Commissioner's Decision #1364
Décision du Commissaire #1364

TOPIC: O00
SUJET: O00

Application No. : 2,150,781
Demande n^{o} : 2,150,781

IN THE CANADIAN PATENT OFFICE

DECISION OF THE COMMISSIONER OF PATENTS

Patent application number 2,150,781 having been rejected under subsection 30(3) of the *Patent Rules*, has consequently been reviewed in accordance with paragraph 30(6)(*c*) of the *Patent Rules* by the Patent Appeal Board and the Commissioner of Patents. The findings of the Board and the ruling of the Commissioner are as follows:

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INTRODUCTION

[1] Patent application number 2,150,781, entitled “Selective Herbicidal Composition” was rejected by the Examiner because the claimed invention was considered obvious in view of a number of prior art publications.

[2] The application was referred to the Patent Appeal Board for review. This review is based on the prosecution record, including the reports exchanged between the Examiner and Applicant, the Applicant’s written submissions and those submissions presented during the hearing which took place on December 6, 2013.

[3] For the reasons that follow, we recommend that the application be refused.

BACKGROUND

[4] The present application is for a herbicidal combination of the safener Benoxacor and the herbicide S-Metolachlor which selectively controls weeds in crops of cultivated plants. The use of chemical herbicides for weed control is an important part of crop production, but crops can also suffer severe damage as a result of herbicide exposure. Safeners are agents that protect the crop from herbicide injury. They act internally (i.e. inside the protected plant) in a manner that increases the tolerance of the crop plant to the herbicide. As a result, when the herbicide and safener are applied together to the weeds and crops, injury of the crop is minimized.

[5] According to the Examiner’s Summary of Reasons [SOR], it would have been obvious to the person skilled in the art at the claim date to protect crops from damage by S-Metolachlor by using it in combination with Benoxacor. The Applicant disputed this allegation and in addition produced a declaration containing evidence of an unexpected advantage provided by the combination. However, the Applicant maintained throughout prosecution that even without the additional evidence, the claimed invention would not have been obvious. The Examiner declined to give this evidence any weight because the advantage demonstrated in the declaration was not disclosed in the original specification.

[6] There are two main points of dispute to consider. The first is whether the advantage demonstrated in the declaration was disclosed in the original application. The second is

whether the claimed invention is obvious.

THE ISSUES

[7] This review addresses two questions:

(1) Is the advantage in the declaration disclosed in the application?
(2) Are the claims obvious?

[8] Since the admissibility of the declaration is in dispute, we will address the evidence in the declaration before carrying out our obviousness analysis.

[9] Obviousness of the invention is determined based on the subject matter defined by the claims, therefore we will begin by purposively construing the claims.

PURPOSIVE CONSTRUCTION

[10] Claims are construed in an informed and purposive manner from the viewpoint of the notional "person skilled in the art" in light of that person's common general knowledge. This is done to objectively determine what the skilled person would have understood the scope of the claims to be based on the particular terms used in the claim. Only then can the elements of the claimed invention be identified as either essential or non-essential (*Free World Trust v Electro Santé Inc*, 2000 SCC 66, [*Free World Trust*] at para. 50). Construction is based on the patent specification itself without resort to extrinsic evidence (*Free World Trust* at para. 66).

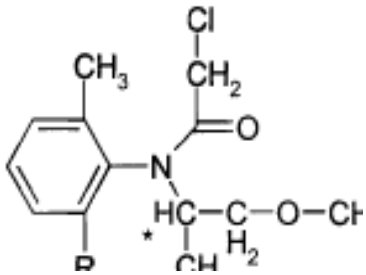
[11] As with purposive construction, the four-step approach to obviousness set out by the Supreme Court in *Apotex Inc v Sanofi-Synthelabo Canada Inc*, 2008 SCC 61 [*Sanofi*] also mandates an analysis from the viewpoint of the person skilled in the art in light of that person's common general knowledge. To avoid duplicating discussions of the skilled person and their common general knowledge, we will simply refer back to this section during our *Sanofi* obviousness analysis.

[12] In reviewing the arguments, it is clear that there are a number of terms that require consideration. To provide context, we will start by introducing the claims.

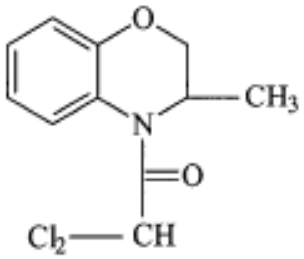
The Claims

[13] There are four claims on file, claims 1 and 2 are the only independent claims. Claim 1 of the application is as follows:

> 1. A composition for the selective control of weeds in crops of cultivated plants, comprising, in addition to inert carriers and adjuvants, as active component, a mixture of
>
> a) a herbicidally effective amount of an α-RS-1'S(-)N-(1'-methyl-2'-methoxyethyl)-N-chloracetyl-2-ethyl-6-methylaniline distereomeric pair of compounds of formula (I)



> wherein R_0 is ethyl and
> b) to antagonize the herbicide, an antidotally effective amount of a compound of formula III as safener.



(III)

[14] The compound of formula (I) in the claims can more conveniently be identified by its chemical name "S-Metolachlor", and the compound of formula III as "Benoxacor". The claim can thus be more conveniently written as:

> 1. A composition for the selective control of weeds in crops of cultivated plants,

> comprising, in addition to inert carriers and adjuvants, as active component, a mixture of
> a) a herbicidally effective amount of the diastereomeric pair of compounds of S-Metolachlor and
> b) to antagonize the herbicide, an antidotally effective amount of Benoxacor as safener.

[15] Using this same shorthand, claim 2 is directed to:

> 2. A method of selectively controlling weeds and grasses in crops of cultivated plants, which comprises treating said plants, the seeds or the locus thereof, concurrently or separately, with an effective amount the diastereomeric pair of compounds of S-Metalochlor and, to antagonize the herbicide, an antidotally effective amount of Benoxacor as safener.

[16] We note that claim 2 uses broader language that allows the S-Metolachlor and Benoxacor to be formulated and applied either separately or together, unlike claim 1 where the active agents are necessarily formulated together.

[17] Claims 3 and 4 are dependent claims which refer back to claim 2. Claim 3 defines specific amounts of Benoxacor and S-Metolachlor, and claim 4 narrows the definition of cultivated plant to "maize."

[18] An additional dependent claim, claim 5, was proposed by the Applicant prior to the hearing. In accordance with the Applicant's wishes expressed at the hearing, the patentability of the proposed claim will only be considered in the event the claims on file are found to be defective.

The Person Skilled in the Art and the Common General Knowledge

[19] The Examiner prepared a Final Action that follows the four-step *Sanofi* framework. According to the Final Action, the skilled person is "A biologist or chemist knowledgeable in crop science." Since the Applicant did not dispute this characterization of skilled person, and this definition is reasonable in view of the teachings of the description, we accept this definition.

[20] Two statements pertaining to the common general knowledge were made in the Final Action. The first is that a "person skilled in the art would know that benoxacor protects

cultivated plants from the phytotoxic effects of racemic metolachlor." The second is that the skilled person "would know that racemic metolachlor is composed of R- and S-metolachlor." Neither of these statements were disputed by the Applicant.

[21] We accept these statements of common general knowledge. The first statement finds support in each of documents D2-D6 cited by the Examiner in the obviousness analysis in the following section (these documents are discussed starting at paragraph [61]). Regarding the second statement, we agree it was common general knowledge that Metolachlor was a racemic mixture composed of four individual compounds, two "R" and two "S", and that the structures of these four compounds were known to the skilled person. This is evident from the background section of document D1, a disclosure of S-Metolachlor which is referred to in the Applicant's description and is cited as prior art by the Examiner in the next section (this document is discussed starting at paragraph [59]). This second statement is further supported by an earlier publication by the same author which is referenced on the cover of D1[1]. That document shows the individual structures of these four compounds were known in 1982. These compounds, which are referred to as the αS,1'S, αR,1'S, αR,1'R and αS,1'R compounds, are pictured below in Figure 1.

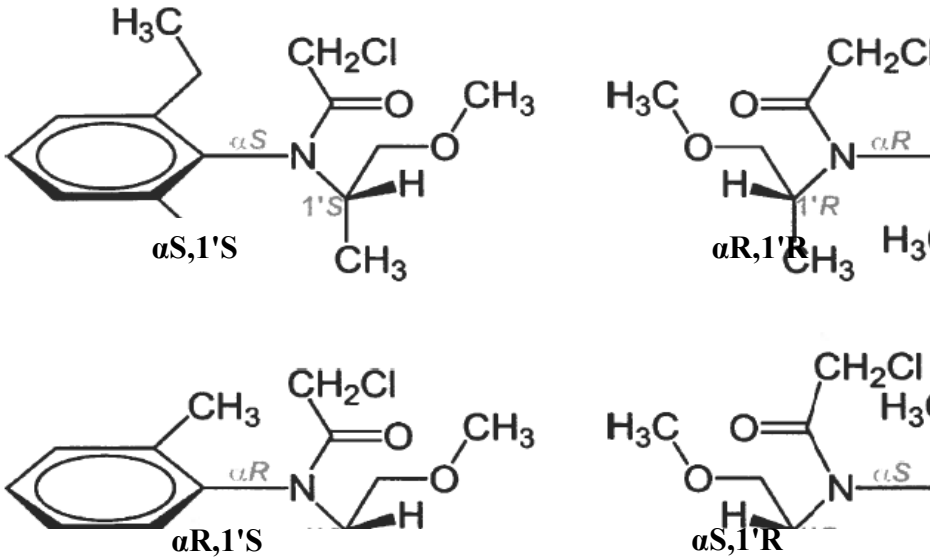


Figure 1 – The four compounds of racemic Metolachlor

[22] In order to understand the meaning and scope of S-Metolachlor used in the claims, and the

[1]Moser et al., Z. Naturforsch, 87B, pp. 451-462 (1982)

relationship between S-Metolachlor and racemic Metolachlor, we will provide a brief explanation. The term "racemic" indicates a mixture of distinct compounds which differ only in that they are each other's mirror image. The Metolachlor compound contains two points of asymmetry; a "chiral centre" (which is denoted by the asterisk in formula I above at [13]), and a "chiral axis" which runs along the bond between the nitrogen atom and the phenyl ring. With two points of asymmetry, racemic Metolachlor contain four distinct compounds, or diastereomers as they are termed in the art. These are shown in Figure 1.

[23] As stated in the claims, S-Metolachlor is made up of two compounds: a pair of diastereomers. Those two compounds account for 50% of racemic Metolachlor: the αS,1'S and αR,1'S compounds pictured on the left hand side of Figure 1. By contrast, R-Metolachlor contains the αR,1'R and αS,1'R compounds pictured on the right hand side of Figure 1, and racemic Metolachlor contains all four.

[24] As mentioned in the background, safeners are agents that protect crops from herbicide injury. As a point of clarification, the Benoxacor is defined in the claims as a "safener" there to "antagonize" the herbicide and is present in an "antidotally" effective amount. These are terms of the art used synonymously and interchangeably. This is consistent with the first page of the originally filed description which equates the terms "safener" and "antidote", and states the safener is able to "antagoni(z)e the harmful action of the herbicide on the cultivated plant, i.e. to protect the cultivated plant while leaving the herbicidal action on the weeds to be controlled virtually unimpaired." These definitions are also consistent with those provided in the Merriam-Webster Dictionary for "antidote" and "antagonize" which are "a remedy to counteract the effects of poison", and "to act in opposition to: counteract", respectively. The person skilled in the art would immediately recognize the purpose of the safener is to counteract the effects of the herbicide for the protection of the crop.

[25] The meaning and scope of "selectivity", or the "selective control of weeds in crops of cultivated plants" used in the claims was in dispute. According to the Examiner, the "selectivity" was limited to the ability of the combination to <u>protect</u> cultivated plants, but not weeds, from the herbicide, as disclosed in the first paragraph of the original description:

> The present invention relates to a selective herbicidal composition for controlling grasses and weeds in crops of cultivated plants...which composition comprises a herbicide and a safener (antidote) and protects the cultivated plants, but not the weeds, from the phytotoxic action of the herbicide.

[26] According to the Applicant, that construction is too narrow. At the hearing, the Applicant also pointed to page 1 of the original description which repeatedly refers to selectivity. The Applicant submitted a person skilled in the art at the claim date would have construed "selectivity" to mean "differential killing activity". It is a general indication that "one is selected over the other"; the weeds are killed, but not the plants.

[27] We accept Applicant's submission and conclude that the person skilled in the art at the claim date would have understood the term "selectivity" as a general indication of a difference in the killing activity towards the weed and the crop. This is consistent with the teachings of document D1 (*supra* at [21], *infra* at [59]) which describes a herbicide that exhibits differential killing activity towards the weed and crop as "selective" even though it does not contain a safener or provide any element of protection.

Inventive Concept or Essential Elements

[28] The appropriate framing of the "inventive concept" of the claims, as it is used within the framework of the *Sanofi* obviousness analysis, was in dispute. In the Final Action, the Examiner identified the inventive concept of the claims as "the use of benoxacor as a safener to protect cultivated plants, but not weeds, from the phytotoxic effects of S-metolachlor."

[29] In response to the Final Action, the Applicant submitted they were entitled to examination of the subject matter defined by the plain language of the claims, finding it unnecessary to rely on "some abstract notion of an inventive concept." According to the Applicant, the plain language of the independent claims reveals the following:

> Claim 1 is directed to a composition for the "selective control of weeds in crops of cultivated plants" the composition including S-Metolachlor and Benoxacor. Claim 2 is directed to a method of "selectively controlling weeds and grasses in crops of cultivated plants" which comprises treating the plants, seeds, or the locus thereof concurrently or separately with S-Metolachlor and Benoxacor.

[30] Notably, the inventive concept presented by the Examiner omits reference to the "selective control of weeds in crops of cultivated plants", and the Applicant's paraphrasing of the claims omits the role of Benoxacor as a safener, to antagonize the herbicide. The Applicant further submits:

> On a purposive construction, the skilled person would readily understand that the

> claimed invention concerns the use of the combination of S-Metolachlor and Benoxacor when growing crops so that the crop can grow without being harmed by the herbicide but the herbicide prevents the proliferation of weeds. This could involve e.g. killing emergent weeds or inhibiting the germination of weeds from seeds. Claim 2, directed to a method of selectively controlling weeds and grasses in crops of cultivated plants, specifies the S-Metolachlor and Benoxacor can be used to treat the plants, the seeds or the locus thereof. The skilled person understands this means that the compounds may be applied to plants that have emerged from the soil, to seeds of the plants prior to sowing, or e.g. the soil.

[31] Once again, the express identification of the role of Benoxacor as a safener was omitted. At the hearing, the Applicant submitted Benoxacor is more appropriately identified in terms of its role in increasing the selectivity of the herbicide than as a safener, explaining that if you "safen" both the crop and the weed, nothing is achieved. The point is to increase selectivity.

[32] In our view, that statement is not consistent with the plain language used in the independent claims which explicitly defines the role of Benoxacor as an antidote, an antagonist and a safener. Given the fact that three synonyms were used in the claims to make this point, due consideration must be given to the role of Benoxacor as a safener.

[33] In the present case, we do not find the inventive concept to be different from the essential elements of the subject matter defined by the claims. Since the Examiner never suggested that any of the elements of the claimed invention were non-essential, and we have no reason to conclude otherwise, we will proceed on the basis that all of the elements of the claims are essential. All of claims 1-4 on file were found to be defective by the Examiner. Neither the Examiner nor the Applicant drew a distinction between these claims, and so we will base our analysis on the plain language of independent claim 2, which we consider to be representative of the other claims. The claims will stand or fall together with the outcome of our analysis.

[34] Consistent with the subject matter defined by the plain language of the claim, we find claim 2 has the following essential elements; i) a method of selectively controlling weeds and grasses in crops of cultivated plants, ii) by treating the plants, the seeds or the locus thereof, concurrently or separately, with iii) an effective amount of S-Metolachlor, and iv) to antagonize the herbicide, an antidotally effective amount of Benoxacor as a safener.

ISSUE (1) IS THE ADVANTAGE IN THE DECLARATION DISCLOSED IN THE APPLICATION?

[35] As mentioned, during prosecution the Applicant submitted evidence of an unexpected advantage. Under the conditions of the experiment carried out in what became known as the "Ruegg declaration", named for the experimenter, the Benoxacor was shown to enhance the herbicidal effect of the S-Metolachlor, reducing germination of the weed tested, *C. album* (*aka* common lambsquarters), by half compared to use of S-Metolachlor alone.

[36] According to the SOR, the evidence in the Ruegg declaration is inadmissible because it discloses an advantage that has no basis in the originally filed specification, the advantage being: the ability of the combination to reduce weed germination. Moreover, it is clear from the declaration that the experiments were carried out after the claim date, and so the results "detailed in the declaration could not have been known as of the claim date(s)."

[37] We invited the Applicant to make submissions on this second point as it relates to *Novopharm Ltd v Janssen-Ortho Inc*, 2007 FCA 217 [*Novopharm*] and the weight afforded to advantages of a claimed invention recognized only after the date of invention, when considering inventive ingenuity.

[38] In *Janssen-Ortho Inc v Novopharm Ltd*, 2006 FC 1234, the case under appeal in *Novopharm*, Justice Hughes proposed a list of factors to guide the obviousness inquiry. He included "subsequently recognized advantages" as a secondary factor, but warned this is "a factor of limited usefulness in considering inventive ingenuity and should be given little weight." This list of factors was reproduced in *Novopharm*, but Justice Sharlow removed "subsequently recognized advantages", providing the following explanation:

> I find it difficult to envisage a situation where a subsequently recognized advantage to a claimed invention would be of any assistance in determining whether inventive ingenuity was required to make it...I recognize that it is impossible to imagine every possible situation, but given the current state of the jurisprudence I would be inclined to give this factor no weight except in the most extraordinary case. (para. 26)

[39] The Applicant submitted it is clear that the law does not require all data of the disclosed advantages to be contained in the application, and that evidence confirming an advantage that is disclosed in the original specification is admissible regardless of when the tests were carried out. The Applicant distinguished their case from *Novopharm*, which considered evidence of a different use of the compound than that disclosed in the application. According to the Applicant, it is appropriate to consider the Ruegg declaration as it is

evidence of an advantage disclosed in the original application, the advantage being: the selectivity of the combination in killing weeds very effectively while protecting the crop from the herbicide. Moreover, they submit the evidence independently forms a basis for patentability.

[40] The question, then, is whether or not the evidence in the Ruegg declaration is a demonstration of an advantage disclosed in the original specification. Before this determination can be made, we must first identify what the advantage is, since this is also in dispute.

Determining the Advantage

[41] According to the Examiner, the advantage is the unexpected ability of the combination to inhibit weed germination, which the Examiner maintained is not part of the specification.

[42] In contrast, the Applicant maintained the advantage demonstrated in the declaration was selectivity, or more precisely it is the superior degree of selectivity of the combination attributed to the revelation that Benoxacor enhances the herbicidal activity of S-Metolachlor on the weed. At the hearing, the Applicant emphasized it is the amplification or increase in herbicidal activity by Benoxacor that needs to appreciated. The Benoxacor is not safening the weed at all, it kills more of the weed. This goes against the expectation that the Benoxacor would either have no effect on the weed, or would have a safening effect.

[43] The Applicant disputes the Examiner's interpretation, stating that inhibiting "weed germination" is a very narrow parsing of the invention, which includes killing weeds regardless of their stage of development. Moreover, the Applicant submits that pre-emergence applications to seeds and soil is within the specification. Likewise, the Examiner disputes Applicant's interpretation, saying that to call the advantage "selectivity" is overly broad.

[44] We agree with both the Applicant and the Examiner, but neither completely so. We agree with the Applicant that the Examiner's interpretation is overly narrow. In our view, upon reading the original specification, the person skilled in the art would have considered "controlling weeds and grasses" to include killing weeds at any stage of development, including the germination stage. However, we also agree with the Examiner that the Applicant's interpretation that the advantage is selectivity is overly broad.

[45] According to the Applicant, the Ruegg declaration demonstrates the "selectivity of the claimed combination—i.e. its ability to target weeds while protecting cultivated plants of interest—which is an advantage disclosed in the application as filed." The Applicant submits the increased herbicidal activity on weeds taken together with the excellent safening on maize provides for the surprising and unexpected selectivity of the claimed composition. The Applicant submitted it is the superior selectivity, or the degree of selectivity, which is the advantage demonstrated in the Ruegg declaration and there can be no doubt selectivity is disclosed in the original application.

[46] We do not find these statements to be consistent with the specification. We were unable to find any passages in the description relating to superior selectivity, the degree of selectivity of the combination, or any indication that relates selectivity to an increased herbicidal action of the combination against weeds. Moreover, Applicant's submission that the selectivity—as an advantage disclosed in the application as filed—is provided for in part by the ability of Benoxacor to increase herbicidal activity against weeds is not consistent with the preferred embodiment of the description which encourages preventing contact between the weed and the Benoxacor during treatment. The description indicates on page 15 that seed dressing or treatment of the germinated seedlings are "the naturally preferred methods of application" because Benoxacor and S-Metolachlor are applied separately in such a way that avoids contacting the weed with Benoxacor. This way, all of the safener is concentrated on the crop only.

[47] During the course of our review, we invited the Applicant to provide comments reconciling this teaching with their position that the increased herbicidal activity achieved using both S-Metolachlor and Benoxacor on weeds, demonstrated in the declaration, was an advantage based in the original description. According to the Applicant, the "specification acknowledges that this is naturally a preferred method as the safener is fully concentrated on the target crop. However, this may not always be practicable in view of other considerations" (our emphasis added), so other means of application such as by tank mixture where the S-Metolachlor and Benoxacor are formulated together are also disclosed.

[48] In our view, if the selectivity as disclosed in the original description was to be attributed to the ability of Benoxacor to both protect the crop and to increase the herbicidal effect of S-Metolachlor on weeds, as submitted, it is unlikely the description would advise the skilled reader to avoid contacting the weeds with Benoxacor whenever "practicable."

[49] Throughout the specification, the selectivity is consistently related to the protection of the cultivated plants, but not the weeds, from the phytotoxic action of the herbicide. Based on these teachings, the skilled reader would not have understood "selectivity" to include increased herbicidal activity; they would have attributed the selectivity to the differential protection of the crop, but not the weed. We, therefore, cannot give weight to the argument that the advantage demonstrated in the Ruegg declaration relates to "selectivity" as described in the original specification.

[50] We conclude that the person skilled in the art would consider the advantage demonstrated in the declaration to be the amplification of the herbicidal activity of S-Metolachlor on weeds caused by Benoxacor. This is consistent with Applicant's statements at the hearing that what needs to be appreciated from the declaration is that Benoxacor does not safen the weed at all—it kills more of the weed (see [42] above).

Was the Advantage Disclosed?

[51] At no point in the original specification is the advantage of using Benoxacor described in relation to its ability to increase the activity of the herbicide. In fact, Benoxacor is consistently described as a safener, without exception. This is particularly evident in the language of the independent claims, where three different synonyms are used to define the use of Benoxacor as a safener to provide protection from the herbicide. For this reason, we are led to the conclusion that the advantage demonstrated in the Ruegg declaration is a separate advantage that goes beyond the four corners of the specification.

[52] There is one last argument to address. The Applicant submitted that proposed claim 5 is based on the evidence of the Ruegg declaration, and since it finds full support in the description, it necessarily relates to an advantage disclosed in the application as filed. Proposed claim 5 is:

> The method according to any one of claims 2 to 4, comprising treating said plants, the seeds or the locus thereof, with an aqueous formulation comprising the diastereomeric pair of compounds of S-Metolachlor and Benoxacor, at the pre-emergence stage.

[53] We agree with the Applicant that proposed claim 5 finds full support in the description, however we do not agree that it relates to the advantage disclosed in the Ruegg declaration. Proposed claim 5 says nothing about the amplification of the herbicidal activity on weeds

caused by Benoxacor. Moreover, claim 5 depends on claim 2, which explicitly and distinctly defines the role of Benoxacor as a safener, to antagonize the herbicide, in an antidotally effective amount.

[54] Based on the evidence before us, we consider the advantage demonstrated in the declaration was not disclosed in the original specification. It is therefore reasonable to conclude it was a subsequently recognized advantage. Since the Applicant did not provide submissions that this is an "extraordinary case" as in *Novopharm*, this evidence will not be given any weight in the obviousness analysis that follows.

ISSUE (2) ARE THE CLAIMS OBVIOUS?

[55] Section 28.3 of the *Patent Act* sets out the information that may be considered in assessing whether a claim is obvious:

> The subject-matter defined by a claim in an application for a patent in Canada must be subject-matter that would not have been obvious on the claim date to a person skilled in the art or science to which it pertains, having regard to
>
> (a) information disclosed more than one year before the filing date by the applicant, or by a person who obtained knowledge, directly or indirectly, from the applicant in such a manner that the information became available to the public in Canada or elsewhere; and
>
> (b) information disclosed before the claim date by a person not mentioned in paragraph (a) in such a manner that the information became available to the public in Canada or elsewhere.

[56] Our obviousness assessment follows the four-step approach set out *Sanofi*:

> (1) (a) Identify the notional "person skilled in the art";
> (b) Identify the relevant common general knowledge of that person;
>
> (2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;
>
> (3) Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed;
>
> (4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

Analysis

Step 1: Identify the notional "person skilled in the art" and the relevant common general knowledge of that person

[57] This first step is common to our claim construction and has been defined in the previous section at [19], [20] and [21].

Step 2: Identify the inventive concept of the claim in question or if that cannot readily be done, construe it

[58] As discussed in the previous section at [34], the essential elements of claim 2 are:
i) a method of selectively controlling weeds and grasses in crops of cultivated plants,
ii) by treating the plants, the seeds or the locus thereof, concurrently or separately, with
iii) an effective amount of S-Metolachlor, and
iv) to antagonize the herbicide, an antidotally effective amount of Benoxacor as a safener.

Step 3: Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed

Document D1

[59] Document D1 is US patent application 5,002,606 to Moser *et al.* In D1, the S-Metolachlor is isolated and compared to racemic Metolachlor. The application refers to D1 on page 11 for instructions on preparing S-Metolachlor in accordance with the present invention. The inventors of D1 found the αS,1'S and αR,1'S compounds, which is S-Metolachlor, had superior herbicidal activity against weeds compared to the mixture of all four compounds of racemic Metolachlor, without having increased phytotoxicity towards cultivated plants (col. 3, lines 50-57). It is suggested that S-Metolachlor "may therefore be formulated in known manner to herbicidal compositions and used for controlling weeds in cultivated plants." Moreover, the S-Metolachlor was said to be far more selective compared to racemic Metolachlor since it was also better tolerated by maize and soybean. For most of the rates of application tested, the S-Metolachlor damaged weeds without harming the specific crops tests. Pre- and post-emergence applications were disclosed in D1.

[60] The key difference between the essential elements of the claim and D1 is the absence of Benoxacor, or any safener for that matter. The S-Metolachlor is used alone.

Documents D2-D6

[61] In the SOR, the Examiner states that the prior art documents D2-D6[2,3] each independently

[2]See the Appendix for full citations of these journal articles

disclose the use of the herbicide racemic Metolachlor in combination with Benoxacor to protect corn crops from the phytotoxic effects of the Metolachlor. We note that although the term "selectivity" is only used to describe the combination in D2, the person skilled in the art would immediately recognize that by virtue of the protective effect of Benoxacor on corn crops, the above combinations are all selective. We further note that these documents teach both concurrent and separate treatments of corn plants with racemic Metolachlor and Benoxacor.

[62] In addition, the panel notes that each of documents D2-D5 also disclose the mechanism of how Benoxacor protects corn crops from injury by the compounds of racemic Metolachlor: exposure to Benoxacor increases activity of the glutathione *S*-transferase (GST) enzymes in the corn. The GST enzymes catalyze a reaction between the compound glutathione (GSH), which is naturally produced in corn plants, and phytotoxic Metolachlor compounds absorbed by the plant. This reaction converts the compounds of racemic Metolachlor to non-toxic conjugates that are safely processed and eliminated without harming the crop plant. This process is referred to as detoxification.

[63] Document D3 explains these conjugates are produced by a standard "nucleophilic substitution reaction", i.e. a reactive electron-rich "nucleophile" attacks a vulnerable electron-poor "electrophile" to form a more stable compound. The nucleophile in this case is GSH, and it attacks the Metolachlor compound at the electron-poor carbon atom substituted by chloro (Cl) at the periphery of the molecule shown in Formula I (at [13]). This is the reaction pathway of the detoxification of the racemic Metolachlor compounds in corn.

[64] The Applicant singled out document D4 as the most relevant reference cited by the Examiner. This document demonstrates the effects of the combination on both crops and weeds. The panel notes that a formulation containing both Benoxacor and racemic Metolachlor, applications at the pre-emergence stage, and specific amounts of the herbicide and safener are all disclosed in a manner consistent with the dependent claims.

[65] The key difference between the essential elements of the claim and D2-D6 is that Benoxacor is used to safen racemic Metolachlor, instead of S-Metolachlor. None of these documents disclose S-Metolachlor or its use.

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[3]In accordance with Applicant's written submissions of January 16, 2014, document D7 has not been considered in our analysis since it does not disclose Benoxacor

Step 4: Do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

[66] The Examiner and the Applicant disagree on the question of whether it would have been obvious for the skilled person to arrive at the subject matter of the claims.

[67] According to the Final Action, it would be obvious for a person skilled in the art to substitute the less effective racemic Metolachlor with the more effective S-Metolachlor in the combinations taught in D2-D6 which benefited from the safening effects of Benoxacor. Moreover, the Examiner takes the position in the SOR that the specification teaches no results beyond what the skilled person would expect.

[68] The Applicant disputed that the cited references, or any combination thereof, teach or suggest substituting the S-Metolachlor of D1 for racemic Metolachlor taught in the combinations of D2-D6, citing *Beloit Canada Ltd v Valmet OY* (1986) 8 CPR (3d) 289 (FCA). At the hearing, the Applicant submitted that since the documents do not refer to one another, and it is not obvious to combine them instead of using a different safener or a different herbicide, it is only with hindsight analysis of the present invention that this combination can be made. Moreover, the results disclosed in the application as filed showing the marked reduction in damage to maize (corn) when S-Metolachlor was used in combination with Benoxacor could not have been expected.

[69] While it is true that the documents do not refer to one another, in our view the person skilled in the art would have found it obvious to replace racemic Metolachlor with the more active S-Metolachlor of D1 in the combination using the Benoxacor safener taught in each of D2-D6.

[70] It is clear that D1 teaches and suggests using S-Metolachlor in place of racemic Metolachlor; they are directly compared and S-Metolachlor is said to be the superior herbicide. Moreover, we conclude the person skilled in the art would have expected corn treated with Benoxacor to detoxify S-Metolachlor in the same way it detoxifies racemic Metolachlor. We explain how we arrived at this conclusion in the following section.

Mechanism of Protective Action: Conjugate Formation

[71] During the course of our review, we asked the Applicant whether the person skilled in the art would have expected the mechanism of action of Benoxacor to work in the same manner for S-Metolachlor as it does for racemic Metolachlor, as disclosed in the cited references.

[72] The Applicant submitted the mechanism of protective action was not relevant to the question of obviousness of the claimed subject matter. According to the Applicant, prior art documents D2-D5 disclose that "Benoxacor stimulates GST activity, thereby increasing conjugation of racemic Metolachlor to GSH, to produce **a** GSH-racemic Metolachlor conjugate or metabolite having reduced herbicidal activity (i.e. detoxified)." (our emphasis added) The Applicant submitted the skilled person might conclude that, in principle, Benoxacor could produce the same result with other herbicides that are detoxified by forming conjugates with GSH, but that since D1 does not describe or propose any mechanism of action for detoxification of S-Metolachlor this conclusion cannot be drawn. Further, even if it were assumed that S-Metolachlor is detoxified by conjugation to GSH, it would not have been obvious that the addition of Benoxacor to increase GST activity would have a beneficial effect, given that S-Metolachlor was already known to be more favourably selective than the racemic mixture.

[73] We disagree that the mechanism of protection is irrelevant to the question of obviousness. Also, we do not agree with Applicant's characterization of the conjugates formed in the prior art. It cannot be a single "GSH-racemic Metolachlor conjugate" that forms, as suggested.

[74] It has already been established that the person skilled in the art at the claim date knew racemic Metolachlor was made up of the four different compounds pictured in Figure 1 (at paragraph [21]). It is these four Metolachlor compounds that individually react with GSH to form four distinct GSH-Metolachlor conjugates. Since it was known from D2-D5 that the compounds of racemic Metolachlor react with GSH in this way, and compounds of S-Metolachlor are among the compounds of racemic Metolachlor, it is indeed reasonable to conclude the skilled person would have expected the same mechanism of action for the detoxification of S-Metolachlor. This is supported by the teaching of the reaction pathway in D3: since all four compounds, including the two of S-Metolachlor, contain the same vulnerable electron-poor site at the periphery of the molecule, the person skilled in the art would have expected the detoxification to proceed in the same manner for all four

compounds.

[75] Based on the references cited, and in view of our analysis above, the subject matter of the claims would have been obvious to a person skilled in the art at the claim date.

[76] Before we consider the proposed claim and conclude our analysis, the Applicant made one last argument we must address.

The Three Year Period Before The Claim Date: 1991-1994

[77] One final argument was presented by the Applicant. Documents D1 and D4—singled out as the most relevant references by the Applicant—were each published in 1991. The Applicant submitted if it was obvious to combine S-Metolachlor and Benoxacor, the Examiner should have been able to find a reference teaching or suggesting the combination in the period between the publication of these documents in 1991 and the earliest priority date of the application, which is June 3, 1994.

[78] In our view, when considering all of the prior art references relied upon, we do not find that a significant period of time elapsed between the publication of the asserted prior art and the claim date. In fact, documents D2 and D3 of record which were part of the above analysis were both published within the period in question, in 1993. The relevant state of the art was still developing until 1993, and the correct legal test is whether the invention was obvious on the claim date in 1994, not in 1991.

Proposed Claim 5

[79] The claims on file have been found defective, and so we will consider the additional claim 5 proposed by the Applicant.

> Claim 5. The method according to any one of claims 2 to 4, comprising treating said plants, the seeds or the locus thereof, with an aqueous formulation comprising the diastereomeric pair of compounds of S-Metolachlor and Benoxacor, at the pre-emergence stage.

[80] The only feature claim 5 contains over the claims on file is that the treatment is applied at the pre-emergence stage. Since this feature is taught in the references cited, combining it with the other features of the claimed method does not indicate an inventive step.

CONCLUSIONS ON OBVIOUSNESS

[81] The claims on file, and proposed claim 5, would have been obvious to the person skilled in the art on the claim date in view of the references cited.

RECOMMENDATION OF THE BOARD

[82] We recommend that the application be refused for lack of compliance with section 28.3 of the *Patent Act*, since the claims are obvious.

Cara Weir	Mark Couture	Christine Teixeira
Member	Member	Member

DECISION OF THE COMMISSIONER

[83] I concur with the findings and the recommendation of the Board. I hereby refuse the application.

[84] Under section 41 of the *Patent Act*, the Applicant has six months within which to appeal my decision to the Federal Court of Canada.

Sylvain Laporte
Commissioner of Patents

Dated at Gatineau, Quebec
this 17 day of April, 2014

APPENDIX

Journal Articles Referenced in the Decision

D2: Fuerst et al., "Partial Characterization of Glutathione *S*-Transferase Isozymes Induced by the Herbicide Safener Benoxacor in Maize", Plant Physiol., vol 102, 1993, pp. 795-802.

D3: Irzyk et al., "Purification and Characterization of a Glutathione *S*-Transferase from Benoxacor-Treated Maize (*Zea Mays*)", Plant Physiol., vol. 102, 1993, pp. 803-810.

D4: Rowe et al., "Efficacy and Mode of Action of CGA-154281, A Protectant for Corn *(Zea mays*) from Metolachlor Injury", Weed Science, vol. 39, 1991, pp. 78-82.

D5: Viger et al., "Effects of CGA-154281 and Temperature on Metolachlor Absorption and Metabolism, Glutathione Content, and Glutathione-*S*-Transferase Activity in Corn *(Zea mays*)", Weed Science, vol. 39, 1991, pp. 324-328.

D6: Viger et al., "Influence of Available Soil Water Content, Temperature, and CGA-154281 on Metolachlor Injury to Corn", Weed Science, vol. 39, 1991, pp. 227-231.

D7: Edwards et al., "Regulation of glutathione S-transferases of *Zea mays* in plants and cell cultures", Planta, vol. 175, 1998, no.1, pp. 99-106.