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Datasheet for the decision of 24 January 2014

Case Number: T 1847/09 - 3.3.07

Application Number: 02786715.9

Publication Number: 1455750

IPC: A61K9/00, A61K31/728

Language of the proceedings: EN

Title of invention:
VISCOELASTIC OPHTHALMIC COMPOSITIONS COMPRISING HYALURONIC ACID AND CHONDROITIN SULPHATE

Patent Proprietor:
Alcon, Inc.

Opponent:
LABORATOIRES DE CONTACTOLOGIE APPLIQUEE - LCA

Headword:

Relevant legal provisions:
EPC Art. 54(2), 100(a)
RPBA Art. 13(1)

Keyword:
Late-filed objection - admitted (no)
State of the art - availability to the public (no)
Inventive step - (yes)

Decisions cited:

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Case Number: T 1847/09 - 3.3.07

D E C I S I O N
of Technical Board of Appeal 3.3.07
of 24 January 2014

Appellant: (Opponent)	LABORATOIRES DE CONTACTOLOGIE APPLIQUEE - LCA Les Propylées 9 Allée Prométhée 28000 Chartres (FR)
Representative:	CAPRI 33, rue de Naples 75008 Paris (FR)
Respondent: (Patent Proprietor)	Alcon, Inc. Bösch 69 6331 Hünenberg (CH)
Representative:	Teipel, Stephan Lederer & Keller Patentanwälte Unsöldstrasse 2 80538 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 14 July 2009 rejecting the opposition filed against European patent No. 1455750 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman: J. Riolo
Members: D. Semino
P. Schmitz

Summary of Facts and Submissions

I. The appeal of the opponent (appellant) lies against the decision of the opposition division announced at the oral proceedings on 25 June 2009 to reject the opposition against European Patent 1 455 750. The granted patent stemmed from an application filed on 13 November 2002 and claiming the priority date of 21 December 2001 and comprised 6 claims, claim 1 reading as follows:

"1. A sterile, aqueous viscoelastic composition for use in ophthalmic surgical procedures, comprising a combination of hyaluronic acid and chondroitin sulfate, or ophthalmically acceptable salts thereof, in an ophthalmically acceptable vehicle, wherein the hyaluronic acid or ophthalmically acceptable salt thereof has a molecular weight of 1,500,000 to 1,900,000 daltons and is present at a concentration of 1.0% to 2.0% w/v; and wherein the chondroitin sulfate or ophthalmically acceptable salt thereof has a molecular weight of 20,000 to 100,000 daltons and is present at a concentration of 3 to 5% w/v."

II. A notice of opposition was filed against the granted patent requesting revocation of the patent in its entirety on the grounds of lack of novelty and lack of inventive step, in accordance with Article 100(a) EPC.

III. In the decision the following documents *inter alia* were cited:

D5: EP-A-0 136 782
D6: S. A. Arshinoff, "Viscoelastic substances: their properties and use when placing an IOL in the capsular

bag", Current Canadian Ophthalmic Practice, Vol. 4(2), 1986, pages 64, 65, 72, 73
D7: T. J. Liesegang, "Viscoelastic Substances in Ophthalmology", Survey of Ophthalmology, Vol. 34(4), 1990, pages 268-293
D9: M. Nishimura et al., "Role of chondroitin sulfate-hyaluronan interactions in the viscoelastic properties of extracellular matrices and fluids", Biochem et Biophysica Acta 1380, 1998, pages 1-9
D10: S. A. Arshinoff, "The use of ophthalmic viscosurgical devices in cataract surgery", Hyaluronan, volume 2, October 2002, pages 119-128
D11: Biomatrix Inc., "Viscosurgery: a historical perspective", Hyaluronan, Volume 2, October 2002, pages 461-465
D32: P. Vincent, "Performances rhéologiques comparées de COHÆRENS avec 2 autres solutions viscoelastiques intraoculaires"
D33: "Attestation" of P. Vincent

IV. The decision of the opposition division, as far as relevant to the present decision, can be summarised as follows:

a) Documents D10 and D11 were prior art under Article 54(2) EPC, in so far as they discussed background information.

b) The composition of granted claim 1 was novel over the disclosure of D5, as that document was silent over the molecular weights of the chondroitin sulfate and of the sodium hyaluronate and over the disclosure of D9, as it did not disclose combinations of hyaluronan and chondroitin sulfate of the claimed molecular weights and in the claimed concentrations.

c) The composition of claim 1 differed from the product Viscoat (as shown e.g. in D6 and D7), which was the closest prior art, in that the concentration of sodium hyaluronate was lower and its molecular weight was higher. The problem solved was the provision of an improved viscoelastic composition for use in ophthalmic surgical procedures, the improvement being an increased viscosity at low shear, a decreased viscosity at high shear and a higher cohesion-dispersion index. As there appeared to be no suggestions in the prior art to adapt the composition in the manner claimed to arrive at an improved composition, the subject-matter of claim 1 was inventive.

V. The appellant lodged an appeal against that decision. In the statement setting out the grounds of appeal the appellant contested the decision as far as inventive step was concerned.

VI. The patent proprietor (respondent) countered the arguments of the appellant in a letter of reply, where it was submitted *inter alia* that D11 was published after the priority date of the disputed patent and therefore did not belong to the state of the art.

VII. In a communication sent in preparation to oral proceedings the Board summarised the objections of the appellant and expressed its difficulties in understanding the changes in viscosity at high shear from the analysis of figure 1 in the patent alone. As to D11, reference was made to the case law regarding a published written disclosure which was based on an oral disclosure at a conference held some years earlier.

VIII. In reaction to that communication the respondent filed with letter of 9 August 2013 a table and a figure where the relevant viscosity data of figure 1 in the patent had been reproduced.

IX. Oral proceedings were held on 24 January 2014. During the oral proceedings the appellant contested for the first time the validity of the priority for granted claim 1.

X. The arguments of the appellant, as far as relevant to the present decision, can be summarised as follows:

Document D11 as state of the art

a) Document D11 was relevant for the analysis of inventive step, as it showed that the relationship of viscosity at low and high shear rates with the concentration and the molecular weight of hyaluronic acid was known. D11 was part of a book which was published in October 2002, but got back to a conference held in 2000. It contained information referring to the common general knowledge of the skilled person. In particular, figures 1 and 2 showed the known behaviour of hyaluronic acid solutions and were taken from a previous publication. On that basis the content of D11 was part of the state of the art.

b) If it was not accepted that the content of D11 (specifically figures 1 and 2) belonged to the common general knowledge, the document was in any case part of the state of the art, as the priority was not validly claimed, since the priority document did not cover the ranges indicated in

granted claim 1. This objection, even if raised only at the oral proceedings, was to be admitted, as the fact that the Board was inclined not to accept the content of D11 as belonging to the common general knowledge came as a surprise at the oral proceedings. Moreover, the lack of validity of the priority was identified only shortly before the oral proceedings before the Board.

Inventive step

c) The products disclosed in D9 were the closest prior art, as the document disclosed compositions comprising hyaluronic acid and chondroitin sulfate having ranges for the molecular weight of the two components and the concentration of chondroitin sulfate overlapping with those of granted claim 1 and mentioned the use in surgical ophthalmology and the enhancement in pharmacological actions. While no single composition had values of the molecular weight of the two components and of the concentration of chondroitin sulfate falling within the ranges, the only difference which could be acknowledged was the concentration of hyaluronic acid which was up to 0.8% in D9 and 1 to 2% in granted claim 1. No effect could be recognised with respect to D9 by virtue of the single available example, which could not support the presence of effects or advantages over the whole breadth of granted claim 1. In addition, any effect on viscosity at high shear rate could not be acknowledged in view of the small quantity of data, the lack of information on the measurement method and its measurement errors and the small difference in the viscosity values. As to the cohesion-dispersion index, that parameter had only

been used by the respondent and there was no general documentation with regard to its relevance and the values for prior art products. Moreover, it seemed to be related only to the presence of hyaluronic acid and to be proportional to its molecular weight. On that basis, the problem solved with respect to D9 could be considered only the provision of an alternative mixture with modified properties in surgical ophthalmology. The required change in the concentration of hyaluronic acid could not be seen as an inventive solution to that problem, as it was very small, the claimed range of concentrations overlapped with the values of many known products and it was known from D9 itself and D7 that an increase in the concentration of the hyaluronic acid resulted in an increase in viscosity. Moreover, it was known from D32 that with values of the molecular weight and of the concentration of hyaluronic acid within the claimed ranges a high viscosity at low shear rate and a low viscosity at high shear rate could be obtained.

d) The commercial product Viscoat, disclosed e.g. in document D6 and known to be used for the same purpose as the claimed composition, could also be taken as the closest prior art. The product of granted claim 1 differed therefrom in that it comprised hyaluronic acid with a lower concentration and a higher molecular weight. The data available could not justify the acknowledgement of an improvement over the whole breath of the claim for the same reasons as detailed with respect to D9 and the solved problem remained the same. The modifications of the molecular weight and of the concentration of

hyaluronic acid were not inventive for the same reasons as given for D9 and in particular in view of the product of D32, which showed the desired effects on viscosity at low shear rate and high shear rate with a low concentration and a high molecular weight for the hyaluronic acid.

e) The product of D5 could also be seen as a proper starting point. The only difference with respect to it related to the values of the molecular weight of the two components, as those values were not given in the document. The problem with respect to D5 was the choice of appropriate values of the molecular weights in order to optimise the product properties. The ranges in granted claim 1 were well known in products used in the field, as shown e.g. by document D9.

XI. The arguments of the respondent, as far as relevant to the present decision, can be summarised as follows:

Document D11 as state of the art

a) D11 was based on a conference held in 2000, but was published two years later. There was no evidence of what was actually disclosed at the conference. While some of the information could be accepted as common general knowledge, as shown also by other documents, it was not known what was added in D11 with respect to the presentation at the conference. Moreover, the interpretation of figures 1 and 2 given by the appellant surely went beyond the common general knowledge at the priority date. On that basis document D11 could not be considered as state of the art.

b) It was surprising to hear that the validity of the priority was contested for the first time at the oral proceedings, all the more as the objection related to the question whether D11 belonged to the state of the art, which had been under dispute since the beginning of the opposition proceedings. Actually the availability of D11 had been disputed in the reply to the notice of opposition, along the opposition proceedings and again in the reply to the statement of grounds, so that the decision of the Board not to consider D11 as state of the art could not come as a surprise to the appellant.

Inventive step

c) The product Viscoat had to be considered as the closest prior art. The composition of granted claim 1 differed from that product in that the hyaluronic acid had a smaller concentration and a higher molecular weight. The data in the patent as reproduced in the letter dated 9 August 2013 showed that the claimed product had a higher viscosity at low shear rate, a lower viscosity at high shear rate and a desired intermediate value of the cohesion dispersion index. While the measurement error at high shear rate was not known, it was not relevant, as the viscosity of Viscoat was three times higher than the one of the claimed product. The values of the three parameters were related respectively to high stability and space maintenance ability, ease of injection and a satisfactory compromise between good retention and ease of removal during ophthalmic surgery. The tests on rabbit models in the patent showed that the advantages had indeed been achieved. While it was true that a single

example of the claimed composition was present, that example was fully representative thereof, as the values of the examples were in the middle of the ranges of the concentrations and molecular weights, which were quite narrow. Moreover, no counter-examples were present to cast doubts on the presence of the effects over the whole breadth. The available prior art did not provide any hint to modify the composition of Viscoat according to the claim in order to obtain the shown advantages. While the relevance of the different effects (viscosities and cohesion dispersion properties) was known, as shown e.g. by D7, and the difficulties in removing Viscoat was apparent, the prior art proposed to use two compositions with different properties to achieve the desired goals and did not point to the variations in concentration and molecular weight of hyaluronic acid according to the claim. The data in D32 referred to a composition comprising only hyaluronic acid and could not be extrapolated to those in which chondroitin sulfate was additionally present. It was also not possible to foresee the effect on the cohesion dispersion index, which depended in an unexpected way on the concentrations and molecular weights of the ingredients, as shown by the data in the patent. On that basis the reasoning of the appellant was based on an *ex-post facto* analysis and the claimed composition was inventive.

d) Document D9 was a scientific publication in which ophthalmology was mentioned just once and no specific composition suitable for that use was disclosed. On that basis alone, it was not suitable as closest prior art. In any case no

single composition was disclosed therein which differed from the one of granted claim 1 only in the concentration of hyaluronic acid and multiple selections within the disclosure of that document together with an increase in the concentration of hyaluronic acid were necessary to come to the claimed composition. There was no hint in the available prior art that, starting from the teaching of D9, the skilled person could arrive at the desired optimisation of properties by selecting the ranges in granted claim 1. On the contrary the skilled person would expect that a change in the concentration of hyaluronic acid would bring an increase in viscosity at all shear rates and any different conclusion would be the result of an *ex-post facto* analysis.

e) The composition of D5 was also not suitable as closest prior art, as no value for the molecular weights of the components was given in the document. Also starting from D5, one could only conclude that the optimisation of the parameters through appropriate selections of the concentrations and molecular weights of the ingredients as accomplished in the patent was nowhere suggested in the prior art.

XII. The appellant requested that the decision under appeal be set aside and the patent be revoked.

XIII. The respondent requested that the appeal be dismissed.

Reasons for the Decision

Document D11 as state of the art

1. It was undisputed that document D11 was part of a book published in October 2002 and arising from the conference "Hyaluronan 2000" which took place in September 2000 in Wrexham, Wales. What was under dispute was whether D11 was state of the art as such or as far as it represented common general knowledge.

1.1 According to the case law, where a written disclosure is published which is based on an oral disclosure at a public conference held some years earlier, it cannot as a rule be assumed that the written disclosure is identical to the oral one. Additional circumstances have to be put forward and proven to justify that conclusion (Case Law of the Boards of Appeal of the European Patent Office, 7th edition 2013, I.C.1.9.5).

1.2 In the present case no additional evidence has been provided by the appellant as to the content of the oral disclosure with respect to the written one, which became available over two years after the conference took place. On that basis it cannot be assumed that the oral disclosure corresponded to the written one.

1.3 Thus the content of D11 only became state of the art with its publication in October 2002 which is after the priority date.

2. At the oral proceedings before the Board the appellant objected for the first time to the validity of the priority claim of the patent in suit in order to support the view that document D11 belonged to the

state of the art, because it was published before the date of filing of the patent in suit.

2.1 This objection is an amendment of the appellant's case which came not only well after it had filed its grounds of appeal, but actually at the very last opportunity to make submissions. It is therefore under the discretion of the Board to decide whether the objection is to be admitted (Article 13(1) of the Rules of Procedure of the Boards of Appeal, RPBA).

2.2 Indeed, the question whether D11 belonged to the state of the art had been into the opposition proceedings since the beginning, it had been decided upon by the opposition division (see point IV a), above), had been contested by the respondent in the reply to the statement of grounds (see point VI, above) and had been identified as a relevant point in the communication of the Board (see point VII, above). Therefore, the objection came as a surprise for the opposing party. Moreover, it can potentially raise a number of not straightforward questions (e.g. whether partial priority was valid for part of the ranges) and it is at least questionable whether the respondent could be expected to deal with it without adjournment of the proceedings. Finally, the fact that the appellant had not realised before that the objection could be raised is also not a possible justification for the late filing, as it is under the responsibility of the parties to put forward their case in a complete manner at the appropriate stage of the proceedings.

2.3 Under these circumstances, the Board can see no justification for the appellant to introduce the new objection at such a late stage of the proceedings and the Board on exercise of its discretion under

Article 13(1) and (3) RPBA finds it appropriate not to admit the late filed objection into the proceedings.

2.4 On that basis document D11 as such does not constitute prior art.

3. The Board has also no sufficient evidence to conclude that at least part of the disclosure of D11 belongs to the common general knowledge of the skilled person. In particular, while D11 makes reference to a previous paper published in 1998 when figures 1 and 2 are mentioned (see D11, page 463, last line of first paragraph, where reference 24 is indicated, and page 465, last three lines, as far as reference 24 is concerned), the appellant decided not to introduce that previous paper into the proceedings, so that it is not known whether figures 1 and 2 of D11 are an exact reproduction of the figures of reference 24, how these figures were presented therein (e.g. close to each other or independently) and whether any interpretation was provided. Under such circumstances, the Board can only conclude that the part of D11 relating to figures 1 and 2 cannot be considered as representing the common general knowledge of the skilled person.

Inventive step

4. *Closest prior art*

4.1 The invention described in the patent relates to the field of viscosurgery and involves a novel combination of viscoelastic agents that exhibits an improved rheological profile for certain types of surgery, especially ophthalmic surgery (paragraph [0001]). This is accomplished by means of the combination of two ingredients, namely hyaluronic acid and chondroitin

sulfate or salts thereof, each of which is present at a concentration and with a molecular weight belonging to specified ranges (granted claim 1).

4.2 Documents D9 and D5 and the product Viscoat as disclosed e.g. in document D6, have been taken as alternative starting points for the analysis of inventive step in the arguments of the parties. These documents have to be analysed in order to determine the closest prior art.

4.3 Document D9 is a study meant to investigate the role of chondroitin sulfate-hyaluronic acid interactions in the viscoelastic properties of tissues and fluids (abstract, first sentence). In the study chondroitin sulfate at 0.5-40 mg/ml (0.05-4% w/v) with a molecular weight of 25,000 to 80,000 daltons is used (page 2, paragraph 2.2; page 6, last 3 lines; see also the notes to all the figures). Hyaluronic acid is used at 0.5-8 mg/ml (0.05-0.8% w/v) with a molecular weight in the range 50,000-1,900,000 daltons (page 7, line 5; see also the notes to all the figures). The use of large hyaluronic acid (>800,000-1,900,000 daltons) as a viscosurgical tool in ophthalmic operations is mentioned together with other uses (page 8, second full paragraph, third sentence).

4.3.1 While in principle values falling within three of the four ranges of concentration and molecular weights are mentioned in D9, namely for the molecular weight of hyaluronic acid and for the concentration and molecular weight of chondroitin sulfate, there is no single example in D9 of a composition with values of these three quantities within the ranges of granted claim 1, as acknowledged by the appellant. Moreover, for the specific application in ophthalmic operations no

indication is given of a specific suitable composition (only a reference to large hyaluronic acid is present, see citation in previous paragraph).

4.4 Document D5 discloses an aqueous composition comprising an aqueous buffer, chondroitin sulfate or a sodium, potassium, magnesium or calcium salt thereof and sodium, potassium, magnesium or calcium hyaluronate (claim 1). Sodium hyaluronate is used at a concentration of from 0.1 g up to 10 g in 100 ml of water (0.1 to 10% w/v) and chondroitin sulfate is used at a concentration of from 0.1 g up to 10 g in 100 ml of water (0.1 to 10% w/v) (claim 3). In the examples the concentrations of chondroitin sulfate and sodium hyaluronate are 5.3 g and 4.2 g in 100 ml of water (5.3% w/v and 4.2% w/v). No molecular weights are indicated in the document. The compositions are developed for protecting endothelial and epithelial cells in anticipation of surgical trauma (page 1, lines 10 to 13); ophthalmic surgery is also specifically mentioned (page 1, lines 18 to 26).

4.5 The product Viscoat, as described e.g. in document D6, is a known viscoelastic composition used in ophthalmology (D6, Table 1 on page 65, see also paragraph [0012] in the patent); it contains sodium hyaluronate with a molecular weight of 500,000 daltons at a concentration of 3% and chondroitin sulfate with a molecular weight of 50,000 daltons at a concentration of 4% (D6, Table 1 on page 65).

4.6 Out of the three possible starting points the product Viscoat is the one which better fulfills the conditions for being the closest prior art, namely to correspond to a purpose or technical effect similar to that of the invention and to require the minimum of structural and

functional modifications (Case Law of the Boards of Appeal of the EPO, 7th edition 2013, I.D.3.1). Indeed, this is the one which is specifically developed for the same use in ophthalmology and none of the products disclosed in D9 or D5 comes closer to the composition of granted claim 1 (as there are always at least two out of the four critical values of concentrations and molecular weights which are either out of the ranges or not known).

4.7 On that basis and in agreement with the decision under appeal the product Viscoat is taken as the closest prior art.

4.8 As agreed by the parties, the composition of granted claim 1 differs from the product Viscoat in that the molecular weight of the hyaluronic acid or its salts is higher (1,500,000 to 1,900,000 daltons instead of 500,000 daltons) and its concentration is lower (1.0% to 2.0% w/v instead of 3%).

5. *Problem solved*

5.1 According to the patent, it is the object of the invention to provide a composition which exhibits "a markedly improved rheology for performing all functions of a viscoelastic agent in an ophthalmic surgical procedure, especially a cataract procedure" (paragraph [0010] in the patent). During such a procedure, the composition should "achieve satisfactory intraocular space maintenance and ocular tissue protection, and at the same time permit manipulation of ocular tissue and ease of removal at the end of the procedure" (still paragraph [0010]).

5.2 The product Viscoat appears to have been developed for the same use in ophthalmology, so that it is necessary to analyse whether the evidence on file makes it possible to acknowledge the presence of improvements or advantages with respect to it.

5.3 The examples and comparative examples in the patent are meant to provide a comparison of the claimed composition with several alternative compositions, including Viscoat (see in particular tables 2, 3 and 4 and figure 1). The composition according to the invention which is tested (composition F) differs from Viscoat in the amount of sodium hyaluronate (1.8% instead of 3%) and in its molecular weight (1,600,000-1,700,000 daltons instead of 500,000 daltons), namely in the identified distinguishing features (see table 2).

5.4 Composition F has a higher viscosity than Viscoat at zero shear rate (280 Pa·s vs 60 Pa·s, see table 3 and figure 1) and a lower viscosity than Viscoat at high shear rate (see figure 1). As to the comparison at high shear rate, while the figure filed with letter of 9 August 2013 shows the behaviour in a clearer way, as only two lines are present, the same behaviour is already identifiable in figure 1 of the patent. The cohesion dispersion index of composition F is higher than the one of Viscoat (12.3 vs 3.4, see table 4). In particular, the viscosity values and the cohesion dispersion index of the claimed composition are intermediate between those of Viscoat and those of Healon, another known product which contains only sodium hyaluronate with high molecular weight (tables 2, 3 and 4 and figure 1).

5.5 While it is true that no specific information is given on the measurement method and on the measurement errors of the viscosity data given in table 3 and shown in figure 1, there are no counterdata on the side of the appellant, nor credible arguments which can put into doubt the credibility of the only comparative data available on file. Moreover, the ranges given in granted claim 1 for the distinguishing features, namely the concentration and molecular weight of hyaluronic acid or its salts, as well as for the concentration and molecular weight of chondroitin sulfate are narrow and the values of concentrations and molecular weight for the exemplified composition F lie in the middle of the ranges, so that in the absence of any counterexample it is credible that the effect on the viscosity and on the cohesion dispersion index takes place over the whole breadth of the claim.

5.6 The effects of the changes in the viscosity and cohesiveness of the composition in their use during ophthalmic surgical procedures is physically understandable, as well explained in the patent.

5.6.1 During injection of the viscoelastic fluid into the eye through a cannula (high shear rate) a low viscosity facilitates insertion and avoids resistance, while, when the fluid is in place (zero shear rate), a high viscosity guarantees high stability and space maintenance (paragraph [0002], last two sentences).

5.6.2 To assure space maintenance and tissue protection a good dispersion of the fluid and adhesion to the surrounding walls is desired, while to facilitate removal a cohesive composition is preferred, so that a reasonable compromise has to be found between cohesion and dispersion properties, as indicated by an

intermediate cohesion dispersion index, i.e. one higher than the one of Viscoat, which is known to be difficult to remove, and lower than the one of high molecular weight sodium hyaluronate, which is highly cohesive, but not adherent (paragraphs [0003] to [0006] in the patent). While the cohesion dispersion index may be a parameter not frequently used in the art, it is a measure of a property whose relevance in use is clearly understandable.

5.6.3 The possibility of creating and maintaining a deeper anterior chamber than when using Healon and removing with more ease than when using Viscoat have been confirmed by the pre-clinical studies presented in the patent (example 5, paragraphs [0028] and [0029]).

5.7 The problem to be solved with respect to the closest prior art is therefore the provision of an improved composition, starting from Viscoat, which achieves satisfactory intraocular space maintenance and ocular tissue protection, and at the same time permits manipulation of ocular tissue and ease of removal at the end of the procedure.

5.8 The comparative examples available in the patent show that such a problem has effectively been solved by a composition according to granted claim 1.

6. *Obviousness*

6.1 It remains to be analysed whether the skilled person aiming at solving the posed problem would be led by the available prior art to the proposed solution, namely to increase the molecular weight and decrease the concentration of hyaluronic acid or its salts, while

using values of these two quantities within the ranges in granted claim 1.

6.2 Document D7 analysis the desirable properties of a viscoelastic substance for ophthalmologic applications (abstract).

6.2.1 It illustrates in particular the effect of molecular weight on viscosity as a function of shear rate for hyaluronate solutions (figure 7 on page 277). At rest or very low shear rates, the viscosity increases tremendously with increasing molecular weight. At high shear rates, the viscosity is independent of molecular weight (note to figure 7 on page 277). Increased viscosity at zero shear rate can be achieved by increasing the molecular weight or increasing the concentration (note to figure 8 on page 277).

6.2.2 As to the relationship of viscosity to the use of the compositions in ophthalmic surgery, D7 discloses that a high viscosity at low shear rate is most important for optimal maintenance of space and tissue manipulation, while to insert the viscoelastic substance through a small cannula, it is best to have a low viscosity at high shear rate (page 278, paragraph bridging the two columns). With regard to cohesiveness it discloses that this property, which is the degree to which a material adheres to itself, is a function of molecular weight and elasticity, it specifies that sodium hyaluronate is cohesive, easily aspirated, while viscoelastic substances of lower molecular weight and shorter chain length are less entangled and upon aspiration leave the eye in pieces, it explains advantages and disadvantages and it concludes that at the time of writing the paper, no comparative cohesive data on the viscoelastic

substances were available (pages 279 and 280, section D).

6.3 D7 therefore, while giving some indications about the relevant properties for solving the posed problem (viscosity at low and high shear rate and cohesiveness), does not provide a clear hint that such a problem may be solved by means of the proposed solution. In other words, while the skilled person may understand from D7 that a high viscosity at zero shear rate, a low viscosity at high shear rate and an intermediate cohesiveness are desired, no indication is present in the document that these results could be achieved by increasing the molecular weight and decreasing the concentration of the sodium hyaluronate present in the product Viscoat.

6.4 In D9 the effect of chondroitin sulfate on the viscosity and elasticity of hyaluronic acid solutions was examined (page 2, last paragraph of the introduction).

6.4.1 It was observed that the addition of chondroitin sulfate increased the viscosity of solutions of hyaluronic acid of different molecular weights (page 3, section 3.1, first paragraph and figure 1) and that the viscosity of the hyaluronic acid solutions increased with the molecular weight of the hyaluronic acid (page 3, section 3.1, second paragraph and figure 2).

6.4.2 The addition of chondroitin sulfate was found to increase the viscosity of the hyaluronic acid solutions at all concentrations of hyaluronic acid and at all shear rates (page 5, section 3.2, last paragraph).

6.5 D9 therefore, while giving some information on the effects of molecular weight of hyaluronic acid on viscosity, does not give any indication that by increasing the molecular weight and decreasing the concentration of the hyaluronic acid in a composition containing hyaluronic acid and chondroitin sulfate the proper compromise between viscosity at low and high shear rate and cohesiveness for ophthalmic use can be achieved.

6.6 Document D32, whose availability to the public as shown by the declaration D33 has not been contested by the respondent, shows that the product COHÆRENS, a composition containing sodium hyaluronate at high molecular weight (2,000,000 daltons, see page 5, section 2.3.3, first paragraph), has a rheological behaviour intermediate between the products Viscoat and Healon, with a zero shear rate viscosity higher than Viscoat and a high shear rate viscosity lower than Viscoat (page 7, section 4.1, figure and text).

6.7 While the product COHÆRENS may have a rheological behaviour similar to the one of the claimed product (cf. figure 1 in the patent and the figure on page 5 of D32), it contains sodium hyaluronate, but not chondroitin sulfate, it has sodium hyaluronate at a higher molecular weight than according to granted claim 1 and at an unknown concentration and document D32 gives no indication on the cohesiveness of the product.

6.8 Also the teaching of D32 therefore is not suitable to lead the skilled person to modify the molecular weight and the concentration of hyaluronic acid in a composition containing an admixture of hyaluronic acid and chondroitin sulfate or salts thereof as according to granted claim 1 in order to solve the posed problem.

6.9 As the available prior art does not hint towards the solution proposed in granted claim 1, the presence of an inventive step has to be acknowledged.

7. The same conclusion would be reached, if the skilled person started from the products of D5 or D9, which as outlined above lie further away from the claimed composition (see points 4.2 to 4.6). In the absence of the possibility of a reasonable comparison with the products disclosed therein, because D5 does not disclose the values of the molecular weights of the sodium hyaluronate and of the chondroitin sulfate and D9 does not disclose any composition suitable for ophthalmic surgery, nor any composition which comes closer than Viscoat to the claimed one, and in the absence of any element from the appellant to te contrary, the data available on file must be taken as credible evidence that the problem as posed in the analysis of inventive step starting from the product Viscoat (point 5.7, above) is effectively solved also in this case and the skilled person would not be hinted at the proposed solution for the same reasons as outlined above (points 6.1 to 6.9).

8. It is therefore concluded that the composition of granted claim 1 involves an inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

L. Fernández Gómez J. Riolo

Decision electronically authenticated