Supporting Information

Effects of Cosmetic Emulsions on the Surface Properties of Mongolian Hair

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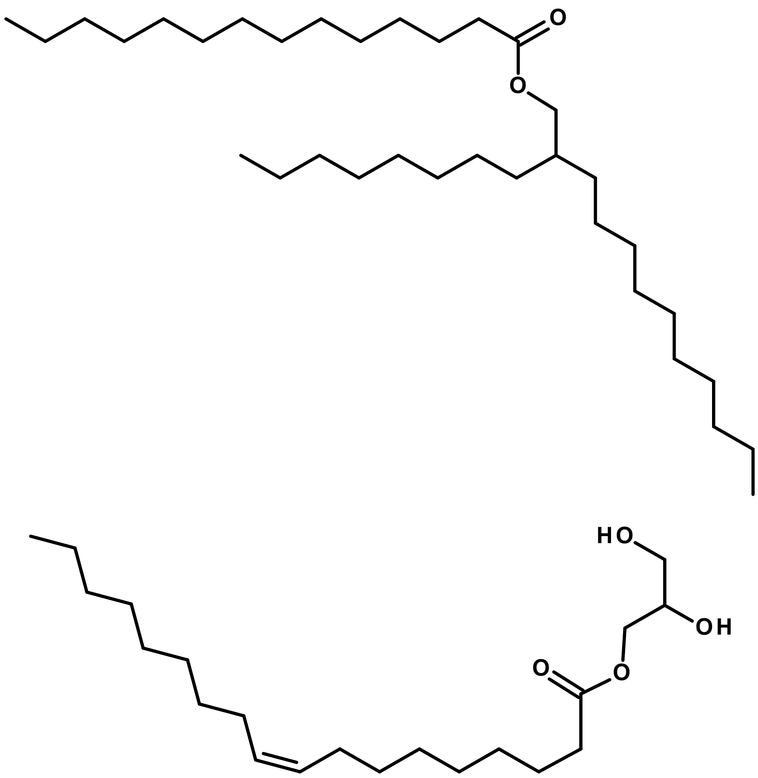

Figure S1: Chemical structures of Eutanol GM (octyldodecyl myristate, top) and Monomuls 90-O18 (glyceryl oleate, bottom).

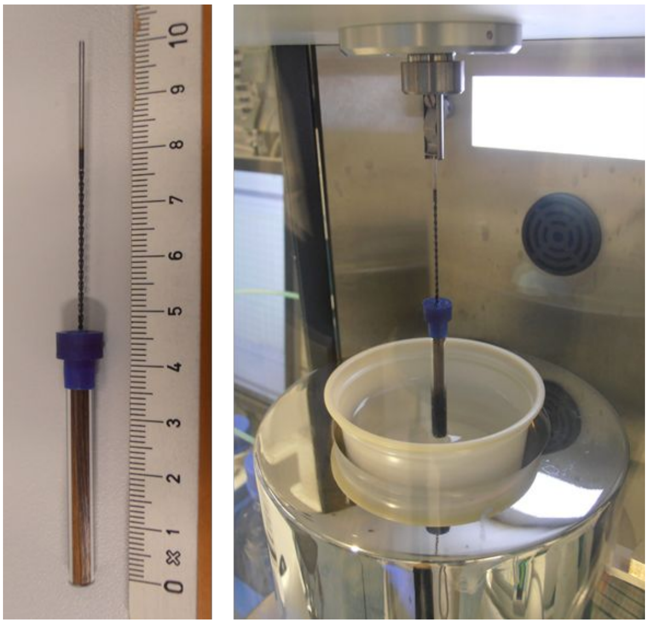

Figure S2: Experimental setup used for investigating the wetting behavior of bleached Chinese hair by means of the Washburn sorption technique. Left: Glass column filled with hair fibers; right: column suspended on force tensiometer with a reservoir containing the test liquid below. Photograph courtesy of Elisabeth Wagner, Copyright 2021.

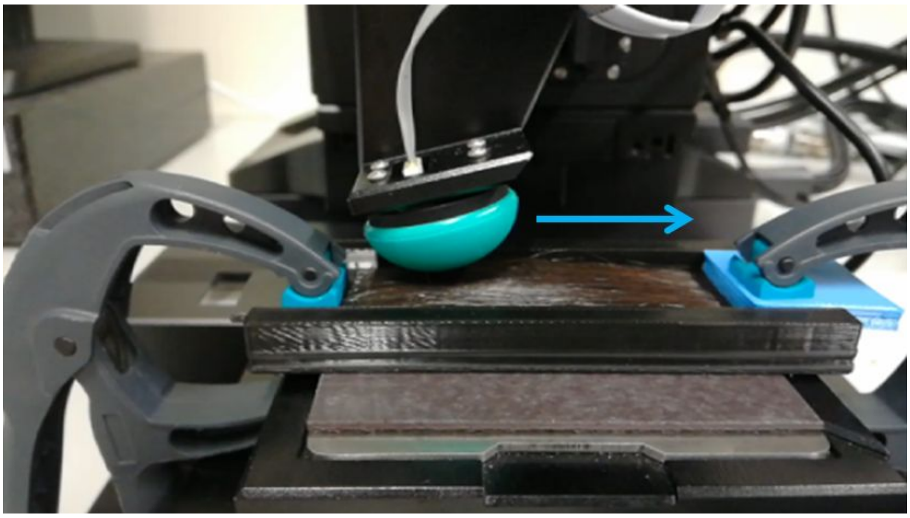

Figure S3: Experimental setup used for haptic characterization of hair strands by means of the Syntouch Toccare instrument. The arrow indicates the movement of the biomimetic finger over the cuticles on the hair surfaces along the growth direction.

Element	Species	Binding energy [eV]	Virgin	Bleached
Carbon (1s)	All		72.2 ± 1.3	66.1 ± 1.7
	C-C, C-H	284.4	41.5	29.8
	C-O	286.2	13.3	14.6
	C-N		6.3	10.1
	COOR, Amide	287.2	9.3	8.7
	Carbonate	288.9	1.8	2.8
Oxygen (1s)	All		14.8 ± 1.5	20.3 ± 1.0
Nitrogen (1s)	All		8.6 ± 0.7	9.4 ± 1.2
	Amide	399.8	7.1	5.6
	Ammonium	401.9	0.8	2.1
	Imide	400.8	0.3	0.3
Sulfur (2p)	All		2.0 ± 0.3	1.7 ± 0.3
	C-S-C, Dithiol	163.5	1.5	0.6
	R-SO_x	165.6-169.4	0.5	1.2
Calcium (2p)	All		0.6 ± 0.1	0.9 ± 0.1
Silicon (2p)	All		1.7 ± 0.1	1.6 ± 0.2

Table S1: Results of XPS analyses on virgin and bleached Chinese hair (values in at%). For each detected element, the total concentration at the surface (denoted as “All”) as well as its distribution into different chemical species (for C, N and S) are given. Fractions for the species were obtained by fitting the signal of each element with multiple components corresponding to the respective binding state, for which the listed binding energies were assumed (note that R-SO_x comprises R-SO, R-SO_3 and R-SO_4).

Parameter	Abbreviation	Origin	Perception
Mactrotexture	mTX	Intensity of low-frequency tactile vibrations arising from large-scale features (> 1 mm) when sliding	from “smooth” to “textured”.
Macrotexture coarseness	mCO	Spacing derived by vibrations from large-scale features (> 1 mm)	from “fine” to “coarse”
Macrotexture regularity	mRG	Uniformity of large-scale features (> 1 mm), reflecting the degree to which macrotexture features repeat periodically	from “random” to “regular”
Microtexture roughness	uRO	Intensity of high-frequency tactile vibrations arising from small-scale features (< 1 mm)	from “smooth” to “rough”
Microtexture coarseness	uCO	Spacing derived by vibrations from small-scale features (< 1 mm)	from “fine” to “coarse”
Tactile stiction	fST	Effort required to initiate sliding as derived from the force to start motion over the surface	from “low grip” to “high grip”
Sliding resistance	fRS	Effort required to continue sliding over a surface after it has been initiated, as derived from the force needed to maintain the given velocity	from “slippery” to “resistive”

Table S2: Description of the haptic parameters determined in this work.

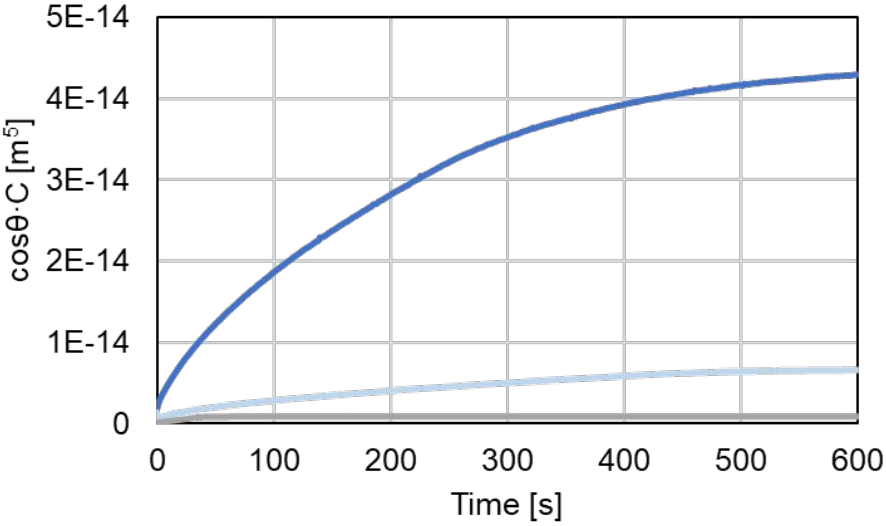

Figure S4: Characterization of the wettability of bleached Chinese hair using the Washburn technique (cf. Figure S1), yielding time-dependent sorption profiles for water (grey), octyldodecyl myristate (light-blue) and dimethicone (dark-blue). Values on the y-axis represent the rate of sorption after correction for differences in the physical properties of the used liquids (i.e. $\cos\theta \cdot C = (m^2/t) \cdot \eta/(\gamma \cdot \rho^2)$, cf. Equation 1 in the main text).