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**D E C I S I O N**  
**of 28 April 2005**

**Case Number:** T 0219/03 - 3.3.2

**Application Number:** 94309554.7

**Publication Number:** 0661040

**IPC:** A61K 7/13

**Language of the proceedings:** EN

**Title of invention:**

Oxidative hair dyeing process with dihydroxybenzenes and aminoethanethiols

**Patentee:**

P&G-Clairol, Inc.

**Opponent:**

L'OREAL

**Headword:**

Oxidative hair dyeing/P&G-CLAIROL

**Relevant legal provisions:**

EPC Art. 54, 56

**Keyword:**

"Admissibility of the late-filed requests: Auxiliary requests 1 and 3 (no): it was contrary to procedural fairness. Auxiliary request 2 (yes) - the amendments were clear and simple and a direct response to the previous discussion"

"Main request: Novelty (yes): Dopa is not a component of example 6. Inventive step (no): the claimed systems represent an obvious alternative to the closest prior art"

"Auxiliary request 2: Novelty (yes) - analogous reasons to the main request. Inventive step (no): the method claimed relates to a commonly known method for applying the obvious systems"

**Decisions cited:**

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**Catchword:**

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Case Number: T 0219/03 - 3.3.2

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.2  
of 28 April 2005

**Appellant:** L'OREAL  
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**Representative:** Fevrier, Murielle  
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**Respondent:** P&G-Clairol, Inc.  
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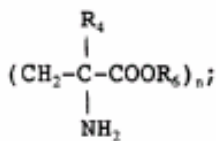
**Representative:** Adams, Harvey Vaughan John  
Mathys & Squire  
120 Holborn  
London EC1N 2SQ (GB)

**Decision under appeal:** Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
11 December 2002 concerning maintenance of  
European patent No. 0661040 in amended form.

**Composition of the Board:**

**Chairman:** U. Oswald  
**Members:** M. Ortega-Plaza  
P. Mühlens



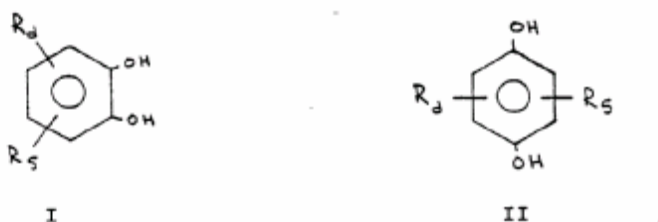


R<sub>1</sub> is H or COOR<sub>7</sub>; R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub>, which may be the same or different, are H, C<sub>1</sub>-C<sub>6</sub> alkyl or C<sub>1</sub>-C<sub>6</sub> hydroxyalkyl; R<sub>6</sub> and R<sub>7</sub> which may be the same or different, are alkali metal, H or C<sub>1</sub>-C<sub>6</sub> alkyl and n is 0 or 1, and

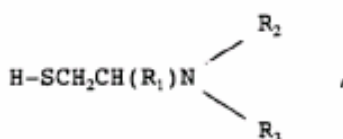
- (b) permanently coloring the hair by allowing the aqueous system to remain in contact with the hair for a period of time sufficient to achieve the desired color."

Independent claim 21 as granted read as follows:

"21. An aqueous hair dyeing system for permanently dyeing hair comprising tinctorially effective amounts of (a) a dihydroxybenzene having a structure

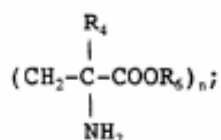


- (b) an aminoethanethiol having the formula



and

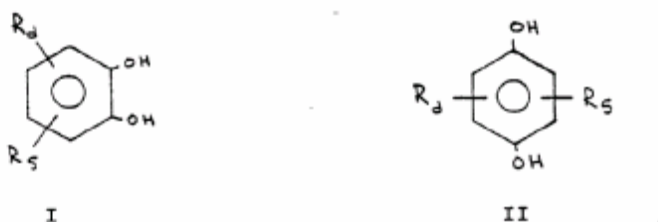
(c) a primary oxidising agent selected from the group consisting of ferricyanide and persulfate salts, wherein  $R_d$  is



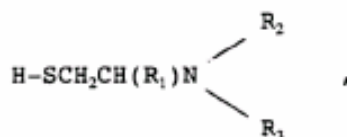
$R_1$  is H or  $\text{COOR}_7$ ;  $R_2, R_3, R_4$  and  $R_5$ , which may be the same or different, are H,  $\text{C}_1\text{-C}_6$  alkyl or  $\text{C}_1\text{-C}_6$  hydroxyalkyl;  $R_6$  and  $R_7$  which may be the same or different, are alkali metal, H or  $\text{C}_1\text{-C}_6$  alkyl and  $n$  is 0 or 1, said system having a pH of from 2 to 11."

Independent claim 44 as granted read as follows:

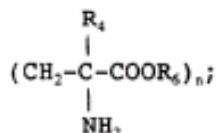
"44. A hair dyeing kit for permanently dyeing hair having in a single package a plurality of containers, the kit comprising (a) a first container containing an aqueous hair dye composition comprising 0.1 to 10% dihydroxybenzene having a structure:



and 0.1 to 10% of an aminoethanethiol having the formula



wherein R<sub>d</sub> is



R<sub>1</sub> is H or COOR<sub>7</sub>; R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub>, which may be the same or different, are H, C<sub>1</sub>-C<sub>6</sub> alkyl or C<sub>1</sub>-C<sub>6</sub> hydroxyalkyl; R<sub>6</sub> and R<sub>7</sub> which may be the same or different, are alkali metal, H or C<sub>1</sub>-C<sub>6</sub> alkyl and n is 0 or 1, and (b) a second container containing an aqueous solution comprising a primary oxidising agent selected from the group consisting of ferricyanide and persulfate salts, a pH control agent contained in the kit being sufficient to provide a pH of from 2 to 11 when the contents of the first and second containers or of the first, second and third containers are combined to form an aqueous hair dye system and the amounts of the aminoethanethiol, the dihydroxybenzene and primary oxidising agent in the kit being sufficient to effect a permanent dyeing of hair when the contents of the containers are combined to form the aqueous hair dye system and applied to the hair."

II. The following documents inter alia were cited during the proceedings:

- (1) EP-A-0161073
- (2) WO-A-9305759

- (3) US-A-4746322
- (5) US-A-4021538
- (7) U. Nickel et al, Zeitschrift für Physikalische Chemie, vol. 170, pages 159-183 (1991)

III. Opposition was filed and revocation of the patent in its entirety was requested pursuant to Article 100(a) EPC on the grounds of lack of novelty and lack of inventive step.

IV. The appeal lies from the interlocutory decision of the opposition division maintaining the patent in amended form, based on the auxiliary request (Articles 102(3) and 106(3) EPC).

The opposition division considered that the main request (set of claims as granted) met the requirements of novelty (Article 54 EPC) but did not meet the requirements of inventive step (Article 56 EPC).

Basically, the opposition division considered that document (1) did not concern permanent hair dyeing, because the oxidising agent used was selected from iodate or periodate as primary oxidising agent. In the opposition division's opinion, although persulfate could be also present in the hair dyeing composition of document (1), periodate and iodate (which were used in excess) were far more aggressive oxidising agents and showed faster oxidising kinetics. Therefore, in the opposition division's view, the dye precursors formed according to the method of document (1) could not penetrate into the hair shaft, where it should be oxidised in order to form pigments of large molecular



size, because they were already oxidised before they could penetrate the hair shaft.

Additionally, the opposition division considered that dopamine, which was used in example 6 of document (1), did not fall within the definition of the dihydroxybenzene derivatives of formulae (I) or (II) according to claims 1 and 21.

As regards inventive step of the subject-matter of the main request, document (2) represented the closest prior art according to the opposition division's findings. The technical problem was the provision of a method for permanently colouring hair reddish or yellow. The solution according to claim 1 was the addition of an aminoethanediol having the formula  $\text{HSCH}_2\text{CH}(\text{R}_1)\text{N}(\text{R}_2)(\text{R}_3)$  which lead upon oxidation with ferricyanide or persulfate in the presence of dihydroxybenzenes directly to phaeomelanins, which are yellow or reddish pigments. The proposed solution was obvious, since it was known from document (2) that phaeomelanins provided yellow to reddish brown pigmentation to hair and that they were formed by oxidative polymerization of cystein-S-yl-dopas via 1,4-benzothiazine intermediates.

The set of claims which served as the basis for the decision of the opposition division maintaining the patent in amended form (auxiliary request) differed from the set of claims as granted merely in the deletion of the options concerning the use of ferricyanide salts.

Accordingly, the opposition division considered that the set of claims of the auxiliary request and the

adapted description, filed during the oral proceedings before the opposition division, met the requirements of Article 123 EPC.

The opposition division acknowledged the novelty of the subject-matter claimed in the set of claims of the auxiliary request for reasons analogous to those given for the main request.

The opposition division also acknowledged the presence of an inventive step for the subject-matter claimed in the set of claims of the auxiliary request (Article 56 EPC).

In particular, the opposition division considered that document (2) represented the closest prior art and that the technical problem lay in the provision of a method for permanently colouring hair reddish or yellow.

In the opposition division's view the solution proposed concerned the addition of the aminoethanediol having the formula  $\text{HSCH}_2\text{CH}(\text{R}_1)\text{N}(\text{R}_2)(\text{R}_3)$  and the use of persulfate as primary oxidising agent.

In the opposition division's view, it was not obvious in the light of the prior art to use persulfate as primary oxidising agent in order to obtain phaeomelanin pigments.

- V. The appellant lodged an appeal against said decision and filed grounds of appeal.
- VI. The respondent (patentee) contested the appeal and brought arguments in support of its position.

VII. Oral proceedings were held before the board on 28 April 2005.

During the oral proceedings, the respondent confirmed that the set of claims filed during the oral proceedings before the opposition division as auxiliary request became its main request. Additionally, it filed three sets of claims as auxiliary requests 1 to 3.

Accordingly, independent claim 1 of the main request differs from claim 1 of the set of claims as granted merely in that the expression "ferricyanide and" has been deleted in the definition of (ii).

Independent claim 19 of the main request differs from claim 21 of the set of claims as granted merely in that the expression "ferricyanide and" has been deleted in the definition of (c).

Independent claim 40 of the main request differs from claim 44 of the set of claims as granted merely in that the expression "ferricyanide and" has been deleted in the definition of (b).

Independent claim 1 of the auxiliary request 1 differs from claim 1 of the main request in that it contains the following at the end of the claim:  
", wherein the aqueous system comprises an aqueous hair dye composition containing the dihydroxybenzene and the aminoethanethiol hair dye components, each of which is present at a concentration of from 0.1 to 10% by weight of the hair dye composition".

Independent claim 18 of the auxiliary request 1 corresponds to claim 19 of the main request and differs from that claim in that it contains the following at the end of the claim:

", wherein the hair dye components (a) and (b) are present in a hair dye composition, each such component being present at a concentration of from 0.1 to 10% the mole ratio of the component (a) to the component (b) being from 2:1 to 1:4."

The set of claims of the auxiliary request 2 differs from the set of claims of the main request in that the claims 19 to 43 have been deleted (product category claims).

The set of claims of auxiliary request 3 differs from the set of claims of the auxiliary request 1 in that the claims 18 to 41 have been deleted (product category claims).

VIII. The appellant's arguments with respect to the admissibility of the requests filed by the respondent in the oral proceedings may be summarised as follows:

The requests were filed too late. The respondent had had plenty of time during the appeal proceedings to file auxiliary requests and had chosen not to do so. The arguments put forward in the discussion previous to the filing of the requests were not essentially different from those already brought during the written procedure.

The appellant's arguments with respect to claim 19 of the main request may be summarised as follows:

The subject-matter of claim 19 of the main request lacked novelty over the contents of document (1). Document (1) disclosed an aqueous system suitable for permanent hair dyeing comprising dihydroxybenzene derivative in the presence of an iodate or periodate. Document (1) concerned permanent hair dyeing, since from the beginning of the document the products were compared to the system using phenylenediamine derivatives which are known for permanent hair dyeing. Moreover, document (1) disclosed the stability of the colour imparted by the dyeing compositions to repeated washings and weathering. Additionally, the appellant referred to the comparative tests filed with its letter of 19 April 2004 which showed that the results of the resistance to shampooing were comparable (or even better) for the systems according to document (1) with respect to the systems according to the patent in suit. The appellant further stated that the tests were carried out under the same conditions for all the compositions tested and that the results were comparable. The evolution in the colour had to be measured by considering all the parameters shown in the equation and not only the so-called  $L^*$ . The parameters  $a$ ,  $b$  decreased with the washings, which meant that there was a loss of chromaticity. The downgrading observed after the six successive washings was to be measured by considering the evolution of the three parameters. The rinsing used was a traditional rinsing, and the dyeing system was applied immediately after being prepared in all cases. The compositions according to document (1) showed a good resistance to shampooing; the compositions according to the patent in suit had a similar resistance, although it was lower.

In the appellant's opinion, permanent dyeing meant resistant to shampooing and to other external factors such as brushing. The penetration into the hair shaft was linked to the fact that it was permanent dyeing. Moreover, the respondent had not provided any proof that the pigments obtained by the claimed systems were indeed incorporated into the hair shaft.

Document (1) disclosed dopamine or dopa as specific dye precursors and cysteine as colour modifier. Moreover document (1) taught to use persulfate together with the colour modifier. Additionally, example 6 disclosed an aqueous system comprising dopamine, cysteine and persulfate for obtaining a red-orange colour. Document (1) disclosed in an unambiguous manner that dopamine could be substituted by dopa, since both appeared as the only two options in a specific subgroup of preferred compounds. Finally, document (1) disclosed a pH range of 3 to 7 which was encompassed by the pH range stated in claim 19.

If, following the respondent's argumentation, persulfate was responsible for the pathway leading to pheomelanins, then this was also achieved by the system of example 6, since the colour obtained was red-orange in contrast to the black or brown of the eumelanins.

The appellant further stated that the dihydroxybenzene derivatives such as dopa or dopamine will lead in the presence of cysteine and an oxidising agent to pheomelanins.

As regards inventive step, the appellant stated that example 6 of document (1) would be taken by the skilled person as starting point. It referred to its previous analysis concerning the issue of permanent dyeing and oxidation. Hence, according to the appellant's analysis, document (1) disclosed systems for permanent hair dyeing. The appellant further stressed that document (1) taught to use dopa or dopamine, or mixtures thereof, as dye precursors. Both of them would lead to pheomelanins in the presence of cysteine and an oxidising agent. The corresponding transformation pathway had been known for decades.

The appellant stated that the problem to be solved was to find an alternative permanent hair dyeing system to those known for colouring reddish orange. Example 6 was therefore the correct starting point.

The skilled person had no need to replace iodate by persulfate, since claim 19 was open in this respect and encompassed the possibility of iodate being present.

With respect to the respondent's arguments concerning the alleged effects attained by the use of persulfate as oxidising agent, the appellant stated that they merely concerned some unproven theories. In this context it cited document (5), which showed that similar hair or skin pigmentation results could be achieved by oxidising esters of dopa with either periodate or persulfate. Both oxidising agents were listed among others as equivalent options in document (5), and both of them were employed in the examples as alternatives.

The appellant argued that no effect had been proven vis-à-vis the compositions of either document (1) or (2).

The appellant referred to the results of the comparative tests filed with its letter of 19 April 2004, which showed that the resistances to shampooing were comparable for the prior art compositions and the claimed compositions and pointed out again that the patentee's allegation concerning a difference in the shaft penetration was not supported by any evidence. The only tests appearing in the patent in suit concerned coloration measurements.

Alternatively, the appellant stated that document (5) could also be chosen as starting point.

With respect to claim 1 of the auxiliary request 2, the appellant stated that the arguments put forward for the product claim 19 of the main request applied mutatis mutandis to the method claim 1, since document (1) disclosed permanent hair dyeing resistant to at least 20 shampoos by using a system comprising the components (i), (ii) and (iii). There was no element in the claim which could justify the presence of an inventive step.

Further to the arguments already put forward in respect of the issue of permanent hair dyeing, the appellant added that document (1) disclosed oxidative coloration leading to melanin derivatives captured in the hair shaft and making them resistant to shampooing, this being the basic principle for permanent hair dyeing.



The appellant also cited document (2) as alternative starting point. This document taught that the melanin precursors obtained when oxidising dopa were capable of penetrating the hair shaft. The appellant stated that it was known, as shown in document (2), to use cysteine and dopa to produce pheomelanin derivatives. Moreover, persulfate was a classical oxidising agent for dopa derivatives as shown by document (5).

IX. The respondent's arguments relating to the admissibility of the auxiliary requests filed during the oral proceedings may be summarised as follows:

Auxiliary request 1 was filed in order to avoid any negative decision with respect to the concentration ranges. It related to a mere combination of claims (claim 2 incorporated into claim 1 and claim 20 incorporated into claim 19) and renumbering of the claims. This request was filed in response to the discussion during the oral proceedings where the concentrations of the components had become an issue.

Auxiliary request 2 had not been filed earlier, since the respondent did not think it was required. It was filed in order to avoid a negative decision by the board due to the product claims. This request did not contain any new claims but only related to a restriction by mere deletion of the product claims.

Auxiliary request 3 related to a mere combination of the amendments performed in auxiliary requests 1 and 2.

The respondent's arguments in respect of the novelty of the subject-matter of claim 19 of the main request may be summarised as follows:

There were at least three reasons why example 6 of document (1) did not destroy the novelty of the claimed subject-matter. Dopamine did not fall within the compounds of formulae I or II of claim 19; the primary oxidising agent in example 6 was not persulfate but periodate; and the system of document (1) was not suitable for permanent dyeing.

When requested by the board to define the expression "primary oxidising agent" the respondent stated that, as disclosed in the description of the patent in suit, it was the oxidising agent carrying the bulk of the first two oxidation reactions of the pathway leading to phaeomelanin pigments. The respondent further explained that, as mentioned in the description of the patent in suit, dopa was oxidised to dopaquinone, which then could be further transformed following two different pathways: either it would undergo the nucleophilic attack of cysteine leading to cysteinyldopa or, alternatively, it would undergo cyclisation into leucodopachrome. Only when following the pathway through further oxidisation of cysteinyldopa to the corresponding thienoquinone and cyclisation to 1,4-benzothiazinylalanine would one eventually, after further oxidation steps, obtain the phaeomelanin pigments. The alternative pathway would lead through further oxidation of leucodopachrome to dopachrome and further transformation through different routes by means of oxidation, to eumelanin pigments.

Eumelanin and phaeomelanin were two kinds of pigments: the first a black or brown colour and the second yellow reddish.

Asked by the board how this teaching was reflected by the product claim, the respondent answered that it was reflected by the presence of components (a) and (b) together with (c) and that the description of the patent in suit should be used to interpret the claims; in this context it referred to paragraph [30] on page 7 and cited Article 69(1) EPC.

The respondent further stated that the skilled person, reading in the claim that the primary oxidising agent is persulfate and seeing the other components, would conclude that persulfate was used for controlling the first two oxidation reactions. This being the case, the persulfate used as primary oxidising agent would help the pathway to pheomelanines. In addition, the claims explicitly required the presence of component (b) (eg cysteine), therefore pheomelanin would be obtained.

The respondent further acknowledged that a primary oxidising agent could be one which is too aggressive in terms of reaction kinetics or which is used in excess, but specified that if persulfate was defined as the primary oxidising agent, the skilled person would know that there could not be another oxidising agent present, which would not allow persulfate to perform its function. In other words, if persulfate was not the quicker agent in terms of kinetics or it was present in too small a concentration, then it would not be able to control the two first oxidation reactions. Therefore, even accepting that iodate and persulfate had

comparable redox potentials, persulfate was much too slow and iodate was present in a concentration 3-6 times higher than persulfate in example 6 of document (1). In this context the appellant also referred to document (7).

The respondent stressed that dopamine was the most preferred dye precursor disclosed in document (1) and to replace it in example 6 was unjustified. Moreover, there were other options for dye precursors disclosed as preferred subgroup in document (1), which did not encompass dopa. Finally, document (1) stated that dopa had some drawbacks with respect to its solubility.

As regards permanent dyeing the respondent was convinced that it was common ground between the parties that permanent dyeing involved the penetration of the small pigment precursors into the hair shaft, where these were oxidised into the bigger pigments which remained there. This was disclosed in paragraphs [18] and [35] of the patent in suit. Moreover, the respondent stated that claim 19 reflected the feature of permanent dyeing, since the composition had to be suitable for permanent dyeing of the hair.

The respondent further stated that if the dye precursors were oxidised by an aggressive oxidation agent, then they were oxidised to big pigments before entering the hair shaft. The inventor of document (1) stated in document (3) that the compositions did not lead to shaft penetration.

In the respondent's view, the tests submitted by the appellant were not acceptable, since they did not give

any indication of how long the dye compositions were prepared before putting them into the hair. If it took too much time, they could already have been oxidised before applying them to the hair. Furthermore, there was no indication as to which kind of rinsing had taken place. If it was done very harshly, then all pigments would drift off. There was an inconsistency in the tests, since the values of  $L^*$  increased in some of the cases, meaning that colour went up, which was evidently not possible.

The respondent also stressed that the nature of the oxidising agent was critical in order to ensure that the dopaquinone followed the correct pathway to the pheomelanins. It cited paragraph [28] of the patent in suit. The respondent stated that in the presence of a too rapid oxidising agent the dopaquinone would divert to the pathway leading to eumelanins, since it would not have enough time (or be in a sufficient concentration) to react with cysteine to lead to cysteinyldopa.

As regards inventive step the respondent argued that document (1) could not be the correct starting point, since the subject-matter claimed in claim 19 related to a system for permanently dyeing hair and document (1) did not concern a system for permanently dyeing hair. The respondent repeated in this context its previous arguments with respect to permanent hair dyeing. The respondent further stressed that the claims should be read in the light of the specification and referred to paragraphs [14] and [35] of the patent in suit. The appellant had the burden of proof.

Additionally, the respondent argued that there were no reasons to select example 6 as starting point, to replace the most preferred dye precursor (i.e. dopamine) by dopa and to replace periodate or iodate, which were disclosed as the key element in document (1), by persulfate, which was merely disclosed to modify the colour. Moreover, document (5) gave no incentive to replace iodate or periodate, since they were also employed as oxidising agents.

The respondent further stated that, if document (1) was taken as starting point, then the problem to be solved was how to produce permanent dyeing. Document (1) disclosed the use of some compounds to assist dye penetration, but document (3) of the same authors taught that they did not function. Therefore the skilled person would modify the compounds to assist dye penetration but not eliminate the key element iodate.

With respect to claim 1 of auxiliary request 2, the respondent stated that there was a difference between a product and a process claim. The respondent argued that the method was defined in claim 1 as a method of permanently colouring hair. This had to be interpreted in the light of the description (paragraph [35]) as introduction into the hair shaft. The mere fact of a resistance to shampooing might mean affinity to hair but not necessarily permanent hair dyeing.

The respondent further argued that in the method claim there was a purpose linked to a technical effect, permanent hair dyeing, which was a feature of the process to be considered for the assessment of inventive step. Whereas this effect might have not been

considered as restricting the product claim, it was to be dealt with as a characteristic of the method. The permanent hair dyeing was achieved by the choice of persulfate as the primary oxidising agent.

The respondent denied that document (1) could be considered as closest prior art, since it did not teach permanent hair dyeing and document (3), which was its continuation in part, stated that there is no penetration into the shaft. Moreover, document (1) employed as primary oxidising agent iodate or periodate, which were aggressive oxidising agents. The dyeing precursors would oxidise to the pigments before penetrating the hair shaft. Moreover, the respondent stressed that document (2) referred to document (3), stating that there was no penetration into the hair shaft.

- X. The appellant (opponent) requested that the decision under appeal be set aside and that the patent be revoked.

The respondent (patentee) requested that the appeal be dismissed (main request) or, as an auxiliary request, that the patent be maintained in amended form on the basis of the set of claims filed as "auxiliary request 2" in the oral proceedings.

## **Reasons for the decision**

1. The appeal is admissible.

2. *Admissibility of the auxiliary requests*

As regards the amended set of claims of auxiliary request 1, the combination of claims which has occurred leads to independent claims having different scope with respect to the products. Additionally, the amended method claim 1 would require a complex analysis in respect of the combination of features, in particular those concerning the specification of a concentration range related to a "hair dye composition" not previously defined in the claim and different from the total aqueous system defined in claim 1 as granted. In view of these reasons the amendments are not so clear, and simply to reasonably expect the opponent to be able to deal properly with them and hence to admit auxiliary request 1 into the proceedings would be contrary to procedural fairness.

Claim 1 of auxiliary request 3 is identical to claim 1 of auxiliary request 1; therefore, the analysis made above for the method claim also applies to auxiliary request 3.

Consequently, auxiliary requests 1 and 3 are not admissible.

As regards auxiliary request 2, it is admissible, since it merely relates to the deletion of the product claims from the main request. This is a clear and simple amendment. Moreover, auxiliary request 2 was filed as a direct response to the discussion during the oral proceedings about the patentability of the product claims.



3. *Main request*

3.1 Example 6 on page 9, lines 30-36, and page 10, line 1, of document (1) relates to an aqueous hair dyeing system comprising inter alia dopamine, cysteine and persulfate. However, it is an undisputed fact that dopamine, which is the dihydroxybenzene compound employed in example 6, does not fall within the definitions given for formulae I or II in claim 19 of the main request. Moreover, example 6 does not relate to a general example concerning a generic dyeing system in which the components can be chosen from different lists of options. Example 6 relates to the illustration of a specific dyeing system where all the components have specific meanings. To arrive at a system encompassed by claim 19, it would be required to exchange dopamine by dopa or to add dopa to the specific system of example 6.

Dopamine is disclosed in document (1) as the most preferred dye precursor (page 5, line 23). Claim 3 of document (1) relates to a dye composition wherein the dye precursor is dopamine, D-dopa, L-dopa or D,L-dopa. Although document (1) discloses dopa as an analogue of dopamine (page 5, lines 25, 26) the preferred dye precursors defined on page 5, lines 5 to 22 do not include dopa.

3.1.1 Therefore, there is no direct and unambiguous disclosure in document (1) leading to a specific system comprising dopa instead of dopamine, cysteine and persulfate, since there are other options for the dye precursor disclosed as preferred within the contents of

document (1), and because example 6 does not represent a generic example.

Since for the requirements of novelty it suffices that at least one technical feature is different from the prior art disclosure, there is no need to deal with the other features of claim 19 in order to conclude that the subject-matter claimed is novel over the contents of document (1).

- 3.1.2 As regards the appellant's argument that document (1) discloses mixtures of two or more dye precursors and hence to add dopa to example 6 is directly disclosed, the following has to be said. Document (1) discloses that the dye precursor can be a mixture of two or more compatible compounds which are shown by a generic dihydroxybenzene formula. Dopa falls within this formula, but there is no indication that it should be selected therefrom as an individual component (cf. page 4, lines 14-15).

The appellant has not contested the novelty of the subject-matter of claim 19 vis-à-vis any of the other cited documents, and the board does not see any reason to differ from that position.

- 3.1.3 Therefore, the board concludes that the subject-matter claimed in claim 19 of the main request meets the requirements of novelty (Article 54 EPC).

- 3.2 Document (1) discloses a dye composition comprising (1) an organic compound which assists dye penetration; (2) a dye precursor of the formula corresponding to a substituted orthodihydroxybenzene; and (3) an iodate or

periodate oxidiser (claim 1). Document (1) further discloses a dye composition, wherein the dye precursor is dopamine, D-dopa, L-dopa or D,L-dopa (claim 3). Document (1) also discloses a dye composition which additionally comprises a colour modifier, preferably catechol or **cysteine** (emphasis added) and a persulfate (claims 8 and 9). In the description it is further stressed that "Other colors can be obtained by use of color modifiers and persulfate" (page 6, lines 34-35).

The dye compositions of document (1) are in the form of aqueous systems (cf. inter alia examples 2, 6, 7, 8, 9) and the pH of the dye composition is from about 3 to about 7.0 (page 7, lines 12-13).

Document (1) discloses that "The result of this combination of dyeing elements is manifested by pleasing and **stable colours** imparted to hair and other keratinous fibres. For example grey hair is dyed to a pleasing and **stable** red, brown or black colour." (page 2, lines 30-33) (emphasis added).

Furthermore, document (1) discloses that "The dyeing agent is non-sensitising and non-mutagenic. In addition, a melanin-like dye confers several surprising advantageous properties to the hair. There is minimal or no damage to the hair and no dyeing of the skin. **The colour is stable to washing** but, after a **large number** (e.g. 20) of washings or after permanent waving, the colour may fade "on shade", e.g. to a lighter tone of the same colour, thus avoiding the red or green overtones which are often observed after repeated washing or perming of hair coloured with commercially-

available phenylenediamine-based dyes." (page 2, line 34 to page 3 line 9) (emphasis added).

Example 6 discloses an aqueous hair dyeing system comprising inter alia dopamine, cysteine, ammonium persulfate and sodium iodate. When the composition is applied to the hair, the hair has a red-orange colour (pages 9, 10).

3.2.1 The board is satisfied that document (1) represents the closest prior art, since it discloses the structurally closest dye compositions to those claimed in claim 19 for the same purpose, i.e. colouring hair, in particular in red-orange colour. As put forward by the respondent, eumelanin-like pigments are black or brown and pheomelanin-like pigments are reddish orange. Therefore example 6 of document (1) is the correct starting point.

3.2.2 The respondent defined the problem to be solved over the prior art as how to produce permanent hair dyeing. However, this problem cannot be accepted for the following reasons. Although document (1) does not explicitly mention permanent hair dyeing, it discloses hair dyeing compositions suitable for permanent hair dyeing, since the colours obtained are stable and resistant to at least 20 shampooing steps.

In paragraph [18] of the patent in suit the following is stated: "By "permanent" is meant **a color not removable by shampooing** with a conventional surfactant-containing shampoo, the permanency being attributable to the inability of the formed pigments to diffuse from

the hair shaft in view of their molecular sizes"  
(emphasis added).

Therefore, it appears that also the patent in suit links the term "permanent" hair dyeing with the resistance to shampooing. Furthermore, the only tests contained in the description of the patent in suit (cf. examples 1 to 3) relate merely to coloration measurements after application of the hair dyeing compositions. These tests do not demonstrate whether or not there is penetration into the hair shaft by the pigments.

Additionally, the respondent has put forward that the compositions of document (1) were not suitable for permanent hair dyeing, due to the use of iodate or periodate as an oxidising agent, which would be too harsh for allowing the dye precursors to penetrate the hair shaft, and that in contrast thereto the claimed compositions penetrate the hair shaft.

The respondent has cited document (3) (a continuation in part of one of the US priority documents serving as a basis for the European patent application document (1)) in order to demonstrate that the compositions of document (1) do not penetrate into the hair shaft. The passage cited reads as follows: "It should be noted that the above compounds act as dye dispersants. In earlier work on this invention it was believed that the compounds used were facilitating the penetration of the dye into the hair shaft. Subsequent tests showed that the dye was dispersed on the hair shaft with little to no penetration into the penetration into the hair shaft." (column 2, lines 52-58).

However, document (3) further discloses the stability of the dyeing and its resistance to at least 20 washings (sentence bridging columns 1 and 2). Therefore, document (3) does not state that there is no permanent dyeing at all or that the colours were not stable.

Moreover, the comparative tests submitted by the appellant with its letter of 19 April 2004 show comparable results for the resistance to shampooing for the compositions according to document (1) and the compositions according to the patent in suit. Indeed, the compositions according to the patent in suit show less good results.

It is possible to reach some conclusions from the test results mentioned, since all tests were made under the same conditions resulting in stable colours resistant to shampooing. Therefore, the allegation made by the respondent that the tests were irrelevant, since the specific dyeing and washing conditions were not stated in detail, cannot be accepted.

- 3.2.3 The burden of proving the facts it alleges lies with the party invoking these facts. If a party whose arguments rest on these alleged facts is unable to discharge its onus of proof, it loses thereby.

Accordingly, in the absence of any proof concerning a different effect achieved by the compositions of claim 19 when compared to the compositions of document (1), the board can only conclude that the problem to be solved lies in the provision of an alternative hair dyeing system to those known.

3.2.4 The solution concerns the compositions according to claim 19 in which dopa is present together with an aminoethanethiol such as cysteine and persulfate salts.

The board is satisfied in the light of the description and the examples of the patent in suit that the problem has been plausibly solved.

3.2.5 It remains now to assess whether the proposed solution is obvious in the light of the prior art.

The skilled person faced with the problem defined above and knowing the aqueous system employed in example 6 of document (1) would have considered as an obvious option to take dopa instead of dopamine as dye precursor since document (1) discloses dopa as an analogue of dopamine (page 2, line 29, page 4, lines 11-12, page 5, lines 25-26, page 6, lines 31-32, claim 3).

It was known to the skilled person that dopa would react with cysteine in the presence of an oxidising agent in an analogous way to dopamine, i.e. it would oxidise and undergo the nucleophilic attack of cysteine. Moreover, the transformation of cystein-S-yl-dopas to phaeomelanins by oxidative polymerization via 1,4-benzothiazine was generally known to the priority date of the patent in suit, as shown by the comment about background art made in document (2) (page 2, lines 3-6).

With respect to the choice of persulfate salts as oxidising agent, it has to be said that although document (1) discloses iodate and periodate as oxidising agents, this document expressly recommends

the use of persulfate (in addition thereto) when colour modifiers are employed (cf. page 6, lines 34-35 and example 6). Cysteine is specifically mentioned in document (1) as colour modifier (page 6, line 3).

Claim 19 comprises as component (c) "a primary oxidising agent selected from the group of persulfate salts", however, claim 19 does not exclude the presence of a second oxidising agent, due to the use of the term "comprising" or of the article "a".

Indeed, even if the skilled person were to take the expression "a primary oxidising agent" as meaning the reactive agent bearing the burden of an oxidation reaction, in the present case the dye precursor dihydroxybenzene undergoes **several** oxidation steps in its way to the final phaeomelanin-like pigments.

Claim 19 stands open with respect to the relation between the oxidising agent and the oxidation step or steps in which it should act as "primary oxidising agent".

Contrary to the respondent's submissions, the description cannot be used to interpret in a restrictive manner the wording of claim 19, which is per se technically meaningful, although it has been broadly formulated.

Additionally, even supposing that the oxidative function of the persulfate salts could be linked to the presence in the system of a dihydroxybenzene (such as dopa) as a suitable substrate, it has to be investigated whether the choice of the oxidising agent leads to a proven effect and whether to take persulfate



as oxidising agent for such an oxidation was obvious for the skilled person in the light of the prior art.

As already mentioned above, the respondent has not proven with evidence the presence of an effect for the compositions claimed over the compositions of the prior art.

Moreover, the tests submitted by the appellant with its letter of 19 April 2004 do not show relevant variations in the results relating to the colour stability (resistance to shampooing) linked to the variation of the oxidising agent employed (inter alia persulfate versus iodate or periodate).

As regards the question of suitability of persulfate salts, alone, as oxidising agents for the oxidation of ortho-dihydroxybenzenes such as dopa or its derivatives, the skilled person is aware from document (5), cited in document (1), that that is the case. Document (5) discloses compositions for hair and skin pigmentation comprising dopa esters (eg alkyl esters) and an oxidising agent. Periodate and persulfate salts are listed as alternative options (column 4, lines 26 and 28). The systems with dopa esters and persulfate salts are exemplified in examples 3 and 7 of document (5).

- 3.2.6 As regards the respondent's argument that the skilled person would not have used dopa instead of dopamine as an alternative to example 6 of document (1) due to its poor solubility, which was acknowledged in the quotation from document (5) made in document (1) (cf. page 2, lines 14-18), the following has to be said.

Document (1) actually discloses dopa as an alternative to dopamine and exemplifies this teaching in example 4.

- 3.2.7 Consequently, the board concludes that the subject-matter of claim 19 of the main request lacks an inventive step under Article 56 EPC since it represents an obvious alternative to the prior art systems.

4. *Auxiliary request 2*

- 4.1 Auxiliary request 2 differs from the main request merely in that the product claims have been deleted.

It is therefore obvious that this set of claims meets the requirements of Article 123(2) and (3) EPC.

- 4.2 The reasons given in points 3.1 to 3.1.3 apply *mutatis mutandis* to the method claims of auxiliary request 2.

The subject-matter claimed in auxiliary request 2 meets the requirements of novelty (Article 54 EPC).

- 4.3 Claim 1 of auxiliary request 2 relates to a method of permanently colouring hair to a desired colour comprising the steps of (a) applying the aqueous system as defined in claim 19 of the main request and (b) permanently colouring the hair by allowing the aqueous system to remain in contact with the hair for a period of time sufficient to achieve the desired colour. Therefore, claim 1 of auxiliary request 2 relates to a method of use of the system as defined in claim 19 of the main request by merely applying the system to hair and letting it react. The effect of permanently

colouring is a direct consequence of the use of the system for its purpose of dyeing hair.

4.3.1 Accordingly, document (1), which has been extensively analysed in point 3.2 above, remains the closest prior art, since it discloses a method of permanently colouring hair comprising the same steps as those claimed, by using the closest systems of the prior art.

4.3.2 The problem to be solved lies in the provision of a further method for hair dyeing or hair colouring.

The solution relates to the method steps defined in claim 1.

In the light of the examples the problem has been plausibly solved.

4.3.3 As becomes evident from the analysis made in points 3.2.2 to 3.2.7 above, the systems employed in claim 1 are obvious in the light of the prior art. Hence, a method characterised by its use in the same way as disclosed in document (1) for the dyeing systems cannot involve an inventive step.

4.3.4 The arguments put forward by the respondent in support of an inventive step for the method were analogous to those employed for the systems and have already been dealt with.

The main difference between the two lines of the respondent's argumentation was that the systems were merely required to be suitable for permanent hair

dyeing, whereas permanent dyeing was an effect directly linked to the method.

However, for the reasons already given above, the board is satisfied that the systems disclosed in document (1) are suitable for permanent hair dyeing and the methods disclosed in that document are methods for permanent hair dyeing. The effect achieved by the method claimed has not been shown to be different from that achieved by the methods of the prior art.

4.3.5 Accordingly, the board concludes that the subject-matter claimed in claim 1 of auxiliary request 2 lacks an inventive step.

Therefore, auxiliary request 2 is not allowable under Article 56 EPC.

**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

A. Townend

U. Oswald