A Fresh Take on Oral Care

Innovating for multi-functional products, applying trigeminal sensory materials, the pursuit of freshness and more.

Sales of over-the-counter oral care products reached $4.9 billion in 2012, up 2.2% from 2011 sales, according to "Oral Care Products in the U.S., 8th Edition.[a]

Market Overview: Growth and Innovation

Growth has been reported by the oral care categories' global leaders. GlaxoSmithKline's 2012 oral care sales totaled £1,797 million, boosted by products such as *Sensodyne Repair & Protect*, *Sensodyne Repair & Protect Whitening* and *Extra Fresh*.[b] The company's denture care business also expanded 17% in emerging markets for the year.

Meanwhile, Unilever launched product innovations such as *Signal Expert Protection* and *Close Up 3X* fresher breath, that latter of which was rolled out in more than 40 markets.[c] In China and Europe, the company introduced *White Now Triple Gold*.[d] The company has reported that consumers in developing markets are increasing their frequency of consumption of oral care products.

Procter & Gamble has reported that its health care sales comprise 15% of 2013 net sales. The category includes oral care, in addition to personal health care and feminine care. The category is typified by brand names such as Crest and Oral-B.

Colgate-Palmolive, meanwhile, has reported oral and health care nine-month 2013 sales of $11,431 million. The company has reported strength in Latin America, boosted by brands such as *Colgate Luminous White*, *Colgate Total Professional Gum Health* and *Colgate Triple Action Extra Whitening* toothpastes, and mouthwashes such as *Colgate Luminous White*, *Colgate Plax Fresh Tea* and *Colgate Plax 2 in 1*.[e] In the Europe/South Pacific region, the company drove growth with premium products such as *Colgate Max White One Luminous*, *Colgate Max Fresh ActiClean with SmartFoam*, *Colgate Total Pro Interdental* and *elmex Sensitive* toothpastes.[f]

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In addition to health concerns, consumers are looking to whiten their teeth and freshen their breath, the Packaged Facts oral care report notes. If a product can do all three, all the better: products that provide multiple benefits are proving to be the most attractive to consumers, as they are more convenient and affordable than the alternative of having to purchase multiple product types. Similarly, marketers looking to spur sales in several categories have had success with "product suites," groupings of products presented as a complete oral care

Side Note: Flavor Profiles

U.S. and E.U. consumers tend to prefer traditional taste profiles—i.e., mint—in their oral care products, and so are less prone to experimentation, says Mike Munroe of Takasago. Asia, Russia and some Latin American markets, however, have displayed a greater appetite for novel/non-traditional sensory profiles. Some products launched for the Russian market, for example, are floral and pine-like. Despite this, the majority of flavor profiles, particularly in the United States and Europe, are dominated by mint.

[a]Portions of this article were originally published by GCI Magazine (*www.gcimagazine.com*) as "Growth In Professional Oral Care Led by Anti-caries and Whitening"; original report from Packaged Facts can be accessed at *www.packagedfacts.com*.

[b]*Sensodyne Repair & Protect, Sensodyne Repair & Protect Whitening* and *Extra Fresh* are trade names of GlaxoSmithKline.

[c]*Signal Expert Protection* and *Close Up 3X* are trade names of Unilever.

[d]*White Now Triple Gold* is a trade name of Unilever.

[e]*Colgate Luminous White*, *Colgate Total Professional Gum Health*, *Colgate Triple Action Extra Whitening*, *Colgate Luminous White*, *Colgate Plax Fresh Tea* and *Colgate Plax 2 in 1* are trade names of Colgate-Palmolive.

[f]*Colgate Max White One Luminous*, *Colgate Max Fresh ActiClean with SmartFoam*, *Colgate Total Pro Interdental* and *elmex Sensitive* are trade names of Colgate-Palmolive.

Some successful two-phase mouthwash products are coming onto the market featuring bacteria-killing actives for immediate freshening, and zinc for neutralizing volatile sulfur compounds from oral bacteria throughout the day.

package, which encourages consumers to remain brand-loyal. The ability to achieve professional results at home without the expense and time of a dental office visit is another powerful product positioning, notes David Sprinkle, research director at Packaged Facts.

By 2017, Packaged Facts projects that retail sales of oral care products will approach $6 billion, reflecting a compound annual growth rate of approximately 4%. Besides the driving forces of the increased appeal of multi-function products, professional quality products and oral care "suites" that provide a one-stop shop for consumers, market gains will be stimulated by the growing Hispanic population and the aging Baby Boomer market. The annual percentage gains could be higher if oral care marketers are able to produce exceptional ingredient developments or research findings, or are able to develop new product lines that address previously underserved dental conditions, such as dental care for diabetics. Conversely, this generally mature market could see sales slip should consumers ignore the growing focus on oral care and overall health, or should another economic downturn affect their willingness to spend on personal care items that are not seen as a necessary part of their health regimens.

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The U.S. professional oral care market grew 5.1% over the last three years to reach $426.5 million in 2013, according to Kline & Co.'s "Professional Oral Care USA" market report.[g]

According to the report, caries (tooth decay) remain the leading therapeutic indication within the professional oral care market in 2013, claiming sales of more than 43% of the total U.S. market due to sales gains of fluoride varnishes. Fluoride varnishes are preferred over other topical fluoride therapy treatments such as gels and foams due to their ease of application, efficacy and safety. Contributing to the popularity of fluoride varnishes has been the addition of amorphous calcium phosphate (ACP), allowing a greater fluoride uptake to the tooth.

Given Kline's findings on the high importance of brand loyalty, this early engagement is a worthy long-term strategy. Kline's research has found that consumers tend to purchase brands that they have used since childhood; moreover, they are likely to pass on their habits to the next generation. Conversely, dental professionals will often recommend oral care products based on their active ingredients rather than specific brands. An estimated 60% of total U.S. professional oral care market sales in 2013 is claimed by the top five marketers, with Colgate-Palmolive leading with 14.6% market share, followed closely by 3M and Philips.

Kline's comprehensive report also analyzes unmet needs and new technologies of interest as expressed by dental professionals. These include air flossers, better plaque removal methods, calcium augmenting products with low antibiotic content, and oral cancer detection products.

Sensory and Multi-functional Innovations

"New [oral care] launches seem to be split generally between sensory and functional benefits," says Mike Munroe, of Takasago's mint and Sensates group.[h]

In the wake of anticavity innovations in the 1960s and 1970s, and chewing gum's evolution in the 1980s and 1990s, Munroe says, "Consumers seem to take such benefits for granted now and focus more on cosmetic [aspects] with real, tangible benefits of fresh breath (for confidence) and white, shiny teeth for a winning smile." He adds, "Consumers increasingly want their cake and eat it too, in the sense that they want benefits delivered as fast and as easy as possible with little or no compromise."

Many oral care products feature new combinations or rebrandings of existing technologies, dominated by claims for cavities, gingivitis, sensitivity, tartar control, whitening and fresh breath. For instance, some successful two-phase mouthwash products are coming onto the market featuring bacteria-killing actives for immediate freshening, and zinc for neutralizing volatile sulfur compounds from oral bacteria throughout the day.

"As our customers are putting things together differently, all of the active ingredients that they're using in their [products], whether it's fluoride or zinc or chlorhexidine (in mouthwash) or whatever they might be using, these things have a natural taste of their own," says Munroe. "With each formulation, customers want to put in as much [active ingredient] as possible to have the best possible clinical claims. There are certain hurdles with perceived off-taste. Something that might be extremely salty, for example, might be great for helping with sensitive teeth, but if it has a natural salty bitter taste we'll have to try and mask it. The challenges are becoming tougher."

[g] *www.klinegroup.com*

[h] The term Sensate is a trade name of Takasago.

Whitening

The rapidly growing whitening therapeutic indication had sales estimated at more than $117 million at the manufacturers' level in 2013, reflecting a CAGR of 10.5% from 2010, according to Kline & Co. figures. Encouraged by convenience, cost advantage, and technological advances, take-home whitening treatments dispensed through dentists' offices have been gaining popularity over in-office treatments.

"With newer whitening treatment formulations having built-in desensitizing ingredients, one of the biggest disadvantages of take-home whitening alternatives has been addressed," says Laura Mahecha, Kline's Healthcare industry manager. "However, the increased sales of advanced whitening treatments containing desensitizers have had a detrimental effect on sales of sensitivity products given that consumers no longer need to purchase additional sensitivity products."

Despite this challenge, manufacturers' sales of anti-tooth-sensitivity products have seen a CAGR of 3.4% over the last three years.

"In the United States, new whitening formulations such as *Colgate's Optic White* have taken the market by storm," says Munroe.[i] "International products such as Unilever's *WhiteNow* product containing a blue dye to give users' teeth the impression of being whiter instantly, as opposed to after two weeks of constant use.[j] Perhaps the most upscale whitening product to hit the market anywhere is the Sunstar Japan Settima *Crystal Bright* toothpaste containing diamond powder for enhanced whitening.[k] At $15 a tube, it represents good value for diamonds and continues to take the Japanese oral care market from the pharmacy counters into the beauty care sector."

"Whitening is driving the [oral care] category right now," says consulting chemist Jim Creagan. "The biggest technical hurdles are with some of those whitening compounds in the final blend … and how they interact with the flavors. I've had some cases where they've reacted to cause an off flavor either immediately or when the product goes into stability after 30, 60 90 days on the shelf. Then you can start to produce some off notes with the product sitting on the shelf. So then you have to go back and look at the chemical composition of the additives and how does that interact with the flavor. Then you tweak the flavor, changing either the ingredients in the flavor or, if you're dealing with a mint or other oils, doing rectification, further distillation processing on that oil to alter the composition so it no longer has the off interaction with the [additives]."

[i] *Colgate's Optic White* is a trade name of Colgate-Palmolive.

[j] *WhiteNow* is a trade name of Unilever.

[k] *Crystal Bright* is a trade name of Sunstar.

The Fresh Factor

The highly active breath freshening sector features products that kill bacteria to resolve bad breath, or contain agents that counteract unpleasant gasses such a sulfides that also contribute to off-odor.

[l] *Breath Savers* is a trade name of The Hershey Co.

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"Zinc salts are still used for broad oral care benefits, including malodor control, and are even finding their way into candies such as Hershey's *Breath Savers* three-hour mints," says Munroe.[l] "[The salts'] one downside is the astringent taste. There is more work to be done in this sector, and flavor needs to play a bigger role than just providing masking."

Munroe adds, "Colgate has joined the exciting new dual-phase rinse market with their *Plax 2 in 1* rinse, which is similar to the *Dentyl Active* rinse launched in the United Kingdom more than a decade ago.[m] This is a combination of form and function with the oil emulsion [the user] creates themselves while shaking the product helping to capture bacteria in the mouth during rinsing. Spitting out into the sink reveals colored (stained) 'dead bacteria' as important evidence that the product is working. Visually, the product is eye-catching, with the multi-layered oil and water phases helping it to stand out on the shelves for consumers. Perhaps this is the mouthwash of the future?"

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He adds,"In mouthwash there seems to be a move away from alcohol bases. New products that are coming onto the market tend to be alcohol-free-based." As a result, he says, "There seems to be more and more cooling coming into products than before."

"The alcohol helps to kill bacteria, but it just tastes awful, and it dries out the mouth which causes bacteria to re-form" says Steve Pringle, sensory ingredients business director, Renessenz. "People [consumers] associate that up front blast that you get from alcohol with mouthwash. They don't particularly like it, but if you take it away completely, the perception is that the mouthwash isn't performing. Without the alcohol, how do you create a sensory perception that is really powerful? How do you formulate for that? You can only go so far with the flavor profile. How do you drive 'fresh and clean' with other materials?"

"Mouthwash … is great for delivering therapies," says Munroe. "You can deliver different technologies for bad breath, gingivitis, etc. Moving into the non-alcohol [products] has had an impact on the flavor. There's a lot of things alcohol helps to do. It helps boost the flavor so it gives more of an impression, and seems to give more of a sensation of cooling because it has a natural burning [effect], slightly tingling."

This is especially true in high-alcohol products typified by classic Listerine profiles.

When alcohol is removed, Munroe explains, "The challenge is to compensate, especially when we have to work on an alcohol-free version of an existing product, because the [consumer] expectation is there. They want the type of burning sensation; it's a [sensory] trigger for consumers to think 'it's cleaning.'"

This space can benefit from salivation-promoting compounds, Pringle adds. These compounds could potentially be delivered through time-release technology to ensure long-lasting effects. The established delivery method for time-release has been fatty or glassy encapsulation, which tend to be impractical for oral care. The solution could lie in some sort of physical or pH release, Pringle notes, leading to a more premium clean, fresh feeling for consumers over a prolonged time period.

This not only ushers in a new frontier for product claims, but also reflects the increased application of trigeminal sensory materials to add an extra dimension to sensory experiences.

Pringle concludes, "This is all about clean and fresh and how you achieve it. Combining established sensations, such as cooling, with heating, tingling and salivating in a way that the consumer perceives as being fresh, can only lead to better consumer experiences."

To match consumer expectations minus the alcohol, formulators have a range of materials at their disposal, including technologies that provide cooling and warming sensations, and tingling and oral salivation.[n] These trigeminal sensory materials present a strong area of differentiation and innovation for formulators by delivering new sensations to consumers. They also underscore the functional benefits of the products that contain them.

"Sensates are … increasingly being used to differentiate toothpaste, mouth rinse and confectionery products from their rivals," says Munroe. "P&G's *Crest Outlast* claims five-times longer-lasting cooling and delivers.[o] Consumers in the United States and beyond are increasingly inquisitive about these new sensations, and we are seeing the 'trickledown' or 'trickle across'

[m]*Plax 2 in 1* is a trade name of Colgate; *Dentyl Active* is a trade name of Dentyl Active.

[n]Takasago's warming and cooling materials are commercialized under the Intensates tradename, while the oral salivation and tingling technology is commercialized under the Sensingle name. The company has also commercialized application-stable synthetic mints under the Mintact banner, as well as malodor suppressors that attack sulfur gasses under the Transatak trade name.

[o]*Crest Outlast* is a trade name of P&G.

effect from the confectionery and beverage sectors into the notoriously conservative and unsexy oral care category."

The challenge for developers is to apply sensory materials in combinations that meet consumer expectations in the absence of alcohol. Currently, there is no "silver bullet" to replace alcohol; creative and technical expertise is crucial to achieve preferred sensory profiles.

Munroe, meanwhile, views freshness as a step along an ongoing evolution of oral care: "I tend to think of innovation in this category in terms of Maslow's hierarchy of needs. In days gone by in the United States (or in new developing markets globally), the concern was around cavities, gum care, tooth loss, etc. After long years of well-formulated products and public health initiatives—dare I say fluoridation?—consumers are no longer focusing on basic functional benefits and are moving up the 'ladder' to higher benefits such as white teeth and confidence-inducing fresh breath."

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He adds, "As we go higher up, what is next—happiness, contentment, pleasure, harmony? We are already seeing mood-enhancing products in personal care and beverage, so we should not be surprised to hear of mood-enhancing, calming, de-stressing toothpaste in the future."

Additional Flavor Challenges

"There are a number of technical hurdles that have stayed with us for some time to irritate formulators, including finding more flavor materials that are stable in hydrogen peroxide or peroxygenic bases," says Munroe. "The existing list is limited to materials such as menthol and methyl salicylate. Flavor encapsulation has promised much in oral care, but delivered little over the years, and is now reduced to pseudo-encapsulation with formulations using 'particles' as visual aids with no particular release effect, flavor or otherwise."

Companies such as Ingredion and Ashland Specialty Ingredients have launched encapsulation technologies for the oral care sector. Munroe notes that Ashland's *Captivates* gelatin coacervate capsules "work well in most toothpaste formulations and can effectively encapsulate flavor systems."[p]

Munroe continues, "Stability issues surrounding chalk formulation are still with us, but this toothpaste abrasive is much less popular than it used to be, even in developing markets. Silica bases have increased in popularity and seem to offer the most flexibility."

The Natural Factor

Mint oil prices are relatively stable, as of press time, but that can fluctuate depending on the quality of each harvest. When it comes to formulations, there is a constant tension between the desire for natural ingredients and the need for controlled/stable costs.

Some markets more than others desire natural products, though how "natural" is defined around the world varies. Some customers have their own definitions, which might be more rigid than local regulations. Those requests can be particularly cumbersome when the desired profile is unique or exotic. In those cases, a synthetic material might be ideal from a sensory perspective, but the formulator will have to troubleshoot for a natural solution. Overall, however, natural is not currently a major segment driver. Those natural-positioned products that are being launched tend to come from smaller and niche producers.

"Big challenges remain for natural toothpaste formulations in their search to replace sodium lauryl sulfate with a more natural surfactant," says Munroe. "Natural toothpaste consumers seem to always have to compromise between taste and naturalness, even with new launches."

"Natural claims are not very important among the majority of people," says Pringle. "Most people don't associate natural with toothpaste because they don't see themselves consuming

[p]*Captivates* is a trade name of Ashland Specialty Ingredients.

it, and therefore natural doesn't link to nutrition and health in the oral care market. There are some regions where the ingredients which consumers associate health benefits in oral care, such as plaque and tartar control, are beginning to be derived from natural sources, but this is going to be [more] prominent in niche areas."

"There is a small segment of the market that is devoted to natural," says Creagan. "There's probably some room in the market from a flavor perspective for broadening [flavor profiles.] Almost everything out there is a mint base. Mint is becoming a more expensive ingredient, so I think there's room for people to branch out into other essential oils and flavors like cinnamon, clove and lemon. Maybe some cost savings can come from [alternatives], but also people's palates are changing."

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—Mike Munroe, Takasago

Future Growth Drivers

Developing markets promise significant future growth for the oral care market. Brands will need to tailor their products for these consumers, often offering smaller pack sizes to match market needs.

"Cost is the key thing in the developing regions," says Pringle. "That's driving a lot of innovation in terms of how you formulate the same product at a lower cost. There are creative ways of driving out cost in terms of processing and, with ingredients, getting more bang for your buck using more [powerful] materials or [conventional] materials in a more creative way."

In order to grow in Europe, which is a mature and somewhat saturated market, a game-changing design is needed to encourage expanded use of toothpastes and other oral care products beyond two times a day. Here, the desire for fresh breath and a cool mouth, often achieved with products such as chewing gum or mints, provides an opportunity for oral care products to move in and create new category growth. While anticavity and other technologies are well-established, more can be done in the area of combating bad breath and promoting fresh breath, particularly with a powerful chemical cleanse that lasts several hours.

"In the established markets you've got a cost-conscious market from a consumer perspective," says Pringle, noting that quite a few consumers are willing to swap out private labels for some oral care products. "That's going to open up an opportunity for [emerging] brands to establish themselves."