

**EFFECTS OF PERSONALIZED COSMETICS ON BASIC SKIN PARAMETERS
MONITORED BY NON-INVASIVE BIOPHYSICAL MEASUREMENTS**

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Personalized skincare approach represents actively growing area in cosmetics industry. Main advantage of personalized cosmetics is a possibility to choose ingredients according to in vivo measurements and monitoring of skin parameters. The aim of this study was to evaluate efficacy of personalized creams. Study included 90 healthy subjects, average age 35.1 ± 12.8 years, 78 (86%) females and 12 (13.3%) males with dominantly dehydrated skin ($n=54$, 60%). Multi Probe Adapter (Courage & Khazaka, Germany) was used for facial skin parameters analysis: hydration, surface sebum content, erythema/melanin index and skin pH at forehead, chin and cheeks. Measurements were performed twice under controlled conditions, before and after personalized creams application. Subjects have used personalized creams twice a day during three months. Hydration was significantly increased (41.4 ± 12.5 to 53.1 ± 11.1 ; $p < 0.001$). No significant difference is observed in melanin (148.6 ± 37.3 to 145.5 ± 27.8 ; $p = 0.241$) while decrease is notified in erythema (361.5 ± 80.2 to 346.9 ± 61.3 ; $p = 0.003$) and pH (5.42 ± 0.49 to 5.32 ± 0.39 ; $p = 0.042$) which remained in optimal range. In total of 47 subjects (52%) skin hydration was significantly increased. In subjects with sebum deficiency (< 70 , $n = 66$) significant increase was observed in 13 (19.7%), while at consumers with the sebum excess (> 180 , $n = 9$) significant decrease was recorded in 8 (88.8%) of them. In conclusion, personalized creams application leads to significant improvement of skin hydration and sebum content normalization on cheeks alongside with erythema reduction. These results indicate efficacy of personalized skincare, and implying the possibility of following research in personal care products impact on skin behavior.

EFEKTI PERSONALIZOVANE KOZMETIKE NA OSNOVNE PARAMETRE KOŽE PRAĆENI NEINVAZIVNIM BIOFIZIČKIM MERENJIMA

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Personalizovani pristup nezi kože predstavlja rastuću oblast kozmetičke industrije. Glavna prednost personalizovane kozmetike je mogućnost odabira sastojaka u skladu sa *in vivo* merenjima i praćenjem parametara kože. Cilj studije bio je procena efikasnosti personalizovanih krema. U studiji je učestvovalo 90 zdravih volontera, prosečne starosti $35,1 \pm 12,8$, od kojih su 78 (86%) žene i 12 (13,3%) muškarci sa dominantno dehidriranom kožom ($n=54$, 60%). Multi Probe Adapter (Courage & Khazaka, Germany) je korišćen za analizu sledećih parametara kože lica: hidratacija, površinski sadržaj sebuma, eritem/melanin indeks i pH kože na čelu, bradi i obrazima. Merenja su izvedena dva puta, pre i posle korišćenja personalizovanih krema. Volonteri su koristili personalizovane kreme, dva puta dnevno tokom tri meseca. Hidratacija je značajno porasla ($41,4 \pm 12,5$ do $53,1 \pm 11,1$; $p < 0,001$). Nije primećena značajnija promena u melaninu ($148,6 \pm 37,3$ do $145,5 \pm 27,8$; $p = 0,241$), dok je pad primećen kod eritema ($361,5 \pm 80,2$ do $346,9 \pm 61,3$; $p = 0,003$) i pH ($5,42 \pm 0,49$ do $5,32 \pm 0,39$; $p = 0,042$), ali je pH ostao u optimalnim vrednostima. Od ukupnog broja učesnika 47 volontera (52%) je značajno povećalo hidrataciju. Kod volontera sa smanjenim sadržajem sebuma (< 70 , $n=66$), primećen je značajan rast kod 13 (19,7%), dok je kod korisnika sa viškom sebuma (> 180 , $n=9$) značajan pad primećen kod njih 8 (88,8%). Zaključak je da se korišćenjem personalizovanih krema značajno povećava hidratacija, normalizuje sadržaj sebuma na obrazima i smanjuje količina eritema. Ovi rezultati pokazuju efikasnost personalizovane nege kože i otvaraju mogućnost za dalja istraživanja uticaja personalizovanih proizvoda na stanje kože.