

BEAUTY, HEALTH AND WELL-BEING WITH COSMETOTEXTILES

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Abstract: The concept of cosmetotextiles, as another aspect of new beauty and health marques a growing success. This hybrid fabric, is definite as a textile article that contains a substance that is release sustainable on the human body skin pointed to perfume, change of appearance, maintenance in good condition, protection, or correction of body odors. Cosmetotextiles are created by microencapsulating different substances for body care or health, that are gradually transfer to the skin, by movement, pressure or the effect of the skin’s natural warmth and enzymes. The paper presents some elements regarding to the microencapsulating process (the major components of them general structure, the major advantages compare to usual presentation of cosmetic substances, some of the used active ingredients and them specific cosmetic and health benefits) and the new generation of cosmetotextiles that bring together the latest innovations in fiber and textile structures and products. So, one of the manufacturing processes of a cosmetotextile is based on functionalisation of fibers by fixing microcapsules in them structure, resulting fibers as Novorel, Tencel C, Nilit Breeze, Emana, or by the functionalisation of fabrics, so of products made by these fabrics, where microcapsules are fixed on the external surface of the fabric, resulting in revolutionary “fabrics’ treatments” for beauty, health-care and well-being. Among these cosmeto fabrics and products are Sensitive Ultra Light Firming fabric, Sensitive Fabric Body ware, textile fabrics with the revolutionary Quiospheres technology, Doubleskin and different cosmeto-knitted products including specific placed areas with microencapsulated ingredients, depending on them destinations (slimming, anti-cellulite treatment, corrective effect).

Key words: microcapsules, active ingredients, cosmeto fibers, cosmeto products

1. INTRODUCTION

In recent years, the customers request for apparel and home textiles containing not only their original basic characteristics, such as comfort, but also extra functions such as health and beauty care. Textiles materials found new applications in the cosmetic field, served by the rapid development of sciences and technologies. Because the quest for well-being and health, in our modern societies, is not simply a fashion, but a serious underlying trend, the market offers numerous opportunities for such functional textiles. Cosmetotextiles are designed to transfer, on contact with human body, an active substance for cosmetic purposes, by example the transfer of skin moisturizing substances. To achieve well-being and health functional effects, the cosmetic and pharmaceutical ingredients are imparting into the fabric of the clothing, and with the natural movements and warmth of the body, the skin receives slowly these ingredients. In odder to prolong the functionality of cosmetic textiles and provide satisfactory performance with increase durability, is necessary to control, the release properties of active ingredients, by microencapsulating technology.

2. MICROENCAPSULATION PROCESS

The microcapsules, produced by depositing a thin polymer coating on small solid particles or liquid droplets, include in them general structure two major components (**Fig. 1**):

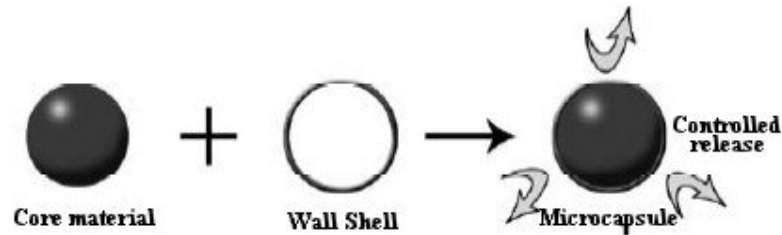


Fig. 1: Structure of a microcapsule

- a) *active ingredient* (named too: core material, internal phase), which is a substance that may be in liquid or solid form;
- b) *wall shell*, a natural, semi-synthetic or synthetic polymer coating, (also called: external phase, membrane, matrix), that surrounds the active ingredient.

Each microcapsule holds a specific amount of cosmetic substance which is the same as conventional cosmetic, but in a concentrated formula (without water). The major advantages, offered by using microcapsules, are:

- the ability to protect the active ingredient from hazardous environments (heat, acidity, moisture, evaporation);
- controlled release properties, under controlled conditions, resulting in increasing efficiency, performance and durability.

The release of core content may be by friction, pressure, change of temperature, diffusion through the polymer wall, biodegradation, etc., depending on the selecting of wall materials and more, on the textile end uses.

Microcapsules with specific active ingredients are used to obtain different cosmetic and health benefits:

- for slimming – the shaping textiles include seaweed (*Fucus*, *Gelidium cartilagineum* – for burn of feat, anti-orange peel, firming) and vegetal oil (*Safflower seed oil* and *Sunflower seed oil* – for moisturizing and nourishing);
- for refreshing (anti-fatigue, soothing, revitalizing) – are used *Menthol* and *Ivy extracts*;
- for anti-perspiration – is used *Aloe Vera*;
- for relaxing – are used *Ylang-Ylang*, *Neroli Essential oil*, *Grape seed oil*;
- for hair care – by using a sponge towel micro-fibers [1] (**Fig. 2**), impregnated with different ingredients:



Fig. 2: Sponge towel with hair care ingredients

- for care & sheen. Because the dryness of the hair is linked to the altered hydrolipidic film, which no longer fulfils its barrier function against external aggressions, for nourishing, moisturizing and regenerating the hair the necessary active ingredients are the *Apricot stone oil organic* (rich in vitamin A, in omega 6 and 9) and *Macadamia oil organic*;
- for anti-dandruff the natural active ingredients are *Bertholletia seed oil*, rich in selenium (the defficiency of selenium on the body cause increase of the desquamation process in the scalp) and *Copaifera officinalls* – rich in *Beta-caryophylene*, a natural bactericide, that helps to reduce of inflammatory process in scalp;
- for prevention of hair loss are used three ingredients: *Inula Crithmoide Extract* – for a better protection and hair restructuration, *Sea Buckthorn berry oil* – to provide hair from sun damage and *Ginger extract oil* – for stimulate micro-circulation of derma papillary.

3. COSMETOTEXTILES

Today, a new generation of cosmetotextiles has appeared which bring together the latest innovations in fiber and textile structures and products.

3.1. New fiber for cosmetotextiles

One of the manufacturing processes of a cosmetotextile is based on functionalisation of fibers by fixing microcapsules in their structure:

- NOVOREL nylon microfiber [2] (patented in 2006 by Nurel), incorporates the microcapsules into the polymer of their nylon yarn, before extrusion;
- TENCEL C, from Lenzing, contains microcapsules of chitosan (a substance made from the shells of shrimps) in the realm of the spun cellulosic that reinforce the skin's barrier by up to 50%, maintaining optimal moisture content and stimulating cell renewal;
- NILIT BREEZE – a new fiber from Nilit [3], that through a combination of a flat cross section structure, a unique polymer with inorganic micron particles, and a special texturizing process, ensure the lower of body temperature;
- EMANA, a bioactive yarn from Rhodia [4], is created by the combination of polyamide 6.6 and a polymer with added bioactive crystals of bio ceramic. These crystals are built into the DNA of the fiber itself. The fibers reflect the far infrared rays emitted by the body back into the skin, helping to regulate the body's temperature, reducing the accumulation of lactic acid, and improving skin tone. The advantages of EMANA over other fiber technologies are:
 - o comfort and maintenance – the garments are as comfortable as those made with normal polyamide, they have the same maintenance requirements as a regulate polyamide microfibre, and no special care is needed while handling or washing the garment. Because the special properties are intrinsic to the yarn, the effectiveness of fiber remain unaltered over time despite frequent washes, with the recommendation to wash only by hand;
 - o hypoallergenic – the interaction between the fiber and the skin is exclusively physical in nature because there is no need for additives to be applied to the finished garment, that are harmful to the body;
 - o easy care and eco-friendly – the products manufactured with Emana are easy to wash and dry, and do not need ironing. The production process of Emana produces no waste, therefore being an environmentally friendly “green” fiber.

3.2. Cosmeto fabrics and products

Another method to manufacture cosmetotextiles is the functionalisation of fabrics, so of products made by these fabrics. In this idea, microcapsules are fixed on the external surface of the fabric, resulting in revolutionary “fabrics’ treatments” for beauty, health-care and well-being.

- ❖ **Eurojersey** (an Italian warp knitter) created [5]:
 - o *Sensitive Ultra Light Firming* fabric, which includes ‘firming active ingredients’ - that improve the elasticity and brightness of the skin;
 - o *Sensitive Fabric Bodyware*, that offers a treatments program for optimal hygiene and better control of perspiration. To keep the wearer feeling fresh all day long increasing comfort in all conditions, the fabric includes a silver based solution that inhibits the growth of odor-causing bacteria helping your clothes to stay fresher, more comfortable and in better condition for much longer. Moreover, due to an innovative polymer applied on this fabric, it changes properties in response to body's temperature: at low temperature it captures moisture, keeping the body drier and warmer, as temperature increases, it cools the body.
- ❖ **Clariant** (a global specialist in chemicals for the textile industry) and **Lipotec** (a creator of cosmetic ingredients) developed a new technology called **Quiospheres®** based on microcapsules which react with natural skin enzymes to release and deliver their cosmetic ingredients, and a homogenous, durable application of these capsules to knitted, woven, and non-woven textiles [6], [7]. Quiospheres® technology can be applied to any textile fabric, such as cotton and nylon. It said, the cosmetic benefits are released onto the skin through a two-step technology(**Fig. 3**):

- first step **AFFINITY** (= Attraction) - is the “transphere” of the microcapsules which, thanks to the special design of Quiospheres®, confers them a high affinity for the skin;
- second step **GRADUAL RELEASE** (= Reaction) - the cosmetic ingredients, encapsulated in a fully cosmetic and biocompatible shell, interact with the body skin enzymes, allowing the ingredients to be delivered to the skin. Lipotec’s ingredients (such as peptides) have been proven to be biologically active and they are gradually released while the finished garment or product is worn. The release of the ingredients is scientifically measured and continues for an extended period of time. Not only are ingredients long lasting but the fabric has good wash resistance and the microcapsules remain effective through 20 wash cycles.

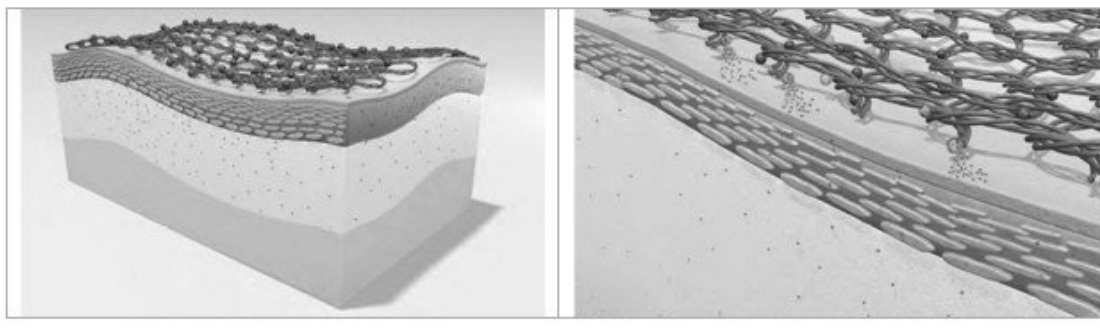


Fig. 3: The two-steps of Quiosphere Technology: attraction and reaction

Advantages:

- Quiospheres® withstand around 20 or more washes, depending on the how the textile is worn and laundered;
- Quiospheres® microcapsules are protected and are unaffected by the impact of handling, mechanical stress and high temperature throughout the textile production process. Garments can be made up, pressed, ironed and steamed at warm temperatures up to 120°C (for 1 minute);
- Quiospheres® technology can be applied to any textile fabric, such as cotton and nylon;
- Quiospheres® properties enable to encapsulate virtually all kind of cosmetic ingredients, even water soluble compounds;
- Quiospheres® microcapsules are based on high technology actives or peptides and actually work with the layers of the skin. They are designed to work continuously over an extended period of time through gradual release (as opposed to a one-off hand applied application of a cosmetic cream);
- garments incorporating Quiospheres® can be tumbled and ironed at warm temperatures up to 70°C.

❖ **Doubleskin** [4] is a product including Emanafibers (that absorb the electromagnetic waves emitted by the human body, and then turns these waves around towards the body based on resonance (**Fig. 4**), is suitable for bioactive clothing because the interaction between the fabric and the skin offers a significant improvement in both microcirculatory blood flow (+92%) and of cellular metabolism. The augmentation of the microcirculatory blood flow deliver important benefits in terms of cosmetics and athletic performances:

- esthetic benefits:
 - **an improvement in collagen synthesis** – it results in an increase in the skin’s elasticity and softness.
 - **cellulite reduction** - An insufficient microcirculatory blood flow is the reason for the irregular distribution of the temperature of the skin. This insufficiency generates an accumulation of liquids that prohibits the lymph node from draining the body correctly. Consequently this causes the growth of fat pockets and modifies the appearance of the epidermis and gives it the “orange peel” effect. By stimulating microcirculation and lymphatic draining, the effects of cellulite are reduced, there is a prevention in the accumulation of fat, and an overall reduction in skin blemishes.
 - **more collagen synthesis** - Doubleskin stimulates collagen synthesis, turning your skin healthier and younger.
- athletic benefits:

- **better body thermoregulation:** the augmentation of microcirculatory blood flow produces a more uniform distribution of heat on the skin's surface - consequently the body disperses of heat faster and maintains a better thermal equilibrium during physical exertion.
- **increase in muscular efficiency and resistance:** by increasing microcirculatory blood flow there is a progressive reduction in the formation of lactic acid and a positive influence in the oxygenation of cells. Consequently there is an increase in physical performance, and muscle recovery time is reduced.

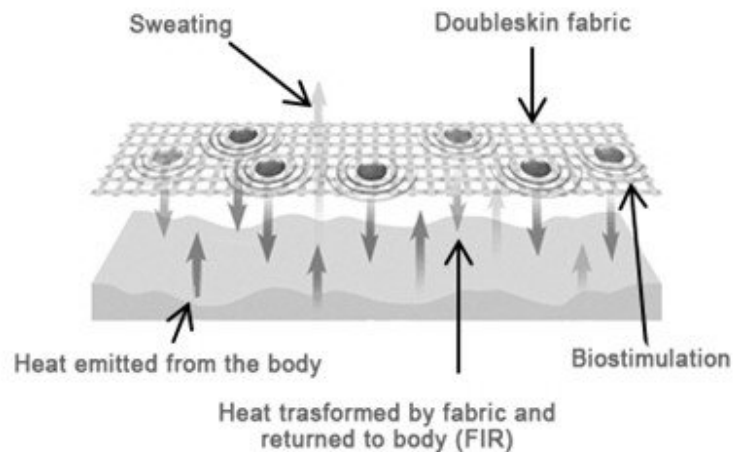


Fig. 4: The work of Doubleskin

Because Emana's special characteristics are activated by body heat, even the slightest amount of physical activity increase the garment's effectiveness.

To manufacture cosmeto-knitted products, depending on them end uses, in the whole garment or in different areas of it, are used specific structures [8]:

- *as a second-skin*, for wellness and slightly shaping - is indicated an elastic knitting, realized by polyamide and elastane microfibre (**Fig. 5a**);
- *for micro-massaging* - is used a double honeycomb knitting, realized by advanced technical yarns, which ensure the acceleration of blood circulation, resulting in a slimming action (**Fig. 5b**);
- *for corrective-shaping* - is used a mesh flexible compression knitting, placed in targeted areas, as hips, thighs, stomach, chest (**Fig. 5c**)

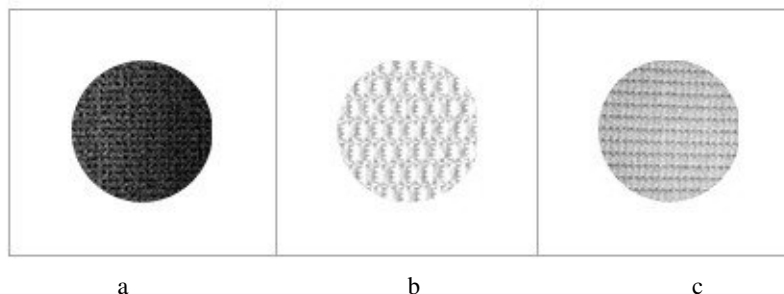


Fig. 5: Knitted structures for cosmeto products

Depending on them destinations (slimming, anti-cellulite treatment, corrective effect) there are different cosmeto-knitted products including specific placed areas [8] with microencapsulated ingredients (**Fig. 6**).

Slimming products		
		
Bike shorts	Capris	Legging
Anti-cellulite treatment products		
		
Bike shorts	Capris	Sleeves
Corrective effect products		
		
Belt panties	Shorty	Bra

Fig. 6: Cosmeto-knitted products including specific placed areas with microencapsulated ingredients

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