Patent Portfolio Analysis of Hair/Scalp Cosmeceuticals

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The paper identifies the patenting trend of calp health actives in a leave-on product. A landscape of innovation portfolios generated through R&D in scalp care and hair care segment has been investigated covering six years period i.e. from 2008 to 2013. Patents have been classified based on benefit from active ingredient, number of benefits from active ingredient, nature of active ingredient, assignee, priority year, country of origin and container/applicator system. The patenting trend indicates that more research is going on products with natural extracts because of consumer preference over synthetic chemicals for the scalp treatment. Analysis of the data revealed that Henkel, L’Oreal, Amorepacific Corporation, Unilever and Procter & Gamble are the leaders in patenting. Geographical mapping shows extensive patent application by South Korea as priority country followed by USA, Japan, China, and Germany. Maximum number of patents claimed for antidandruff benefit from the active.

Keywords: Patent, scalp active, leave-on-product, scalp, hair, natural extracts, Espacenet, USPTO database

The key impressive personality is good looking hair and key to good looking hair is healthy scalp. Rise in per capita income and spread of awareness towards health, has seen hair care more particularly scalp health care industry moves its focus from simple hair care products to products which are specifically meant for scalp health. Thus, the beauty industry is transforming to more health oriented. Consumers’ more attention towards scalp care products indicate that they are taking scalp care seriously to enhance hair beauty and wellness.

Skin care and hair care segment is getting tremendous boom due to rise in population of middle class which is more concerned about looks and use of sophisticated products.

Traditionally women are conscious about hair care but modern men are also not behind as demonstrated by importance of hair in the self-esteem of men. Many companies tap this opportunity and came up with specialized products for both men and women. For this, companies are gradually concentrating on innovations to satisfy need of both the men and women. By doing this, they are combining beauty with therapeutics. Alternatively, these products are also known as cosmeceuticals, which is prevalent in the area of hair and skin care. Dermo-cosmetic agents are compositions intended to place on hair and scalp for the purpose of cleansing, promoting attractiveness, protection and altering appearance to keep them in good condition. From ancient times, baldness was the matter of concern and for that ‘Special Physician of the head’ was there. Throughout history, human scalp had been the object of both cosmetic and medical interest, as well as of superstition and mystery.

Many people have hair or scalp problems. Hair may thin or fall out, break off, or grow slowly. Dandruff, alopecia, itchy scalp are some other major scalp disorders. Dandruff is the most widely occurring scalp problem symptomized by shedding of dead skin cells from the scalp. The actual cause of dandruff is still not definite, the proposed etiology has fluctuated between increased cellular activity with pathologic cornification and microbiological involvement, though the role of sebaceous gland secretions too appears to influence dandruff formation and has yet to be elucidated. It is however, well established that the yeast-like organism Malassezia furfur is involved in this. Hair loss or alopecia is a loss of hair from the head or body. Baldness can refer to general hair loss or androgenic alopecia. Some types of baldness can be caused by Alopecia areata, an autoimmune disorder. An itchy scalp may be caused due to skin diseases like psoriasis, fungal or bacterial infection, inflammatory disorders, parasitical infestation, stress, anxiety. Itchy scalp is embarrassing, irritating and can often cause discomfort which may culminate into hair thinning.
The main objective of this article is to search and analyze the patenting trends of scalp health actives in a leave-on-products segment. An attempt has been made in this work to study the different aspects of scalp actives mentioned in the patent application i.e. benefits & chemical nature. A Patent portfolio analysis has also been done of top ten players in leave-on-products.

**Patent Search Strategy**

Patents related to scalp actives were extensively searched in both public and commercial patent databases. Here, only patent applications filed between 1 January 2008 and 31 August 2013 were taken into account as author wants to study the recent patenting trend. Filing trend chosen after 2005 as many countries became TRIPS compliance afterwards. Specifically, data from 2008 chosen by taking into consideration of sample size to ascertain recent trend in patent filing and by looking at large sample size. Since the patent applications are not published until 18 months from the filing date, the applications which were filed after 31 August 2013 were not considered for this study.

The patent databases used for the search were WPIX file on STN, Espacenet and USPTO. Both public and private site databases were used to avoid any possibility of missing of data from search. On Espacenet and USPTO database the following keywords were used for search: Scalp active, hair care, dandruff, hair loss, Alopecia, leave-on-product, hair damage, scalp inflammation, hair growth, scalp treatment, hair treatment, conditioner and scalp itching.

The STN search strategy is given below.

**File WPIX**

S (Scalp OR hair) (5A) (disease? OR treat? OR health OR infection OR diagnosis OR diagnosing OR condition OR disorder OR cleanliness OR irritant? OR inflammation OR Psoriasis OR disorder OR anti-itch?OR antiitch? OR itch?)/TI,AB,CLM

L1

S ((scalp) (3A) (care OR active OR product OR protect? OR damage? OR repair? OR restor? OR cure?))/TI,AB,CLM

L2

S ((?Dandruff OR anti-dandruff OR hair-growth OR (hair (A) growth) OR alopecia OR hair-loss OR (hair (A) loss) OR bald? OR lice OR (seborrhoeic (w) dermatitis) OR (hair ringworm)) (S) (treat? OR disease? OR protect? OR damag? OR repair? OR restor?))/TI,AB,CLM

L3

S (B14-N17E OR C14-N17E OR D08-B03A)/MC

L4

S L1 OR L2 OR L3 OR L4…………………………Scalp treatment keywords

L5

S (A61Q005-00+NT OR A61Q007-00+NT OR A61K008-00+NT)/IPC,CPC

L6……………………………………………….Hair care class codes

S L5 AND L6

L7

S (Leave-in OR leave-on OR leave(W)in OR leave(W)on)/BI,BIEX

L8

S (lotion OR conditioner OR gel OR moisturizer OR cream OR mousse OR oil OR powder OR serum OR mask OR conditioner or solution)/TI,AB,CLM

L9

S L8 OR L9

L10

S L6 AND L10

L11

S L11 AND (2008-2014)/PRY

L12………………………………Scalp health treatment with LOP

**Research Methodology**

The search has retrieved approximately 4000 patent records from all the databases. These records were scrutinized manually to get a set of 354 patent records. Patents were scrutinized for their relevance to the study undertaken i.e. whether they are related to scalp on actives or whether it is related to product or process. Only patents that specifically mentioned ingredients for the scalp or hair or related meaning were kept in this study.

Recognizing that multiple filing of patent applications for the same invention in different countries is likely under the existing patent system. The study is restricted to individual inventions rather than a consideration of the gross number of patents filed during the period. Thus, priority date has been used as the parameter to segregate equivalent patents and to identify the actual number of inventions during the periods under study. Claims were analyzed and interpreted in light of the patent specification. Drawback of this study is that claims may change over time i.e. between filling and granting. Any change in patent application after filling was not considered in this study.
Classification of scalp actives done as per use/benefits of the actives in diseases which were mentioned in the international system of classification, such as, Alopecia, dandruff and itching. In addition, one more category added into the classification i.e. Hair treatment as this category of actives were not used in the treatment of diseases but contains significant number of actives which having pronounce effect on hair health.

The patents of interest were broadly classified on the basis of benefits achieved from the main scalp active. The benefits coded as follows:

1. Hair growth/hair loss prevention/Alopecia treatment (A)
2. Anti-dandruff (B)
3. Scalp itching/scalp health/inflammation (C)
4. Hair treatment (D)

The scalp active discloses more than one benefit. Therefore, further categorizations of patent documents were carried out on the basis of number of benefits disclosed by scalp active. This further categorization is significant as number of leave-on-products claims more than one benefit like, antidandruff hair tonic.

Categories of patents on the basis of number of benefits codes as scalp actives with 3 benefits (group X); 2 benefits (group Y); and 1 benefit (group Z).

Year-wise patenting trend in the stretch of 6 years i.e. from 2008 to 2013 was analyzed. While considering year of patent application, priority date was taken into consideration. Geographical distribution was also done in order to compare the patenting activity in various countries during same time period. Patent portfolio analysis of top 10 assignees was carried out to know the technology trend in the leave-on-product domain by taking into consideration of number of benefits from the actives and chemical nature of the active. Author also analyzed the patents which mentioned the packaging type or applicator in the claim.

Details of Classified Benefits of Scalp Actives

Hair Growth/Hair Loss/Alopecia Treatment

Hair tonic acts as a vasodilator that penetrates to hair root, enhances blood circulation and stimulates hair follicle growth in anagen or telogen phases. Some actives promote absorption of external scalp nutrition, improve nutritional status of the hair and activate skin. Actives used for treatment of Alopecia restores hair follicle, improved overall appearance of keratin fibers, where improvement in keratin fibers include root sheath thickness, fiber anchorage, growth rate, shine, number of visible fibers, length, volume; decrease in fiber loss; reduction in fiber breakage; increase in keratin fiber strength and increases hair density. Some actives increase longevity of scalp cells, delays the shedding, trichosis promotion effect and oxygen-resistance effect. Some reduces signal factor stimulating depilation while some some possesses antioxidant effect, bacteriostatic effect, deodorizing effect and anti-androgen effect.

Anti-Dandruff

These actives re-establish the scalp ecoflora and in particular prevent excessive colonization of the scalp by Malassezia sp. Some shows activity against the microorganisms responsible for desquamative disorders. Some actives inhibit filobasidium and sebum secretion.

Scalp Itching/Scalp Health/Inflammation

This category of actives contains antioxidants which are useful for reducing free radicals from the damaging cells and improved scalp compatibility. Some actives protect the scalp from drying out and environmental influences, UV-light irradiation, and heat or special hair treatments which may cause damage to the scalp. Some actives are used for their antimicrobial effect and preventing and/or treating seborrhoeic dermatitis. Some actives promote re-oiling of the dry scalp and pore-opening phenomenon, regulation of the balance between keratinocyte proliferation and differentiation, and removes excess oil from scalp.

Hair Treatment

This category of actives improves glossiness, flexibility and elasticity of hair. They supply nutrients to hair root, hair follicle and mother cells by which increases hair fiber diameter and tensile strength, improves hair structure and promotes rebirth of hair follicle tissue. Some actives having cleansing effect on scalp that simultaneously and synergistically absorb sebum from the surface of the hair shaft and provide a volumizing effect.

Year-wise Patenting Activity Trend

Data shown in Table 1 depict the patenting trend in the stretch of 6 years i.e. since 1 January 2008 to 31 August 2013 taking into consideration of priority date. There is no recognizable regularity in the

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<td>2013</td>
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patenting pattern, as is evident from the study. Initially there is downfall in the Patenting which may be the outcome of an economic recession the world economy suffered in the year 2007 to 2009. After 2009 patenting gained momentum and in 2011 recorded high of 75 patent records. Patenting trend seems to be declining after 2011, this may be due to patent applications after 2011 taking priority based on unpublished patents/applications before 2011. One point should also be taken into consideration that patent applications analyzed were only of 6 months in the year of 2013; hence remaining 6 months patent applications are missing. One hypothesis can also be predicted as companies concentrating on existing product range or improving performance of already marketed product instead of going for huge investment on R&D for patenting new technology which may not accommodate in existing product range.

Geographical Distribution of Patent Records

The geographical analysis has been done in order to understand the patenting pattern in various countries. The analysis was based on number of the patents filed in priority country. Table 2 shows depict the number of Patent applications filed in different countries from 2008 to 2013. Patenting activity arises from various developed and developing economies around the globe. The countries in which patents are filed indicate that, the inventors and owners consider these countries can best protect their technology in terms of Intellectual property. There are about 22 countries in the world where there is measurable patenting activity in scalp actives.

Korea had emerged as a nation with highest number of patent applications. The possible reason is more prevalence of Alopecia aerate (AA) in population. A clinical study report concluded that EGF and EGFR gene polymorphisms might contribute to the increased susceptibility to AA in Korean population. Another study indicated that intrinsic aging cause various changes in hair and scalp features of Korean women at an earlier age. These factors drive consumer demand for leave-on-product which leads to more research on this particular segment.

Apart from Korea, extensive patent filing is seen in countries like USA, Japan, China, and Germany indicating high end research and development in the field of leave-on products. High number of patent filings in Asia can be attributed to the location of top players like, Ameropacific Corp., Kao Corp., Lion Corp., Bioland Ltd. etc. in Korea and Japan. Besides, the demand for leave-in products is high due to higher incidence and prevalence of baldness, dandruff in USA, Europe, Japan, China, Asia.

Only 6 WIPO applications suggested the localization of Invention base in case of scalp actives. Only first 7 countries have number of patent applications in 2 digits. Developing countries like, India, Brazil and Taiwan have limited number of patents. They can be grouped as sporadic patent filing countries in leave-on-products. Patenting in these country can be ascertain by research driven by continuously increasing middle class consumer demand for sophisticated products and raised concerns regarding hair health.

Multiple Benefits/Combinations of Benefits of Scalp Actives

The categorizations of patent documents were carried out on the basis of number of benefits from scalp active as shown in Table 3. Consumers prefer one product which gives multiple benefits instead of

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<td>Spain</td>
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<td>Turkey</td>
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<td>South Africa</td>
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<th>Category</th>
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<th>Y</th>
<th>Z</th>
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<tbody>
<tr>
<td>Combination of benefits</td>
<td>A+B+C</td>
<td>A+C+D</td>
<td>A+B</td>
</tr>
<tr>
<td>Number of patent records</td>
<td>11</td>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>
single benefit from one product. These multiple beneficial scalp actives are economical for industry also as this will give more value to their product. The author anticipated that the commercial value of the patent would be more if multiple benefits are combined since product disclosed by such patents would be preferred by the customers. Though combination of scalp actives is desirable, practically it may not be possible due to compatibility and stability problems. The product, containing more than one active, may become turbid, develop foul odour, change in original colour, precipitate. Interestingly, no scalp active or no patent filed who will combine all the four benefits. The scalp actives claiming one benefit are maximum in number (79.66%) than two benefits (16.94%) and three benefits (3.39%) category.

Detailed Description of Combination of Benefits

Group X – 3 Benefits
About 91% of patent applications mentioned benefits from the class A+B+C and only one patent records disclosed natural extracts having 3 benefits under class A+C+D. Interestingly, no patent contains the benefit from the class B+C+D (Table-4).

Group Y – 2 Benefits
Total 50 patent records mentioned active/actives having 2 benefits. 52% of records disclosed benefits from the A+C class and 36% from the B+C class. Lowest i.e. 2% of records discloses benefits from B+D class. Maximum numbers of patent records from 2 benefits category are for natural extracts i.e. 40 (Table 5).

Group Z – 1 Benefit
In this category, active shows only one benefit. Table 6 provides number of patent records from group Z category under the following sub-categories:

Hair Growth/Hair Loss Prevention/Alopecia Treatment
Under this category of benefits, 156 patents were classified. These patent records disclosed around 17 scalp actives in leave-on treatment for hair growth/hair loss prevention/Alopecia treatment. Among this 61% of patent records mentioned natural extract followed by 12% contains combination of actives.

Anti-Dandruff
Under this category of benefits, 61 patents were classified. These patent records disclosed around 15 scalp actives in leave-on treatment for dandruff treatment. 22% patent records disclosed natural extract and 19% disclose combination of actives as an active for antidandruff treatment.

Scalp Itching/Scalp Health/Inflammation
Under this category of benefits, 41 patents were classified. These patent records disclosed around 20 scalp actives in leave-on treatment for scalp itching/scalp health/inflammation. About 54% patent records disclosed natural extract and 11% combination of actives.

<table>
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<th>Table 4–Number of patent records from group X category</th>
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<td>Class/ Benefits</td>
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<td>A+B+C</td>
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<td>A+C+D</td>
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</table>

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<tr>
<th>Table 5–Number of patent records from group Y category</th>
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<tbody>
<tr>
<td>Benefits/Class</td>
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<tr>
<td>Natural extract</td>
</tr>
<tr>
<td>Combination of actives</td>
</tr>
<tr>
<td>Azole compounds</td>
</tr>
<tr>
<td>Sugar/polysaccharides</td>
</tr>
<tr>
<td>Ellagic acid/derivatives</td>
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<tr>
<td>Alcohol</td>
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<tr>
<td>Acids</td>
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<tr>
<td>Metal complex</td>
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<tr>
<td>Microbial derivatives</td>
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<tr>
<td>Phospholipids</td>
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<tr>
<td>Amines</td>
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<td>Total number of patents</td>
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<tr>
<th>Table 6–Number of patent records from group Z category</th>
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<tbody>
<tr>
<td>Benefit/Class</td>
</tr>
<tr>
<td>Natural extract</td>
</tr>
<tr>
<td>Combination of actives</td>
</tr>
<tr>
<td>Synthetic drug</td>
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<tr>
<td>Organic compounds</td>
</tr>
<tr>
<td>Peptides/Proteins/Amino acids</td>
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<tr>
<td>Purine derivatives</td>
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<tr>
<td>Sugars/Polysaccharides</td>
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<tr>
<td>Polymer</td>
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<td>Phospholipids</td>
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<td>Hormones</td>
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<td>Lactone derivatives</td>
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<td>Total number of patents</td>
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</table>
Hair Treatment

Under this category of benefits, 21 patents were classified. These patent records disclosed around 11 scalp actives in leave-on products in hair treatment. About 40% patent records disclosed combination of actives and 18% natural extract.

Patent Portfolio Analysis of Top Ten Assignees

This analysis revealed that there were about 230 key players active in this area. From these 230 assignees top 10 assignees were evaluated. Table 7 depicts the number of patent records by top 10 assignees. Henkel has a maximum number i.e. 28 patent to their credit; followed by L’Oreal had (19); Amorepacific Corporation (16); Unilever (14) and Procter & Gamble having 8 patent records to their credit.

Patent Portfolio Analysis of Top 10 Assignees based on Benefit from Active

A micro-level study has been carried out with a view to assess the emerging focus areas in hair care research. Top 10 assignees are further analyzed on the basis of benefits from active/s (Table 8).

Henkel has maximum number of patent records (77%) disclosing actives having anti-dandruff benefit followed by hair treatment (11%). Only 1 application filed for the A category benefit. 52% of patent records of L’Oreal disclose anti-dandruff benefit followed by 15% for each A and B+C category. This shows that top 2 patent assignees concentrated their R&D on the development of anti-dandruff products. Amorepacific Corp. shows more interest in developing product having benefit for hair growth/hair fall/Alopecia treatment which can be evident by its 52% patent records from A category. Highest number of patent records of Unilever is from A category followed by C category. Interestingly, Unilever has not filed any patent for anti-dandruff benefit. Procter & Gamble, Kao Corp., Lion Corp., IAC and ELC Management LLC. focus their R&D efforts for the development of product showing benefits from A category. It can be evident that out of top ten assignees top two have focuses on their R&D efforts on anti-dandruff and rest of the assignees for hair growth/hair fall/Alopecia treatment.

Patent Portfolio Analysis of Top 10 Assignees based on Nature of Active

The key actives used in leave-on-products were analyzed w.r.t. top ten assignees based on nature of actives. Table 9 reveals top ten assignee with their claimed actives. It has been observed that maximum number of applications are related to natural extracts followed by patents on combination of actives (Table 10).

Henkel

Henkel has highest number of patent records i.e. 28. Patent from proteins/peptides/amino acids category discloses mainly Epsilon-poly-L-lysine as scalp active. The patent disclosing combinations of actives contain mainly cationic quaternary ammonium compounds, cationic silicone derivative and zinc derivative. Less patent records were found for microbiologically produced actives, sugars and amides. Henkel has filed a patent (DE102011089366A1) for use of extract of *Moringa olifera* for treatment of hair loss, reactivation of hair root and increase of hair growth. Piroctoneolamine (WO 2013010709) used in combination with Epsilon-poly-L-lysine as an
anti-fungal agent. It destroys *Pityro sporumovale*, a fungal species responsible for scalp infection, soothes inflamed scalp and reduces flaking. Piroctoneolamine is advantageous because of its good anti-dandruff action, solubility and safety, and its special functions such as, thickening preservation and elimination of body offensive odour. Patent EP 2724714 discloses cationic agents which form a film or deposit on the hair shafts due to reaction between the cationic agent and the keratinous material of the hair. Due to which it increases natural strength of hair and delays the dandruff formation. The patent WO 2013010706 discloses combination of actives containing selenium sulfide which is widely used in the treatment of dandruff and seborrhea. Selenium compounds inactivate free sulfhydryl groups of keratin through mercaptide formation. Thus, selenium sulfide may act as an antimitotic, resulting in a reduction in the turnover of epidermal cells. It also has local irritant, antibacterial, and mild antifungal activity. EP 2165697 discloses product containing betainand taurine. Betain is a naturally occurring quaternary ammonium type compound which protects the skin from chemical, mechanical, biological irritation. Biological irritation is irritation induced by secretory products of skin and scalp, such as, sweat and sebum. Taurine is semi essential sulfur containing beta amino acid, inhibits the inflammation mediated hardening of the hair follicle matrix. Many of the Henkel’s patent discloses silicon in leave-on-product. The silicon is present in the epidermis and the cuticle of hair where it acts to increase the chemical resistance of keratin by participating in the reticulation of the collagen fibres and in restructuring the hair. Silicone increases the resistance of the hair shaft. Silicone binds to proteins and other hydrating substances allowing the scalp to retain the necessary degree of humidity and avoids dehydration. It acts as a cytoprotectant of the dermal and hair follicle cells. It is an anti-free-radical element which reorganizes the cell membranes, making them more resistant to be attacked by the free radicals leading to ageing.

*L’Oreal*

*L’Oreal* has19 patent applications to their credit. Three of their patent discloses ellagic acid and its derivatives mainly for hair treatment. The enzymes Tyrosinase Related Protein-2 (TRP-2) is involved in melanogenesis in the hair bulb of hair follicle. If TRP-2 is less, there will be less melanogenesis. The amount of TRP-2 will be less if Growth Stimulating Hormone (GSH) is less. Ellagic acid and its derivatives are capable of increasing the GSH level in the melanocytes of hair bulb, thus improve the TRP-2 level. This leads to increase in the viability of the melanocytes, reduced hair whitening and restoration of hair pigmentation. Thus, Ellagic acid and its derivatives maintain the normal appearance of hair.

*L’Oreal* technology disclosed maximum filings on actives produced from microorganisms having anti-dandruff benefits. Patent JP 2010111670 and FR 2945944 discloses lysate of *Bifidobacterium longum* which stimulates the synthesis of proteins such as, Ribonuclease 7 (Q9H1E1), dermcidin (P81605), prolactin-inducible protein (P12273),

<table>
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<tr>
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<th>Nature of active</th>
<th>Henkel</th>
<th>L’Oreal</th>
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<th>Procter &amp; Gamble</th>
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<th>ELC Management LLC.</th>
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<td>Henkel</td>
<td>Combination of actives</td>
<td>Quaternary ammonium compound + silicones containing sugar structures, Cationic oligoglucoside, alkyl- or alkenylologlucoside + ester oil + ester quaternaries, Amino acid + cationic keratin hydrolyzate, Zinc pyrithione + Climbazole + Octopirox (RTM: Piroctoneolamine), Ketoconazole + Selenium disulphide + Selenium-containing vegetable oils + Selenium-containing plant extracts, Zinc pyrithione + climbazole + Octopirox + ketoconazole + cationic amino-silicone, Amino acids + cationic silicones, Antidandruff agent + silicone sugar structures + quaternary ammonium compound, Polyquaternium + Cationic amino silicone Quaternium-22, Cationic alkyl oligoglucosides + cationic silicones, Betaine + taurine or its derivatives + active substance obtained from plants of <em>Echinacea</em>, Acetylpyridinium derivative + surfactant</td>
<td>B</td>
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<tr>
<td>L’Oreal</td>
<td>Ellagic acid derivatives</td>
<td>Ellagic acid, its ethers + zinc pyrithione, Ellagic acid, ethers thereof, ellagic acid salts and ellagic acid ether salts, and mixtures thereof, Elassic acid, ethers thereof, ellagic acid salts and ellagic acid ether salts, and mixtures thereof, Non-nitrogenous zinc salt - zinc sulphate and zinc chloride + Amino silicone, Pyridine dicarboxylic acid ester and its salts + Fixing polymer, Pyridine dicarboxylic acid ester + Ester of glucose and fatty acids, Pyridine dicarboxylic acid ester + Vitamin B, Lysate of bacteria such as, <em>Vitreoscilla filiformis</em> (ATCC 15551), Probiotic microorganism - <em>Lactobacillus</em> and/or <em>Bifidobacterium</em> species, Lysate of at least one microorganism of the genus <em>Bifidobacterium</em> species, Ellagic acid and non-fruiting non-photosynthetic filamentous bacterial extract, Bacterial lysate, Bacterial lysate pertaining to the <em>Vitreoscilla</em> sp., Lysate of a bacterium or bacteria belonging to the <em>Vitreoscilla</em> sp., Essential oil of Achillea, 2-ethoxy-phenol compound</td>
<td>B+C</td>
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Table 10—Comprehensive patent portfolio analysis review of top 10 assignees—Contd

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<th>Assignee</th>
<th>Nature of the active</th>
<th>Claimed scalp active</th>
<th>Benefit category</th>
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<tr>
<td>Amoreacific Corp.</td>
<td>Natural extract</td>
<td>Old ginseng solution, Bamboo sap, <em>Paeania lactiflora</em> extract, <em>Thujae</em> semen extract or <em>Polygonum multiflorum</em> extract, <em>Pinus sylvestris</em> extract, <em>Torreya nucifera</em> seed oil, fermented extract of green tea or <em>Glycine max</em> extract, <em>Ginkgo biloba</em> extract or <em>Scutellaria baicalensis</em> essence, Licorice essence, and mixture of <em>Scutellaria baicalensis</em> extract and Licorice extract, <em>Jaglansregia</em> extract, <em>Castanea crenata</em> extract, Red ginseng extract, <em>Mori radix</em> cortex extract and <em>Scutellariae radix</em> extract, Black soybean extract and blue berry extract</td>
<td>A+C</td>
</tr>
<tr>
<td></td>
<td>Combination of actives</td>
<td>Zinc pyrithione + Panthenol + Salicylic acid + Nicotine amide + Kashiwako Hitoshi (<em>Thujae</em> semen) Cationic surfactant, xylitol, zinc oxide, <em>Glycyrhiza</em> extract, bridal wreath extract and <em>Portulaca</em> extract, Zinc pyrithione, pantenol, salicylic acid, nicotinamide or <em>Thujae</em> semen extract, Zinc pyrithione, panthenol and salicylic acid, nicotinamide and <em>Platycladus orientalis</em> fruit extracts, Black soybean extract and blue berry extract</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Surfactant</td>
<td>Disodium R-glucose-sulfosuccinate Extract of <em>Glabranin</em> or a derivative</td>
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<tr>
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<td>Natural extract</td>
<td>Extract of <em>Glabranin</em> or a derivative</td>
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<td>Combination of actives</td>
<td>Premix with metal pyrithione, Surfactant, Polymer Nuclear factor erythroid-2 related factor 2 (Nrf2) agonist Thchogenic complex Azole fungicide + Zinc gluconate</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Fatty acid amide</td>
<td>Coco monoethanolamide</td>
<td>C</td>
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<td>Metal complex</td>
<td>Metal pyrithione - zinc pyrithione</td>
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<td>Esters</td>
<td>Gallic acid ester (methyl gallate)</td>
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<td>Metal salt</td>
<td>Aluminium chloride</td>
<td>D</td>
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<td></td>
<td>Sugars/ Polysaccharides</td>
<td>Sucrose acetate isobutyrate</td>
<td>A</td>
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<tr>
<td>Procter &amp; Gamble</td>
<td>Combination of actives</td>
<td>Cationic surfactants, high melting point fatty compounds, metal pyrithione, and metal salts other than metal pyrithione Xanthine compound, vitamin B₃ compound, panthenol compound Hair diameter increasing agent -xanthine compound, vitamin B₃ compound and panthenol Deposition agent (inorganic solid particulate, a polymer solid particulate, a xanthine compound, a vitamin B₃ compound, and mixtures thereof) + Adhesive agent - panthenol Hair diameter increasing agent -xanthine compound, vitamin B₃ compound and panthenol</td>
<td>C</td>
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<td>Natural extract</td>
<td>Apigenin</td>
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<td>Peptides/Proteins/Amino acids</td>
<td>Oligopeptide</td>
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<td>Phenol compounds</td>
<td>Chlorinated resorcinol</td>
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### Table 10—Comprehensive patent portfolio analysis review of top 10 assignees—Contd

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<th>Benefit category</th>
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<td>Kao Corp.</td>
<td>Natural extract</td>
<td>Butcher's broom - butcher's broom rhizome</td>
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<td>Plant Anthriscussylvestris and Taiwan <em>Crimus asiaticum</em>, or its extract</td>
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<tr>
<td></td>
<td>Combination of actives</td>
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<tr>
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<td></td>
<td><em>Eucalyptus</em> extract</td>
<td></td>
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<tr>
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<td></td>
<td>Blood circulation promoter selected from <em>Swertia japonica</em> extracts, vitamin E</td>
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<tr>
<td></td>
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<td>and nicotinic acid, flavanols and pantothenic acids</td>
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<td>Acids</td>
<td>Malic acid and salt</td>
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<td>Microbially - produced</td>
<td>Leuconostocmesenteroides strain KSM-4/108 (FERM P-20586)</td>
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<td>Lion Corp.</td>
<td>Natural extract</td>
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<td>Extract of at least one plant – <em>Wikstroemia retusa</em>, <em>Stellera chamaejasme</em>,</td>
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<td><em>Daphne feddei</em> and <em>Synaptoplepis retusa</em></td>
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<td>Copolymer containing vinylpyrrolidone + <em>Loquat</em> leaf extract + Pure soybean extract</td>
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<td>Malto-oligosaccharide</td>
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<td>glyceride, minoxidil, carpronum chloride, t-flavanone, and</td>
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<td>Hypericum eructum extract</td>
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<td>Elec Management LLC</td>
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<td>MgSiO$<em>2$:Eu$</em>{2+}$; Dy$<em>{3+}$; Mn$</em>{2+}$; CaO.2ZnO.9MgO.0.9Si$<em>2$O$<em>6$, doped with Eu$</em>{2+}$; Dy$</em>{3+}$; Mn$<em>{2+}$; SrAl$<em>2$O$<em>3$: Eu$</em>{2+}$; Dy$</em>{3+}$; Er$</em>{3+}$; La$<em>2$Ga$<em>2$Ge$<em>2$O$</em>{12}$:Cr$</em>{3+}$; with or without co-dopants such as Li$<em>2$; Zn$</em>{2+}$; Ca$</em>{2+}$; Mg$<em>{2+}$ and Dy$</em>{3+}$; L$_2$Ga$<em>2$Ge$<em>2$O$</em>{12}$:Cr$</em>{3+}$; (Ln=Y, Gd, La or Lu); LiGa$_2$O$<em>3$:Cr$</em>{3+}$; M$_2$Ga$<em>2$Ge$<em>2$O$</em>{12}$:Cr$</em>{3+}$; (M=Sr or Ca); La$_2$Ga$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; La$_2$Ga$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; La$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; La$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; Z$_n$Ga$<em>2$Ge$<em>2$O$</em>{10}$:0.5% Cr$</em>{3+}$; and combinations thereof</td>
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<td>Phosphors of MgSiO$<em>2$:Eu$</em>{2+}$; Dy$<em>{3+}$; Mn$</em>{2+}$; CaO.2ZnO.9MgO.0.9Si$<em>2$O$<em>6$, doped with Eu$</em>{2+}$; Dy$</em>{3+}$; Mn$<em>{2+}$; SrAl$<em>2$O$<em>3$: Eu$</em>{2+}$; Dy$</em>{3+}$; Er$</em>{3+}$; La$<em>2$Ga$<em>2$Ge$<em>2$O$</em>{12}$:Cr$</em>{3+}$; with or without co-dopants such as Li$<em>2$; Zn$</em>{2+}$; Ca$</em>{2+}$; Mg$<em>{2+}$ and Dy$</em>{3+}$; L$_2$Ga$<em>2$Ge$<em>2$O$</em>{12}$:Cr$</em>{3+}$; (Ln=Y, Gd, La or Lu); LiGa$_2$O$<em>3$:Cr$</em>{3+}$; M$_2$Ga$<em>2$Ge$<em>2$O$</em>{12}$:Cr$</em>{3+}$; (M=Sr or Ca); La$_2$Ga$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; La$_2$Ga$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; La$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; Z$_n$Ga$<em>2$Ge$<em>2$O$</em>{10}$:0.5% Cr$</em>{3+}$; and combinations thereof</td>
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<td>Phosphors of MgSiO$<em>2$:Eu$</em>{2+}$; Dy$<em>{3+}$; Mn$</em>{2+}$; CaO.2ZnO.9MgO.0.9Si$<em>2$O$<em>6$, doped with Eu$</em>{2+}$; Dy$</em>{3+}$; Mn$<em>{2+}$; SrAl$<em>2$O$<em>3$: Eu$</em>{2+}$; Dy$</em>{3+}$; Er$</em>{3+}$; La$<em>2$Ga$<em>2$Ge$<em>2$O$</em>{12}$:Cr$</em>{3+}$; with or without co-dopants such as Li$<em>2$; Zn$</em>{2+}$; Ca$</em>{2+}$; Mg$<em>{2+}$ and Dy$</em>{3+}$; L$_2$Ga$<em>2$Ge$<em>2$O$</em>{12}$:Cr$</em>{3+}$; (Ln=Y, Gd, La or Lu); LiGa$_2$O$<em>3$:Cr$</em>{3+}$; M$_2$Ga$<em>2$Ge$<em>2$O$</em>{12}$:Cr$</em>{3+}$; (M=Sr or Ca); La$_2$Ga$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; La$_2$Ga$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; La$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; Z$_n$Ga$<em>2$Ge$<em>2$O$</em>{10}$:0.5% Cr$</em>{3+}$; and combinations thereof</td>
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<td>Phosphors of MgSiO$<em>2$:Eu$</em>{2+}$; Dy$<em>{3+}$; Mn$</em>{2+}$; CaO.2ZnO.9MgO.0.9Si$<em>2$O$<em>6$, doped with Eu$</em>{2+}$; Dy$</em>{3+}$; Mn$<em>{2+}$; SrAl$<em>2$O$<em>3$: Eu$</em>{2+}$; Dy$</em>{3+}$; Er$</em>{3+}$; La$<em>2$Ga$<em>2$Ge$<em>2$O$</em>{12}$:Cr$</em>{3+}$; with or without co-dopants such as Li$<em>2$; Zn$</em>{2+}$; Ca$</em>{2+}$; Mg$<em>{2+}$ and Dy$</em>{3+}$; L$_2$Ga$<em>2$Ge$<em>2$O$</em>{12}$:Cr$</em>{3+}$; (Ln=Y, Gd, La or Lu); LiGa$_2$O$<em>3$:Cr$</em>{3+}$; M$_2$Ga$<em>2$Ge$<em>2$O$</em>{12}$:Cr$</em>{3+}$; (M=Sr or Ca); La$_2$Ga$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; La$_2$Ga$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; La$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; Z$_n$Ga$<em>2$Ge$<em>2$O$</em>{10}$:0.5% Cr$</em>{3+}$; and combinations thereof</td>
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<td>Phosphors of MgSiO$<em>2$:Eu$</em>{2+}$; Dy$<em>{3+}$; Mn$</em>{2+}$; CaO.2ZnO.9MgO.0.9Si$<em>2$O$<em>6$, doped with Eu$</em>{2+}$; Dy$</em>{3+}$; Mn$<em>{2+}$; SrAl$<em>2$O$<em>3$: Eu$</em>{2+}$; Dy$</em>{3+}$; Er$</em>{3+}$; La$<em>2$Ga$<em>2$Ge$<em>2$O$</em>{12}$:Cr$</em>{3+}$; with or without co-dopants such as Li$<em>2$; Zn$</em>{2+}$; Ca$</em>{2+}$; Mg$<em>{2+}$ and Dy$</em>{3+}$; L$_2$Ga$<em>2$Ge$<em>2$O$</em>{12}$:Cr$</em>{3+}$; (Ln=Y, Gd, La or Lu); LiGa$_2$O$<em>3$:Cr$</em>{3+}$; M$_2$Ga$<em>2$Ge$<em>2$O$</em>{12}$:Cr$</em>{3+}$; (M=Sr or Ca); La$_2$Ga$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; La$_2$Ga$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; La$<em>2$Si$<em>2$O$</em>{12}$:Cr$</em>{3+}$; Z$_n$Ga$<em>2$Ge$<em>2$O$</em>{10}$:0.5% Cr$</em>{3+}$; and combinations thereof</td>
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<td><em>Artemisia asiatica</em> herb</td>
<td>C+D</td>
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<td>Complex crude extract - <em>Morfolium</em>, mulberry, radix <em>Polygoni multiflori</em>,</td>
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<td><em>Cnidii rhiza</em>, wild <em>Chrysanthemum</em> and <em>Rehmanniae radix</em> crudes extract</td>
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<td>Active ingredients - <em>Morfolium</em> extract or <em>Morfolium</em>, and extracts of</td>
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<td><em>Paenolia japonica</em>, <em>Diosypros kaki</em> thunberg calyx, <em>Ginkgo</em> semen lobe,</td>
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<tr>
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<td><em>Cnidii rhiza</em>, and mulberry</td>
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proteins S100 A8 and A9 (P05109 and P06702), and the protein histone (Q5R2W0) in hair follicles. In turn, the proteins reinforce the defenses of the epidermis against excessive colonization by pathogenic microorganisms. Thus, application of the cosmetic or dermatological or pharmaceutical compositions of lysate of *Bifidobacterium longum* promotes a decrease in colonization of the scalp and of the hair follicles by *Malassezia sp*.

L’Oreal filed only one patent application for actives from natural extract.

Amorepacific Corp.

Amorepacific Corp. has 16 patent applications to their credit out of which 11 are from natural extracts. Combination of actives patent discloses Zinc pyrithione, Salicylic acid, Nicotinamide and Xylitol for hair growth and scalp itching benefits. KR 2010066743 discloses product consisting of Bamboo leaf-extract is claimed to inhibit the post-oxidation of lipid and to scavenge post oxidation product and used for the treatment of Alopecia and act as a hair tonic. KR 2010013439 discloses Green tea which possesses anti-oxidant property which makes it useful for strengthening of hair follicle and preventing itchiness. Green tea also inhibits 5-alpha-reductase and reduces conversion of testosterone to DHT. This causes reduction of androgenic miniaturization at the hair follicle dermal papilla. Two key regulators of hair follicle growth, sonic hedgehog (Shh) and β-catenin, are involved in the induction of the transition from telogen to anagen. When the level of either protein is low, hair growth is severely damaged. CN 102188331 discloses *T. orientalis* extract which induces the anagen phase in resting hair follicles and therefore is a potential hair growth-promoting agent.

Unilever

Unilever has 11 patent applications to their credit. Maximum numbers of patent applications are from combination of actives category. Unilever product contains sugar or polysaccharides such as, glabranin and its derivative, malvidin and its derivative. WO 2012004228 disclosed Glabranin which was obtained from leaf of *Glycyrrhiza glabra* and seed of *Annonaglabra*. One of the product of Unilever disclosed in WO 2014095289 contains nuclear factor-erythroid 2-related factor-2 (Nrf2) agonist. Nrf-2 and Nrf-2 agonists promote hair fibre growth. Aryl hydrocarbon receptor (AhR), is a sensor of the redox system against oxidative stress and regulates nuclear factor-erythroid 2-related factor-2 (Nrf2), a master switch of the redox machinery. Nrf2 redox system downregulates either cytokine induced (AhR-independent) or PAH-induced (AhR-dependent) oxidative stress, reduces inflammation and act as a cytoprotective.

Procter & Gamble

Procter & Gamble has 8 patent applications to their credit of which maximum number of patents are for combination of actives i.e. Xanthine, metal pyrithione and Vitamin B3. US 20140093466 discloses natural extract Apigenin which when used on the scalp dilates the blood vessels in the dermis and allows a greater flow of blood to the hair follicles due to which acts as a hair growth tonic.

Kao Corp.

Kao Corp. had 7 patent records to their credit of which maximum number of patents are for combination of active containing natural extracts.

Lion Corp.

Lion Corp. has 6 patent applications to their credit of which 3 patents discloses natural extract.
ELC Management LLC.

ELC Management LLC. has 5 patent applications to their credit of which 4 filings are on inorganic compounds scalp active for anti-dandruff benefits. WO 2013049644 discloses ginsenoside Rb1 and Rgl which enhance the proliferation of human dermal papilla cells and upregulate the proliferation of hair matrix keratinocytes which makes red ginseng is beneficial for human hair growth promotion. Amorepacific Corp., IAC and Bioland Ltd. also had patent records containing extract from Ginseng.

Industry-Academic Cooperation (IAC)

Industry-Academic Cooperation Foundation from DaeguHaany University and other Korean universities has 6 patent applications to their credit out of which 4 filings are on natural extract. KR 20130112771 discloses Vimentin protein which facilitate the dermal papilla cell proliferation and migration. Thus, Vimentin used in the treatment of hair loss, promotes hair growth.

Bioland Ltd.

Bioland Ltd. had 4 patent applications to their credit of which 3 for natural extract and 1 for phospholipid scalp actives. KR 2009093613 discloses Magma seawater extract which suppresses the effect of 5α-reductase activation and acts as a hair growth promoting agent. Extract from Magnolia officinalis also possesses activity same as Magma water extract.

Patent Portfolio Changes

Patenting activity of Henkel gradually increases from 1 in 2008 to 9 in 2011. In 2008 and 2009 most of the patent records discloses benefit for hair treatment and from 2010 to 2013 discloses anti-dandruff benefits, this shows Henkel’s shift in patent portfolio from hair treatment to anti-dandruff. Patenting trend of Amorepacific decreases from five in 2008 to one in 2013. Amorepacific never shifted its focus from hair growth and scalp itching to any other category of benefit. Procter & Gamble doesn’t show consistency in patenting as no patent records were found in the year 2009, 2010 and 2011. Unilever shows, consistency in patenting by 2 patents every year during study period. From 2008 to 2010, Uniliver innovate for hair growth and Alopecia treatment, and in 2011 and 2012 shifted his focus towards scalp itching and hair treatment. L'Oreal shows one patent every year from the class of microbially-produced actives. From 2009 to 2012, about 80% of the patent records disclose actives from anti-dandruff category. L'Oreal didn't show any shift in technology focus during study period. Lion Corp. maintain patent portfolio for hair growth and alopecia treatment. IAC initially focused its R&D efforts in natural extracts and later diversified to peptides and proteins. Bioland doesn't show any consistency in patenting, only 3 patents were found collectively in 2008 and 2010. Even if strong preference by consumers for botanical products, none of the company focused its R&D into it.

Patent Portfolio Analysis of Packaging Type or Applicator

43 patent records disclose composition along with packaging of leave-on-products. Maximum number of patent records describe product with applicator. Few applications claim packaging of product into bottle, sachets, bags and tubes. Patenting of formulation or product with packaging material shows importance of container or applicators in leave-on-products. Table 11 gives details of disclosure of product packaging or applicator of leave-on-product. The need to use products is quickly and easily increasing among consumers due to the rhythm of life and the scarcity of time. The manufacturers constantly try to adapt to these social changes, introducing slight variations to improve the experience of using the product, with more convenient packaging. Small innovative changes in packaging can add commercial value to the product if they can simplify their use.

Patent Gap

Even if there is huge demand for the hair colorants in the market, no significant patent records were found which will disclose coloring technology. No patent was found in combination of all the benefits for scalp active category.

Market Analysis

The world hair care products industry witnessed 3% expansion in 2010, generating revenue of almost $49 billion and volume sales of more than 15 billion units. The market is expected to reach almost $58 billion in 2015, representing 18% expansion over a five-year period. The market should hit a volume of almost 18 billion units in 2015 for a 19% growth rate.11

The fastest growing segment within haircare is anti-dandruff, anticipated to grow at a CAGR of 7.1% over the 2012–17 periods, which can be attributed to strong existing interest in emerging economies
regarding dandruff and scalp treatments. This segment is being driven by innovation in developed markets and use in emerging markets.12

The emerging markets contributed nearly 90% to overall hair care value growth in 2013. Developed markets played strategic role as they contributed 50% of global hair care value sales. In terms of growth, conditioners recorded the highest value growth i.e. 40% followed by hair colorant segment at about 30% between 2008 and 2013.

Still it has been observed that no significant patenting trend found in hair colorant segment. Shampoos contributed the most to the value growth of hair care, specifically, shampoo with conditioners. A key impetus to the growth in shampoos has been aspiring consumers in emerging markets upgrading to more premium western brands, their rising disposable incomes as well as the increasing penetration in rural areas.

Brazil is the focal point of growth in hair care segment. Brazil contributed about 20% to global hair care retail value growth in 2013. This is because Brazilian women have a strong preference for straight hair and spend considerable amounts on conditioners and moisturizers. But no significant patenting as country of origin found in case of Brazil.

Per capita spending in developed markets is much higher than developing markets, with the exception of Brazil. For example, in Norway, per capita spending on hair care is almost 50 times higher than per capita spending in India, despite India’s robust growth prospects in hair care.13

R&D expenditure of Henkel in 2008 was 429 million Euros which in 2010 decreases to 391 million Euros. In 2014, it again increases to 413 million Euros showing consistency in R&D expenditure to fund the innovations due to which Henkel maintains first position in patenting. During 2012 to 2013, L’Oreals’ overall R&D expenses increased strongly at 8.4% and thus increased as a percentage of sales from 3.5% to 3.7%. Gross profit of 16,374 million Euros, came out at 71.3% of sales, compared with 70.7% in 2012. Thus, these two companies spend a lot of money in R&D and maintain their top rank in hair care segment.

**Conclusion**

It is evident from the patent portfolio analysis, natural products is a fast growing category, reflecting the increasing preference of consumers for less synthetic and more for ‘natural’ or ‘botanical’ products.

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<table>
<thead>
<tr>
<th>Packaging/applicator types</th>
<th>Description</th>
<th>Number of patent records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerosol container</td>
<td>Aerosol containing foam</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Aerosol with pump bottle containing foam</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerosol with pump-action spray</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerosol or pump-type sprayer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerosol spray with actuator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerosol sprays</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerosol included or a non-aerosol included</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerosol cans with propellants</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Device - applicator, dropper, spray pump or unit dose blisters</td>
<td></td>
</tr>
<tr>
<td>Applicator</td>
<td>Applicator device</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Applicator pen, spray applicator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Applicator such as a wipe, roller or spray</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manual applicator</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Masks, patches, applicators, cotton ball, swab, pad, applicator pen and spray applicator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Roll-on applicator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tube applicator device</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wipe, puff, roller, or spray</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Care spray</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bottle, tube, roll-ball applicator, propellant driven aerosol device, squeeze container or lidded jar</td>
<td></td>
</tr>
<tr>
<td>Bottle</td>
<td>Solution bottle</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Spray bottle</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bottle with applicator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Container with a label</td>
<td></td>
</tr>
<tr>
<td>Packaged</td>
<td>Packaged in bags</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Packaged in pouches</td>
<td></td>
</tr>
<tr>
<td>Kit</td>
<td>Kit consist of water-tight, transparent container with a lid that may be opened and reclosed</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Kit providing composition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kit &quot;PRO-Clean(TM)&quot;, supplied from Hygiena, contains a cotton swab, a protein detecting composition</td>
<td>5</td>
</tr>
</tbody>
</table>

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Table 11—Analysis of patent records disclosing packaging type applicator
Consumers are better informed, they care more about their hair health and they are more concerned about the risk of infections or hygiene-related diseases. Gradually the technology in hair care segment is changing from synthetic, chemical, temporary to natural, botanical, long lasting alternatives. For example, Minoxidil and Finasteride, are the only clinically proven, mildly effective actives used for hair growth but not shown much presence in patent records.

Patents for dandruff treatment are available in large number as compare prevention and treatment of hair loss, reducing scalp inflammation and hair treatment. This shows the more focus of R&D on research related to dandruff treatment. Many patents combined the benefit of actives to increase commercial value of patent and consumer acceptance of product. Many patent records disclose packaging style of the product taking into consideration of consumer demand. Patenting of packaging style of product gives unique identity to the product, a key way of differentiating a product from the competition and help in brand building. The growing environmental concerns have led use of biodegradable packaging, lighter packaging, refill packages, use of smaller packs.

References