18 June 2018

Microbial contamination of cosmetic accessories: Risks and solutions?

Cosmetic accessories and applicators are examples of high-risk products in terms of microbial contamination during use. This contamination poses a risk for users and is a source of concern to manufacturers in the cosmetics industry. In order to limit the spread and transfer of microorganisms to users, Pylote develops world-first antimicrobial technology that guarantees safe use of cosmetic accessories and applicators throughout their shelf life.

What are the risks for consumers?

The risks generated by microbial contamination on these types of products range from the development of unpleasant odours to full-blown skin and eye infections affecting their users [1]. Microbial contamination is strongly related to the composition and configuration of these cosmetic products, as well as the way in which they are used. Due to their design, accessories such as make-up sponges and brushes are perfect traps for the humidity, sebum, cells and microorganisms present on the skin, and offer an ideal environment for germs to thrive. In the case of applicators combined with a formula such as mascara, some of the microorganisms transferred during use find their way into the formula and can then develop and spread, despite the presence of preservatives. They are then transferred back to the consumer via the applicator [2] [3].

Cross-contamination is also a significant risk to be taken into consideration. Each person's skin microflora is unique and can be harmful to other people [4]. Yet, now that testers and trial makeovers are becoming increasingly common in stores, many consumers effectively share potentially contaminated products. For example, an Australian woman ended up paralysed in 2015 after contracting a bacterial infection from a friend's make-up brush [5].

Are there any solutions?

To reduce microbial contamination, the first course of action is to clean all cosmetic accessories very thoroughly on a regular basis. But because this can be tricky, users do not tend to clean their products as often as they should, or else they do so poorly – not thoroughly enough to really remove all the germs present.

Another solution (mainly for beauty salons and stores) is to use disposable, single-use applicators that lower the risk of cross-contamination. This initiative is questionable from an environmental point of view, especially as regards its carbon footprint and the volume of waste generated.

Market stakeholders have also tried out solutions based on the incorporation of additives directly in the accessory or applicator, the most common ones being:

- Silver (nano)particles: they have microbial properties but the way they release ions via migration means their effectiveness decreases over time and eventually stops, and they also contaminate the elements they come into contact with. Many studies have also demonstrated their potential toxicity for humans and the environment, in addition to the fact that certain microorganisms are resistant to these (nano)particles [6] [7] [8]
- Pyrithione Zinc: despite its proven antimicrobial properties, its cytotoxic effect on skin cells makes it unsuitable for everyday use [9].
- Activated carbon: absorbs microorganisms to a certain extent but without destroying them, which means its effectiveness is limited over time.

ABOUT PYLOTE

pylote

Created in 2009, Pylote conceives and products innovative unique green mineral microspheres that can be integrated in many cosmetic accessories, through an exclusive in-house manufacturing process.

Through a complete industrial offer and a licensed commercial model, Pylote brings added value to its clients, who are also present in pharmaceutical, food or industrial markets, by proposing end consumers with greener, cleaner and safer products.

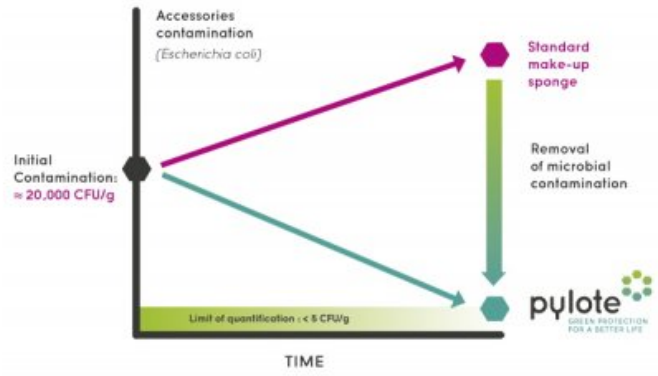
Company website: **www.pylote.com**

Pylote patented technology

Pylote develops, produces and markets innovative technology based on an exclusive manufacturing process for 100% mineral microspheres. The composition, size, structure and density of these microspheres is perfectly controlled, and as a result they transfer microbial properties to the materials into which they are integrated without altering the manufacturing process at all. Once they have been integrated, they do not migrate into the formulas, thereby guaranteeing that the formula remains completely stable and its efficacy entirely consistent over time. Given that these microspheres are 100% mineral and COSMOS-certified, plus the fact that they do not contain any nanoparticles and there is no migration from the host material, the technology is totally safe for consumers.

Pylote has a significant impact on a wide variety of microorganisms, including bacteria expressing acquired antibiotic resistance, and viruses [10]. Regarding the latter, a degree of efficacy that goes beyond international standards for viruses such as cold sores, for example, as well as an adenovirus involved in conjunctivitis, paves the way for a wide variety of applications in the lip and eye area.

Microspheres have been integrated successfully on the industrial production lines of many accessories and applicators (sponges, brushes, spatulas, etc.). The JIS Z 2801 standard [11] and its counterpart, ISO 22196, developed in order to measure the antibacterial activity of treated surfaces, has been adapted by independent scientists and laboratories and certified to measure the actual reduction of microbial contamination risks directly on manufactured accessories, on Escherichia coli and Staphylococcus aureus, two main sources of infections in humans [12].



After 24h of incubation in conditions that sustained the viability of bacteria, the innovation offered by Pylote totally eradicated the microbial population contained in the accessories (lower count than the quantification threshold) and drastically reduced the related risks.

Conclusions

Pylote is therefore extremely effective at reducing the risk of contamination between two instances of use and between two users of cosmetic accessories and applicators.

By guaranteeing the cleanliness of the tip of applicators used in combination with a formula, Pylote technology limits the transfer of microorganisms to the formula and consumers.

Finally, when applied to current application devices such as flip-top bottles, cannula assemblies and pumps (of the airless type), Pylote technology reduces the biggest source of potential contamination during use in order to boost the efficacy of the preservation system and reduce and/or select the preservatives included in cosmetic formulas while guaranteeing that consumers are offered a "microbiologically clean" dosage.

This publication is provided by the Marketing & Sales Department of Pylote.

Footnotes

[1] Dadashi and Dehghanzadeh, 2016. Health Promot Perspect 6: 159-63.

[2] Campana et al., 2006. Lett Appl Microbiol 43: 301-06.

[3] Pack et al., 2008. Optometry 79: 587-93.

[4] Grice and Segre, 2011. Nat Rev Microbiol 9: 244-53.

[5] CNN International Edition. Herpes and other germs lurking on makeup. November 10, 2017.

[6] Reidy et al., 2013. Materials 6: 2295-2350.

[7] Panacek et al., 2017. Nat Nanotechnol 13: 65-71.

[8] ANSES, 2015. Report on Silver nanoparticles.

[9] Priestley and Brown, 1980. Acta Derm Venereol. 60: 145-48.

[10] Feuillolay et al., 2018. J Appl Microbiol 125(1): 45-55.

[11] JIS Z 2801 (Japanese Industrial Standard), 2010. Japanese Standard Association.

[12] Bachir raho and Abouni, 2015. InThe Battle Against Microbial Pathogens: Basic Science, Technological Advances and Educational Programs (A. Mendez-Vilas, Ed.) 2: 637-48.