

Supporting information

Development of a thermostable microneedle patch for influenza vaccination

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Figure S1. Flowchart of microneedle patch fabrication process.

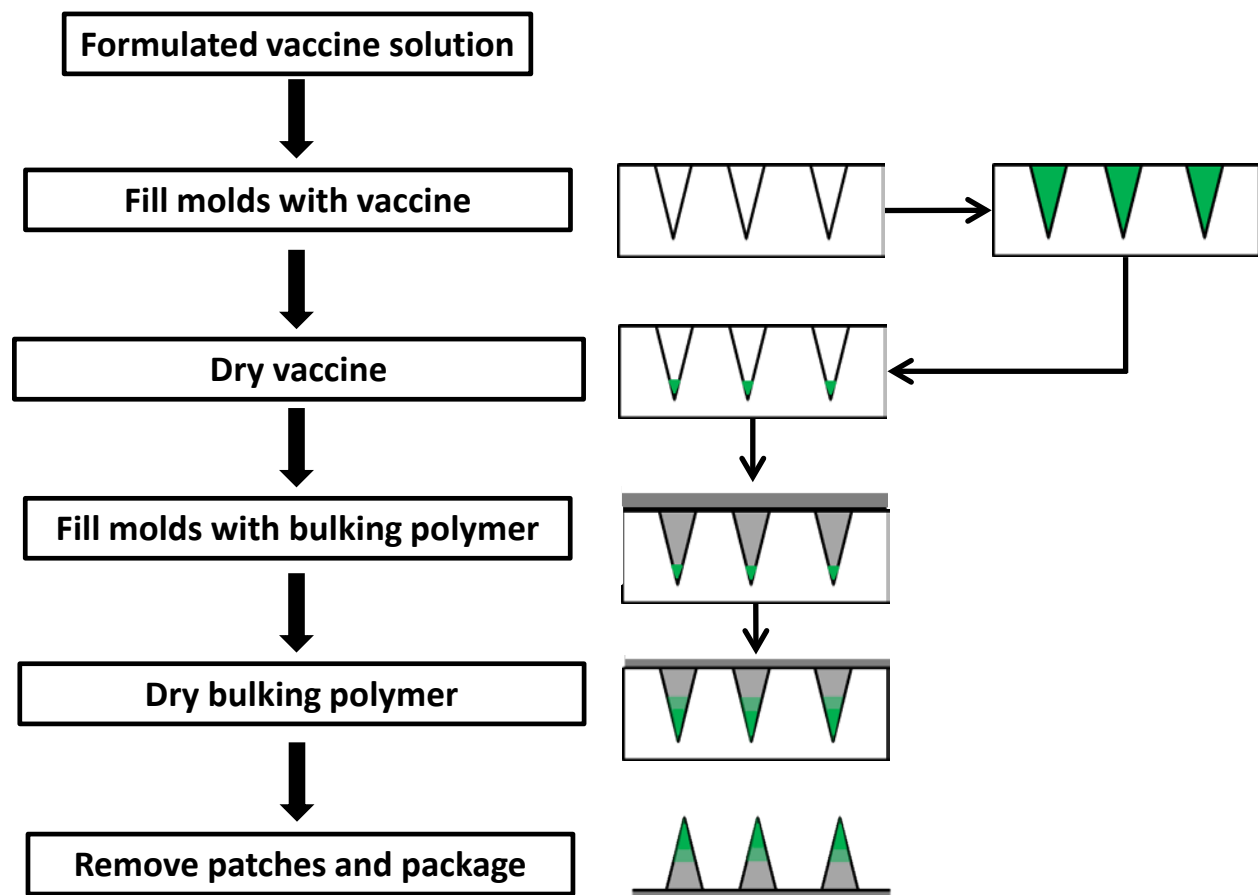


TABLE S1. Surfactants and their critical micelle concentrations from Figure 2.¹

Surfactant	critical micelle concentration (mM)
Lutrol F68	0.04
Tween 20	0.06
SDS (sodium dodecyl sulfate)	8
CTAB (cetrimonium bromide)	1
CHAPS (3-[(3-cholamidopropyl)dimethylammonio]-1-propanesulfonate)	6

TABLE S2. Key to vaccine formulation excipients found in Figure 3.

Formulation #	Stabilizer	Activity remaining	Formulation #	Stabilizer	Activity remaining
1	maltodextrin 4	98%	32	lysine	40%
2	arginine	91%	33	sodium phosphate	40%
3	trehalose	89%	34	valine	40%
4	maltose	87%	35	threonine	39%
5	histidine	85%	36	galactose	39%
6	calcium heptagluconate	85%	37	alanine	37%
7	maltodextrin 13	85%	38	methionine	37%
8	sucrose	82%	39	proline	35%
9	glucose	82%	40	mannitol	34%
10	heparin	81%	41	human serum albumin 2	34%
11	raffinose	80%	42	glutamine	34%
12	myo-inositol	77%	43	human serum albumin 1	32%
13	lactose	77%	44	tryptophan	32%
14	sorbitol	76%	45	tyrosine	32%
15	arabitol	75%	46	serine	31%
16	fructose	72%	47	bovine serum albumin	31%
17	γ -cyclodextrin	70%	48	creatine	30%
18	potassium gluconate	62%	49	leucine	30%
19	adonitol	60%	50	potassium sulfate	29%
20	xylitol	58%	51	sodium succinate	29%
21	sodium thiosulfate	57%	52	isoleucine	29%
22	asparagine	55%	53	ethyl lactate	24%
23	2-hydroxypropyl- β -cyclodextrin	55%	54	phenylalanine	23%
24	Tris	54%	55	arabinose	21%
25	sodium citrate	53%	56	potassium phosphate	16%
26	dulcitol	53%	57	xylose	14%
27	potassium citrate	50%	58	potassium sulfite	9%
28	ovalbumin	47%	59	cysteine	8%
29	glycine	47%	60	glycerol	4%
30	methyl glucoside	43%	61	sodium thioglycolate	4%
31	β -cyclodextrin	42%			

TABLE S3. Key to vaccine formulation excipients found in Figure 4.

Formulation #	Stabilizer 1	Stabilizer 2
1	maltodextrin	lactose
2	maltodextrin	sodium thiosulfate
3	maltodextrin	trehalose
4	maltodextrin	sodium citrate
5	maltodextrin	sorbitol
6	maltodextrin	arginine
7	arginine	lactose
8	arginine	sodium thiosulfate
9	arginine	trehalose
10	arginine	sodium citrate
11	arginine	sorbitol
12	sorbitol	lactose
13	sorbitol	sodium thiosulfate
14	sorbitol	trehalose
15	sorbitol	sodium citrate
16	sodium	lactose
17	sodium	sodium thiosulfate
18	sodium	trehalose
19	trehalose	lactose
20	trehalose	sodium thiosulfate
21	sodium thiosulfate	lactose

Reference

1. Caligur V 2008 Detergent properties and applications. BioFiles 3:14.