

Supporting Information for:

**Coating based on Cellulose from Oil Palm Empty Fruit
Bunches and Chitosan Doped by Ag⁺: Multivariate
Optimization and DFT Analysis**

Maulidan Firdaus^{a*}, Nurani Alawiyah^a, Jeesica Hermayanti Pratama^a, Achmad
Nurul Yaqin^b, Fajar Rakhman Wibowo^a

*^aDepartment of Chemistry, Faculty of Mathematics and Natural Sciences,
Universitas Sebelas Maret*

*^bMedical Department, Faculty of Medicine, Universitas Sebelas Maret
Jl. Ir. Sutami 36A Surakarta 57126, Indonesia*

***Corresponding Author**

Maulidan Firdaus

Email: maulidan@mipa.uns.ac.id

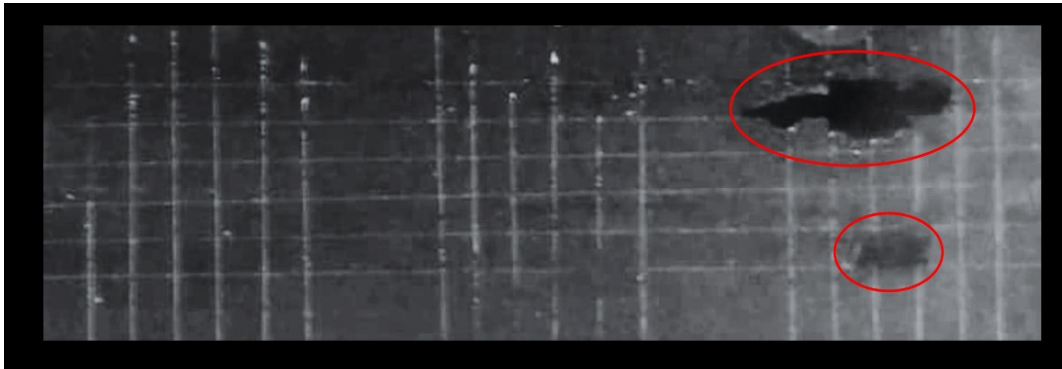


Fig. S1 Representative results of the adhesive test

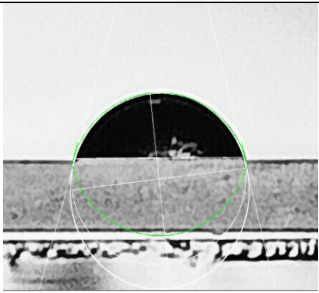
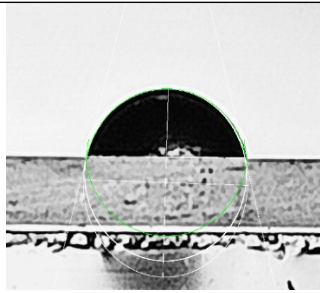
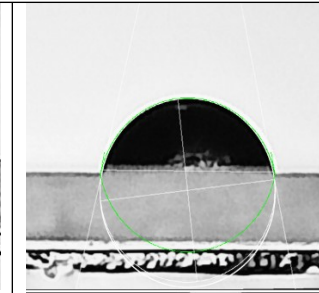
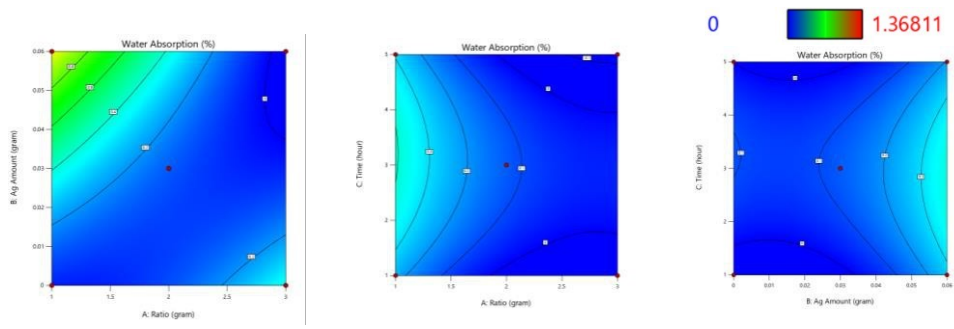
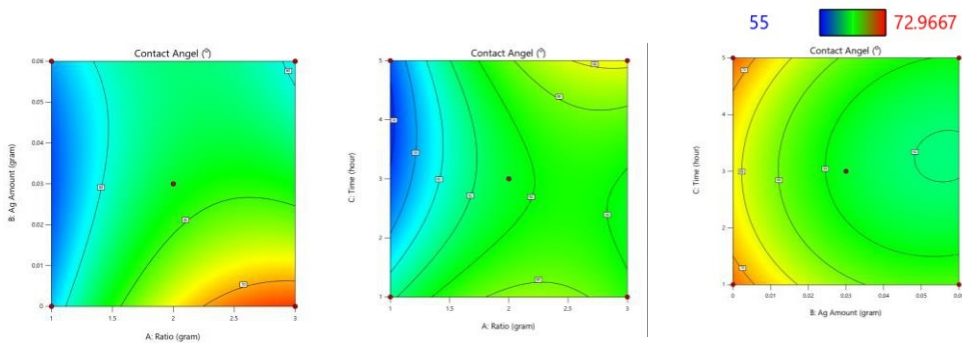
Contact Angle		
		
89°	93°	97°
Average		93 ± 4°

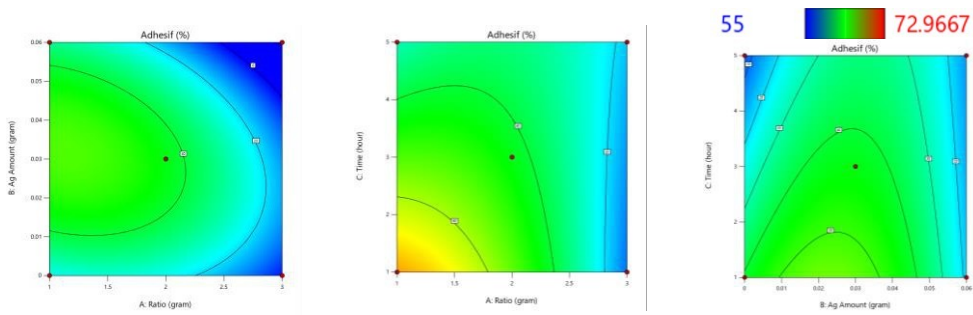
Fig. S2 Average apparent contact angle of coating surface obtained with the goniometer camera



Water Resistance Response



Contact Angle Response



Adhesive Strength Response

Fig. S3 Graph plotting of independent variables on responses

Table S1 Box-Behnken design parameter for coating material synthesis

Set	Variable*			Variable code			Response		
	A	B	C	X ₁	X ₂	X ₃	Adhesive strength (%)	Water absorption (%)	Contact angle (°)
F1	3	0.06	1	+1	+1	-1	1.7	0.1046	66.300
F2	2	0	1	0	-1	-1	50.0	0.0851	70.300
F3	2	0.03	1	0	0	-1	3.3	0.0423	63.200
F4	3	0	3	+1	-1	0	1.0	0.0206	73.167
F5	2	0	5	0	-1	+1	21.7	0.2222	71.367
F6	1	0	3	-1	-1	0	0.3	0.0419	60.567
F7	1	0.06	5	-1	+1	+1	36.7	0.1041	55.067
F8	3	0.06	5	+1	+1	+1	3.3	0.0000	65.467
F9	1	0.03	3	-1	0	0	33.3	1.3496	55.000
F10	2	0.03	5	0	0	+1	4.3	0.0422	65.167
F11	2	0.06	3	0	+1	0	43.3	0.1231	59.400
F12	3	0.03	3	+1	0	0	0.0	0.0000	56.967
F13	1	0.06	1	-1	+1	-1	90.0	0.1087	60.633

*A = CNC/chitosan mixture (g); B = Ag amount (g); C = reaction time (hours)