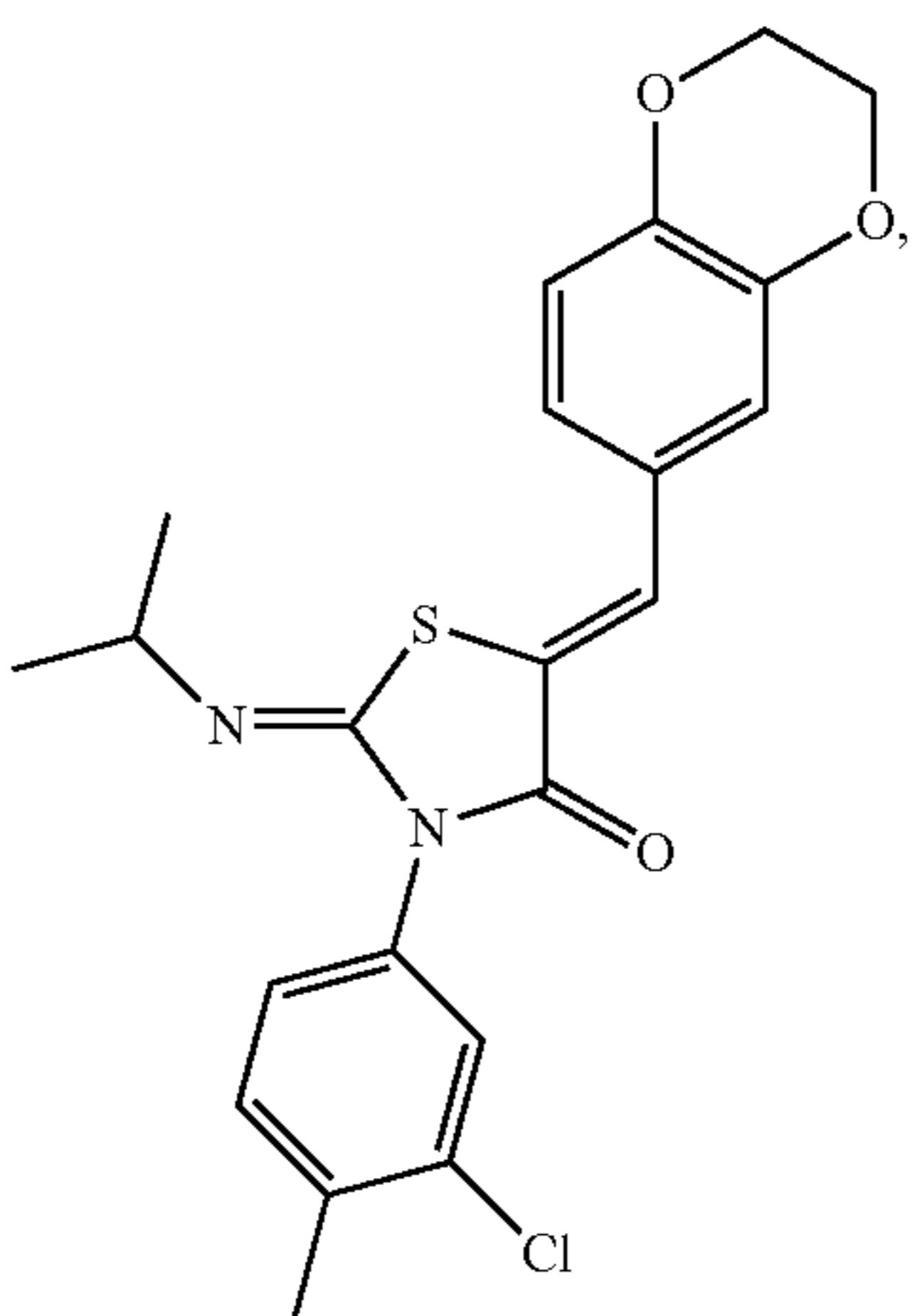
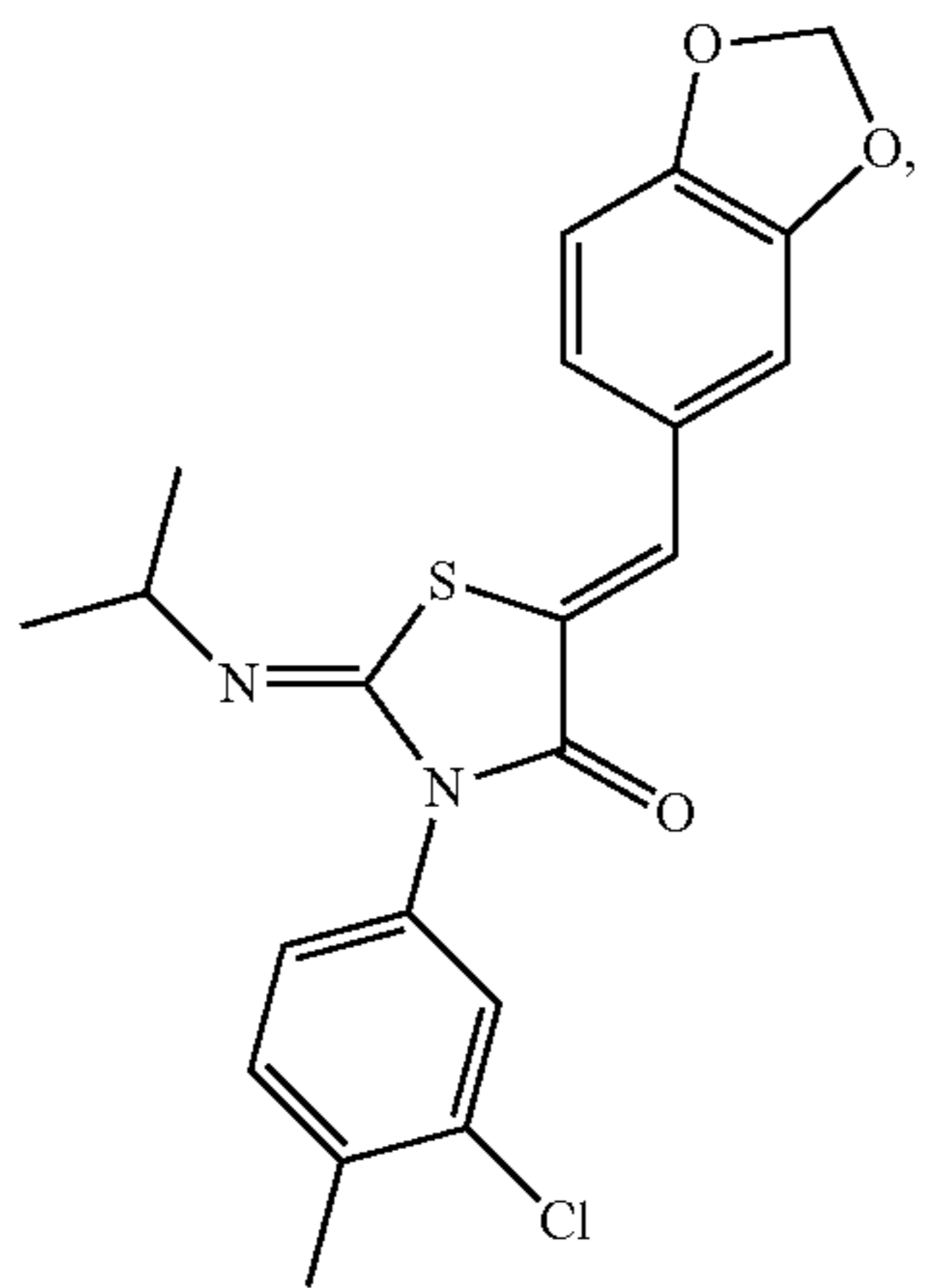
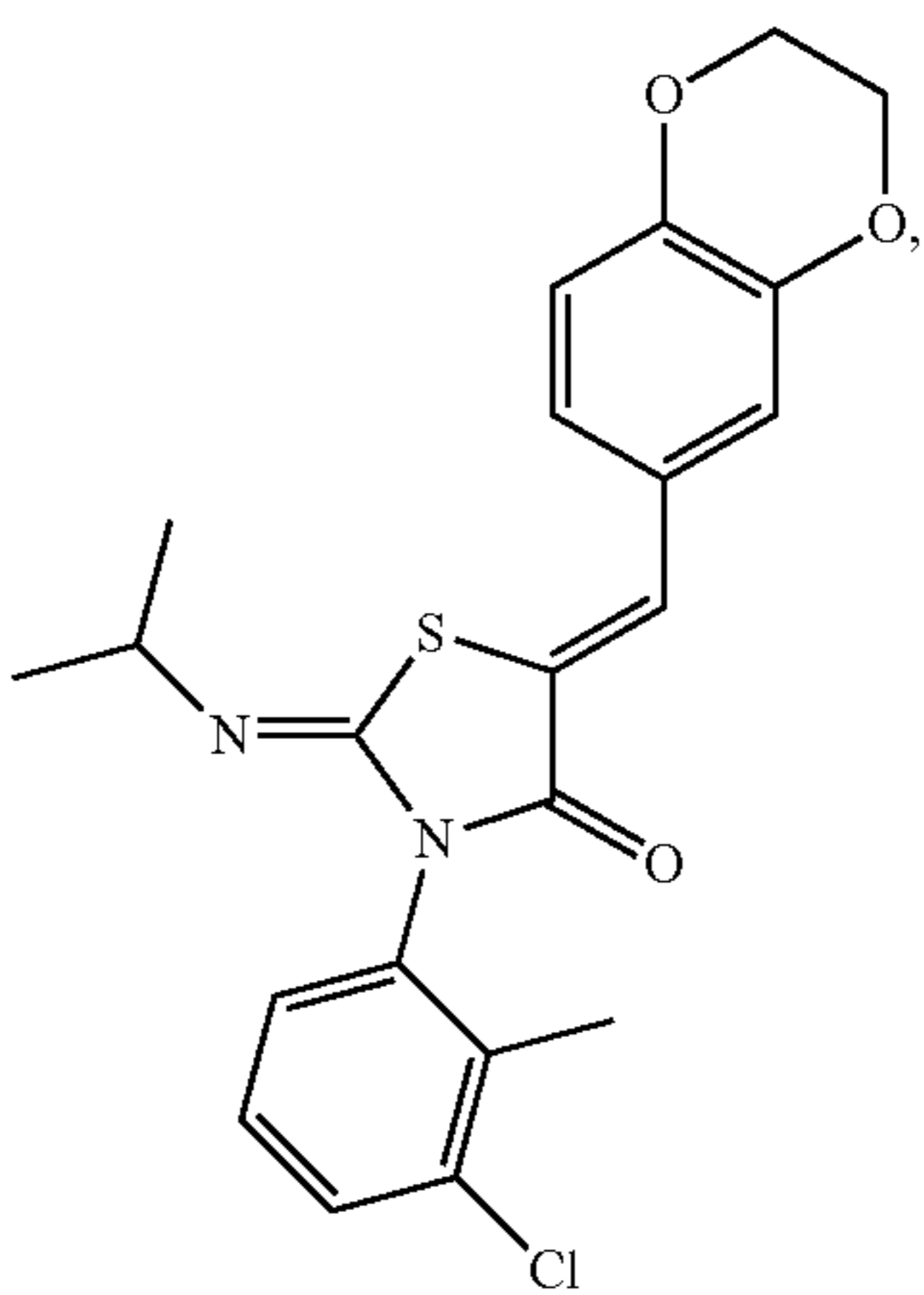
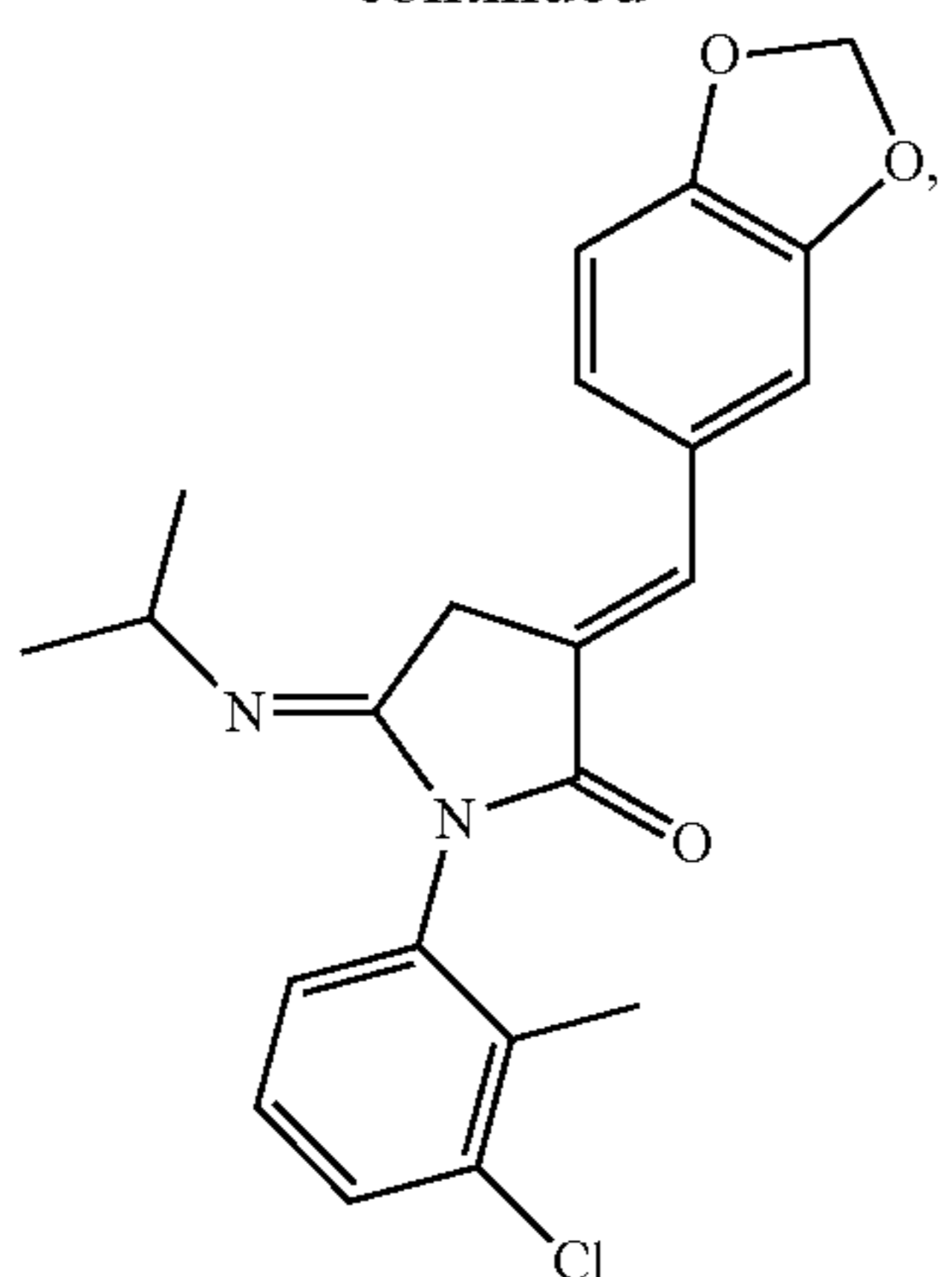
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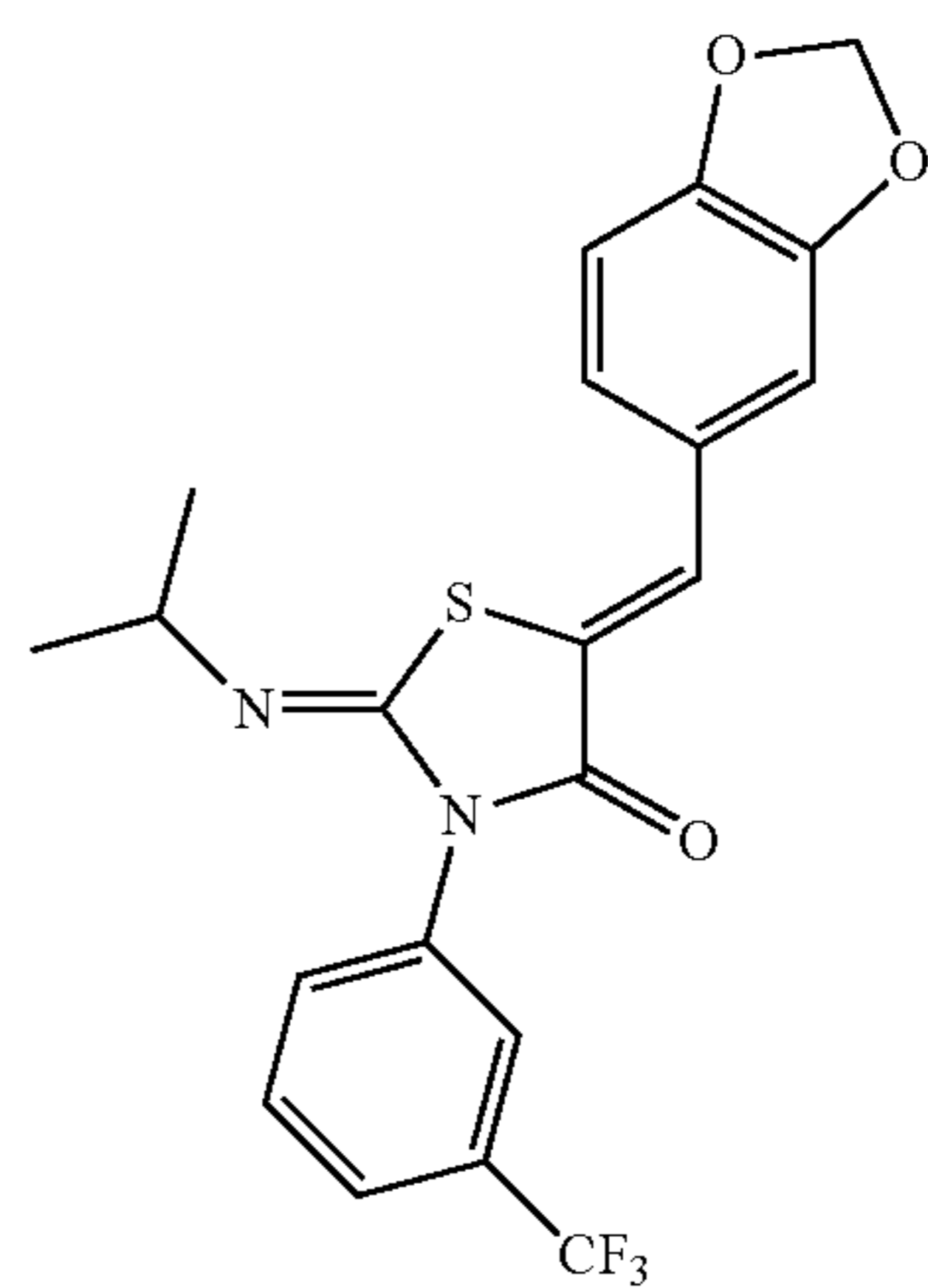
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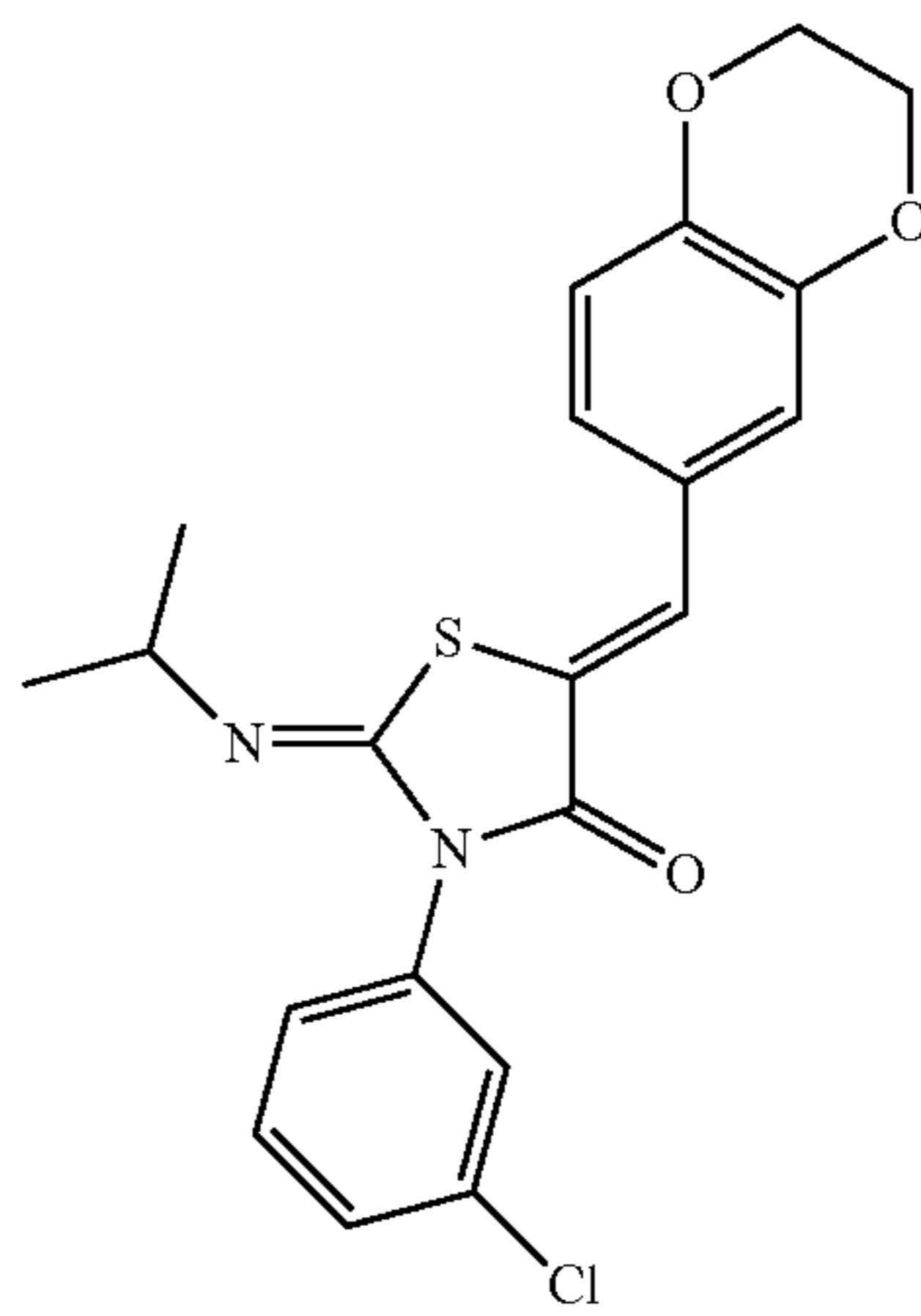
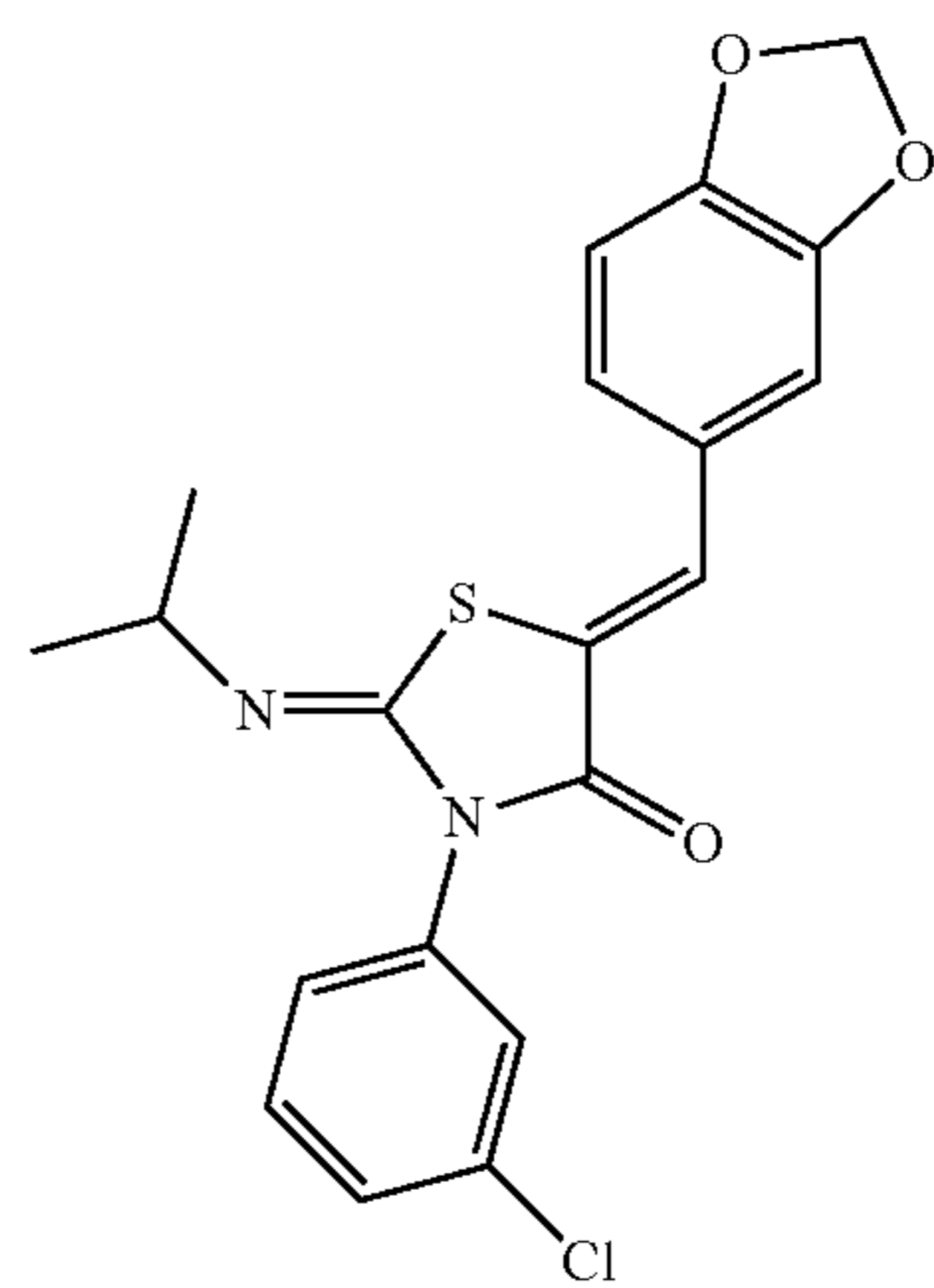
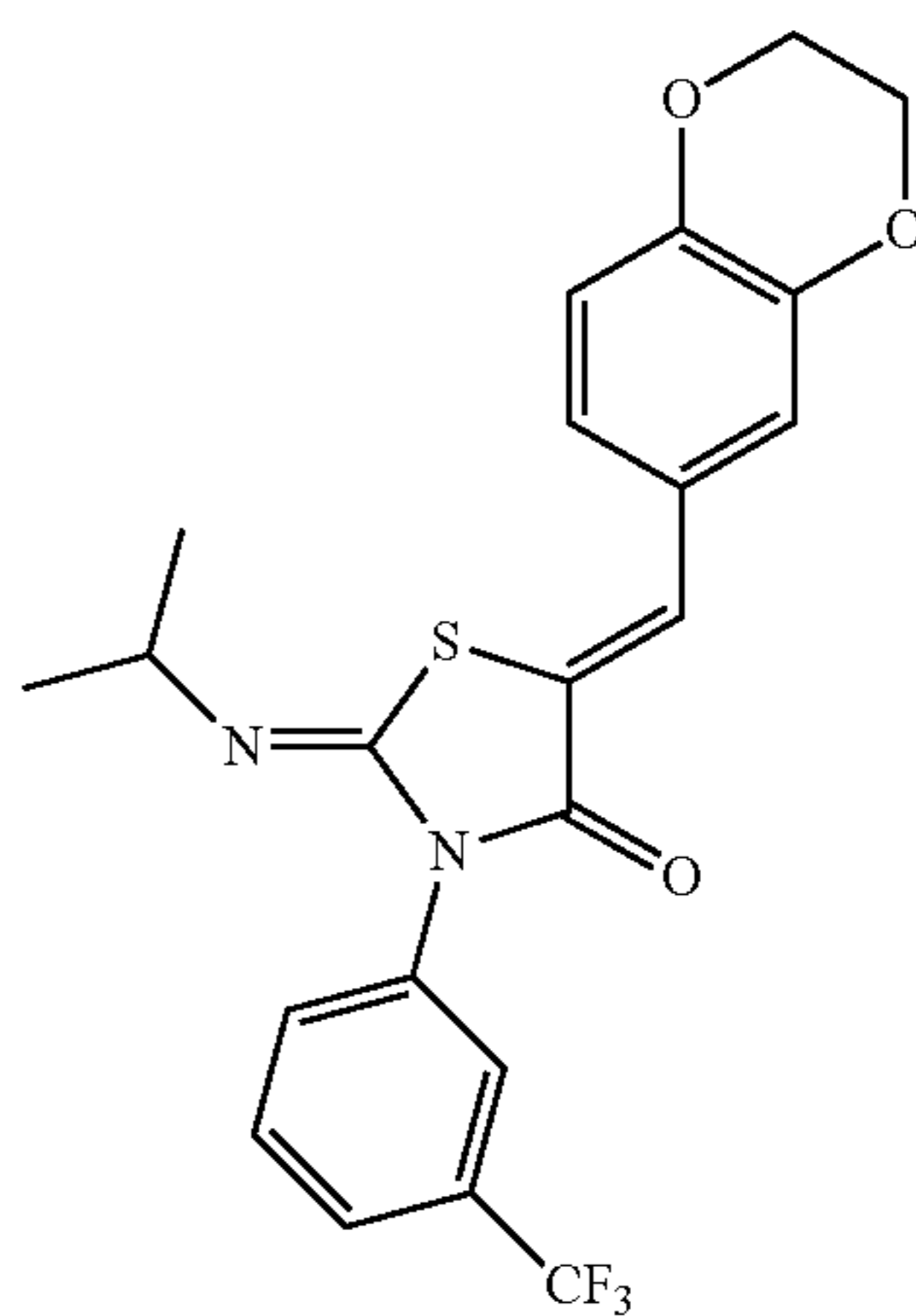
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UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : RE45,174 E
APPLICATION NO. : 15/981802
DATED : August 25, 2020
INVENTOR(S) : Justin Grimes

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the Title Page

The priority claim is corrected as:

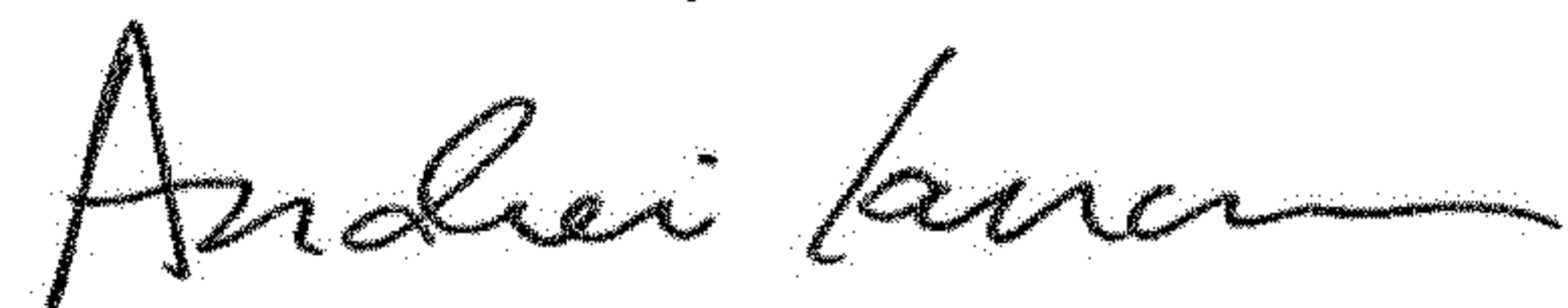
The instant application is a reissue of US patent application No. 14/640,733, filed 2015-03-06, and issued as patent No. 9,340,223 on 2016-05-17, which claims the benefit of:

US provisional application No. 61/949,785, filed 2014-03-07,

US provisional application No. 61/949,758, filed 2014-03-07, and

US provisional application No. 62/129,100, filed 2015-03-06.

Signed and Sealed this
Twentieth Day of October, 2020



Andrei Iancu
Director of the United States Patent and Trademark Office