

# **Nanosponge-Hydrogel of Octadecyl 3-(3, 5-di-tert-butyl-4-hydroxyphenyl) propanoate of *Alcaligenes faecalis***

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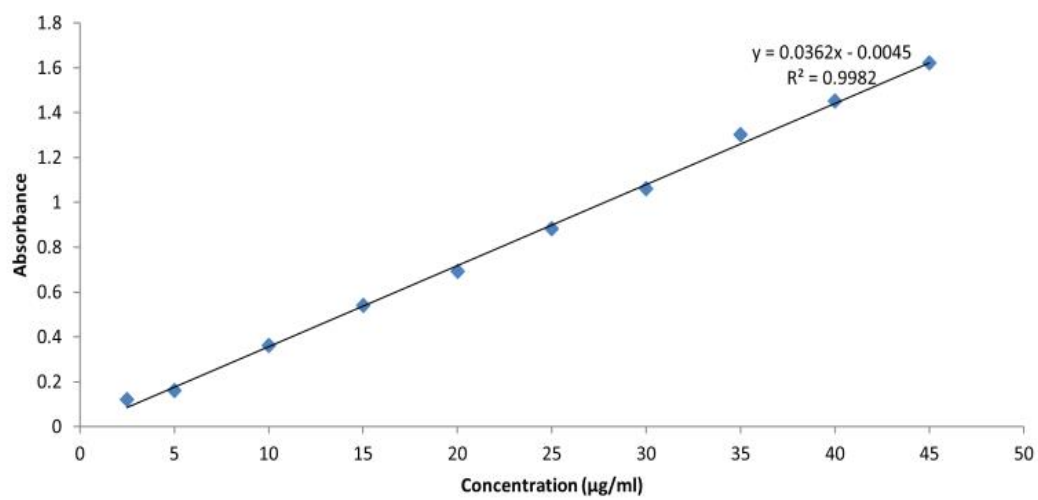
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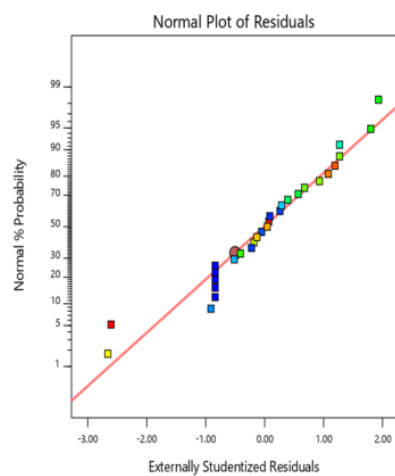
**Fig.S1** Standard curve of ODHP

Design-Expert® Software

particle size

Color points by value of

particle size :  
320 391



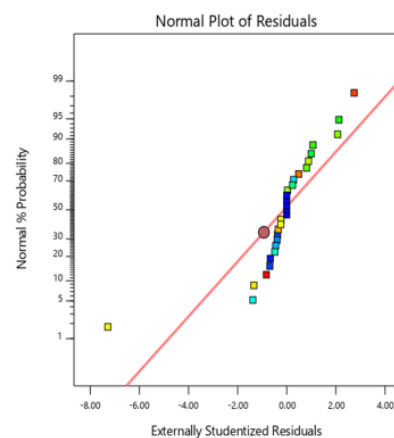
a

Design-Expert® Software

(polydispersity index)<sup>2</sup>

Color points by value of

(polydispersity index)<sup>2</sup>:  
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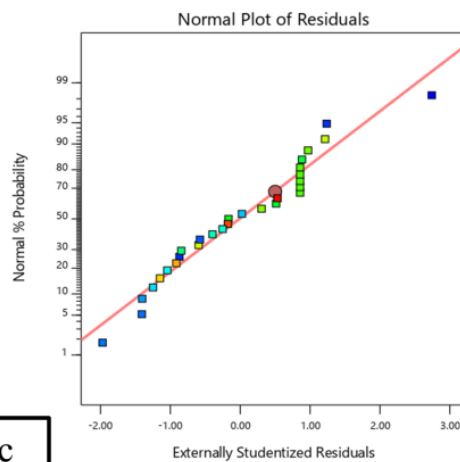
b

Design-Expert® Software

entrapment efficiency

Color points by value of

entrapment efficiency:  
86.32 92.1



c

**Fig.S2** The normal probability plots of residuals for (a) PS, (b) PDI, and (c) EE%

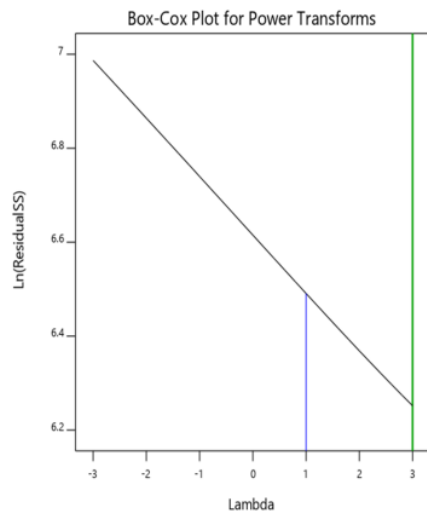
Design-Expert® Software

particle size

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Best Lambda = 3

Recommended transform:  
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(Lambda = 1)



a

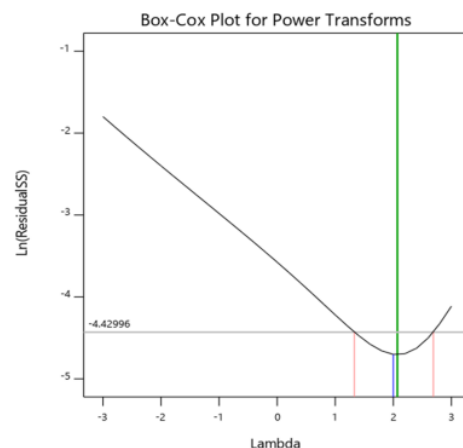
Design-Expert® Software

(polydispersity index)^2

Current transform:  
Power

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CI for Lambda: (1.33, 2.69)

Recommended transform:  
Power  
(Lambda = 2.07)



b

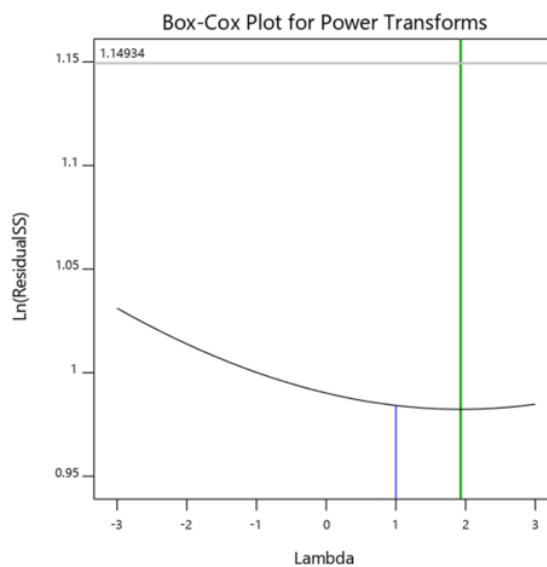
Design-Expert® Software

entrapment efficiency

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CI for Lambda: (-6.91, 10.77)

Recommended transform:  
None  
(Lambda = 1)



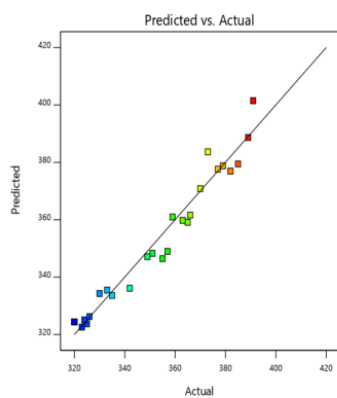
c

**Fig.S3** The Box Cox plots of (a) PS, (b) PDI, and (c) EE%

Design-Expert® Software

particle size

Color points by value of  
particle size :  
320 391

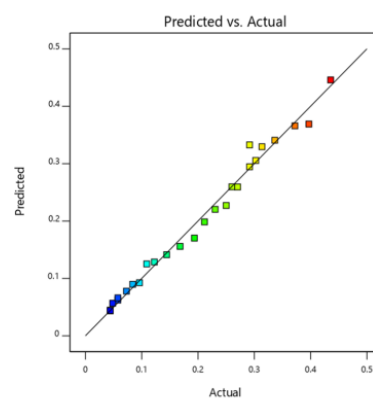


a

Design-Expert® Software

(polydispersity index)<sup>2</sup>

Color points by value of  
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0.044 0.436

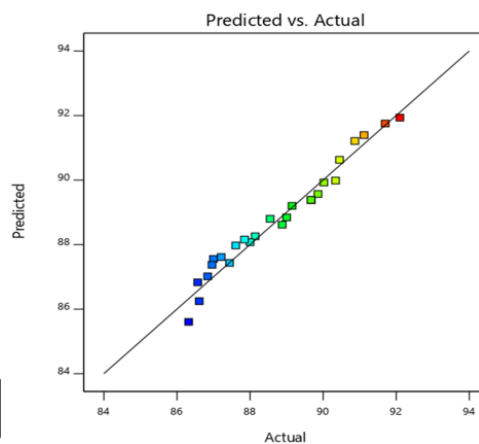


b

Design-Expert® Software

entrapment efficiency

Color points by value of  
entrapment efficiency:  
86.32 92.1



c

**Fig.S4** The predicted versus actual values plot of (a) PS, (b) PDI, and (c) EE%

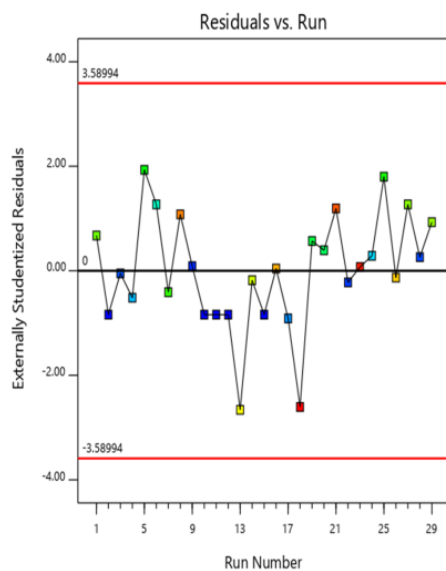
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particle size

Color points by value of  
particle size :

320 391

**a**



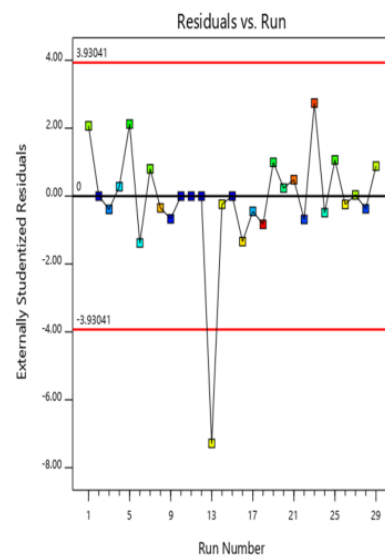
Design-Expert® Software

polydispersity index)^2

Color points by value of  
polydispersity index)^2:

0.044 0.436

**b**



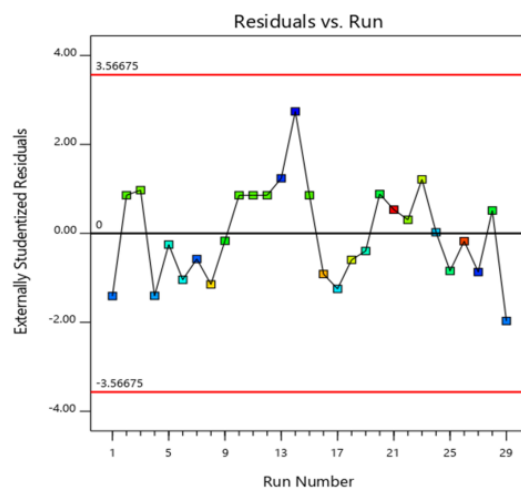
Design-Expert® Software

entrapment efficiency

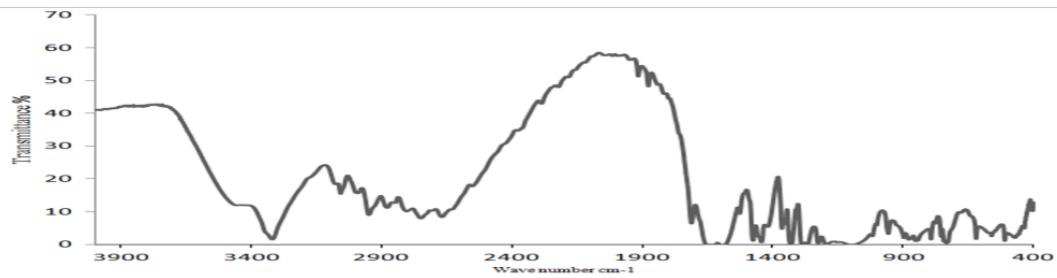
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entrapment efficiency:

86.32 92.1

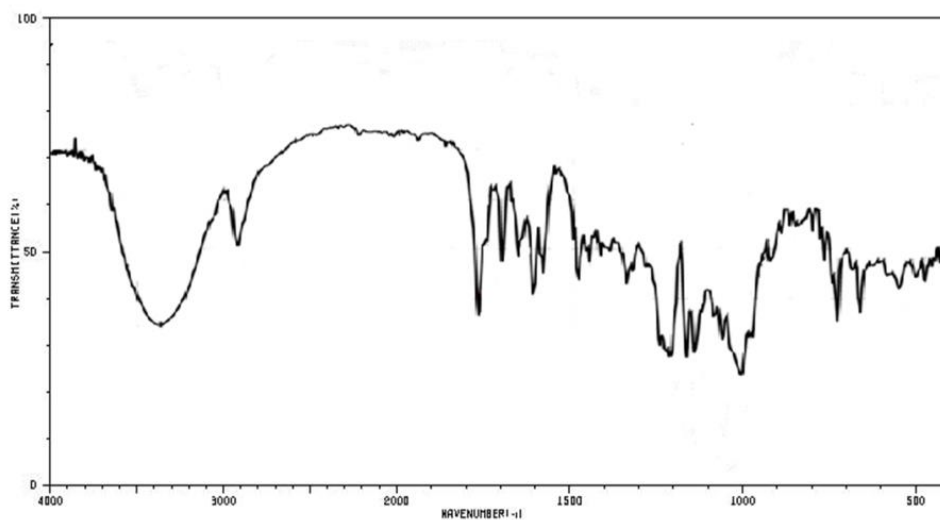
**c**



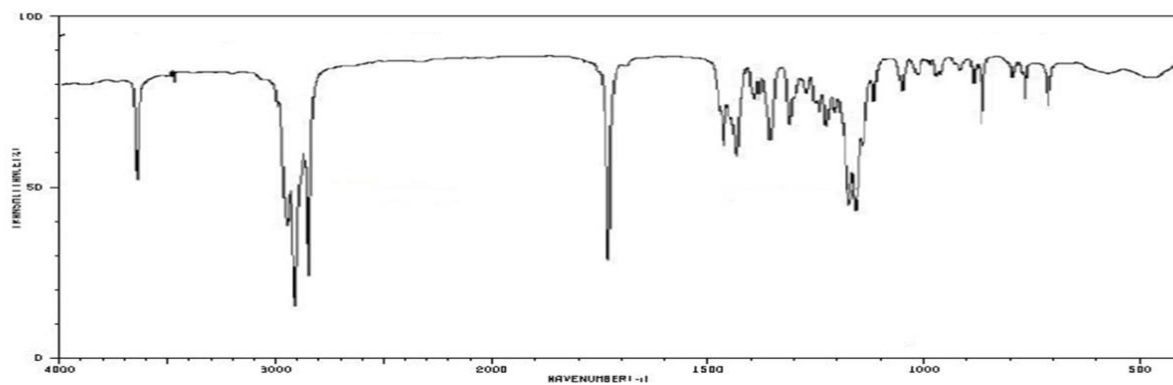
**Fig.S5** The residuals versus Run number plot of (a) PS, (b) PDI, and (c) EE%



(a)

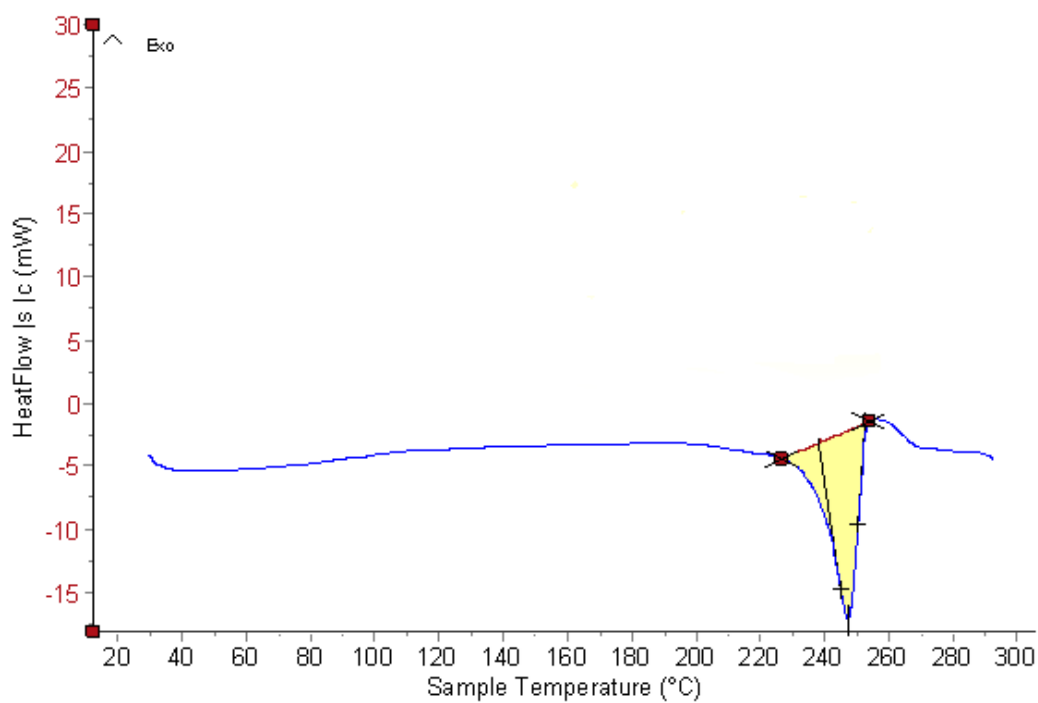


(b)

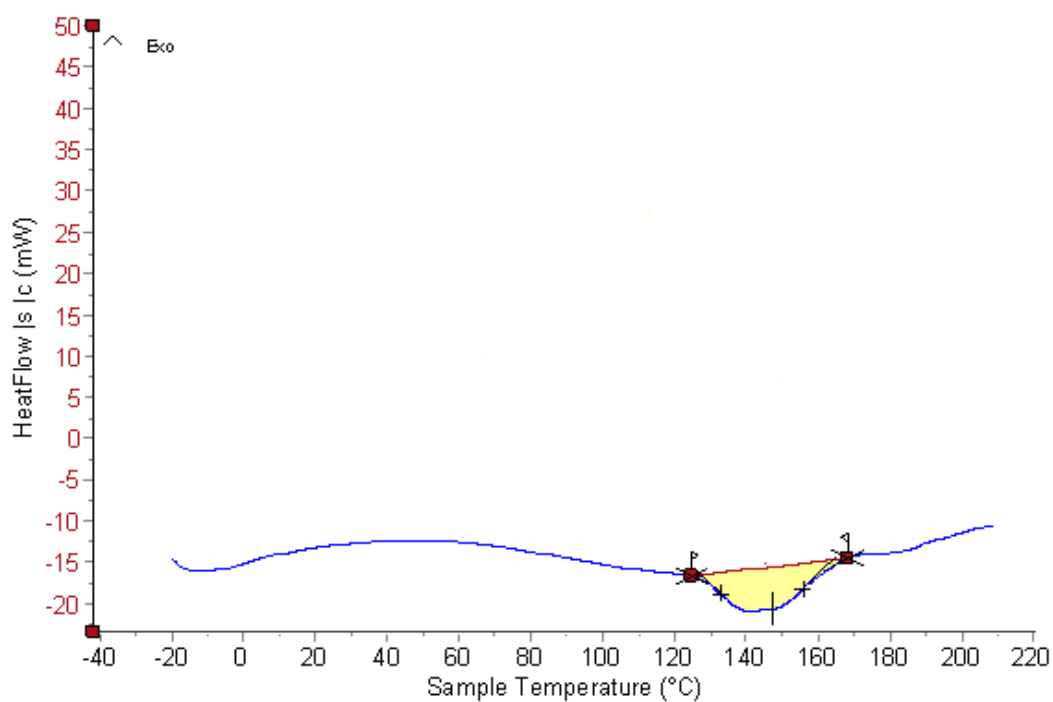


(c)

**Fig.S6** FTIR spectra of (a) ODHP-NS complex (b)  $\beta$ -CD and (c) ODHP

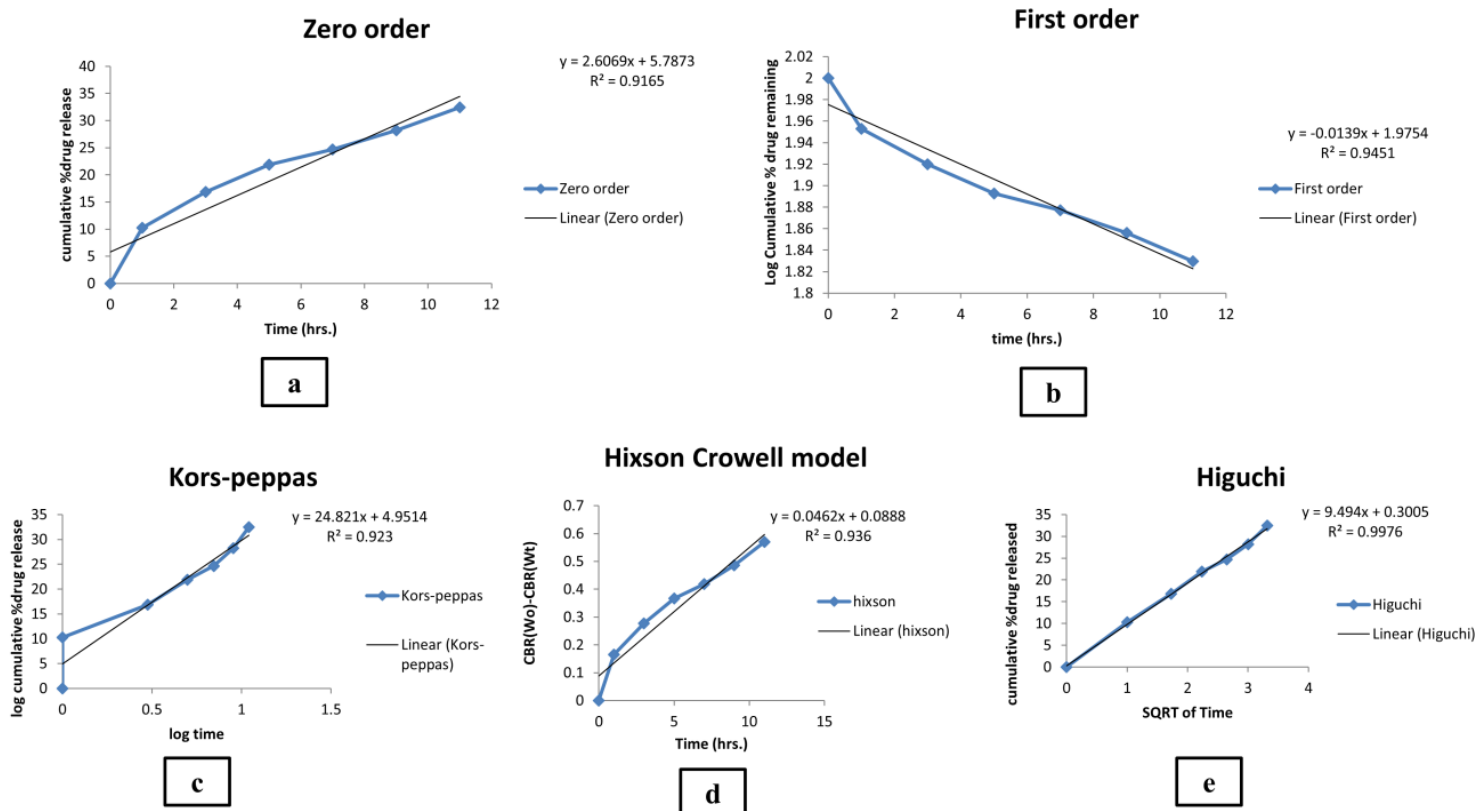


(a)

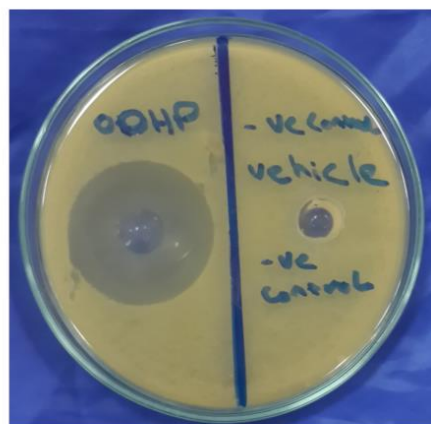


(b)

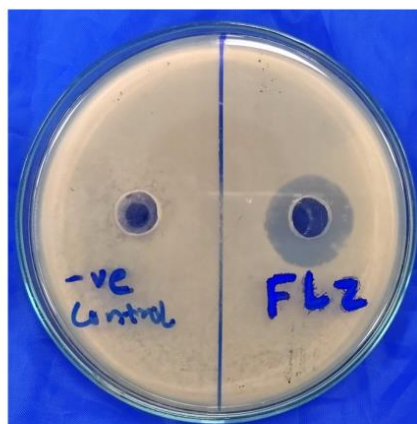
**Fig.S7** Differential scanning calorimetry thermograms of (a) pure ODHP (b) optimized ODHP-loaded nanosponge formulation



**Fig.S8** Various kinetic models of the in-vitro release data **(a)** Zero order, **(b)** First order, **(c)** Korsmeyer and Peppas, **(d)** Hixson and Crowell model and **(e)** Higuchi 's model



a



b

**Fig.S9** In vitro antifungal activity of (a) ODHP-NS-HG (b) Fluconazole (FLZ) against *Candida albicans* ATCC10231

**Table S1** Evaluation of different gel formers for the preparation of hydrogel

| <b>Visual characteristics</b> | <b>Sodium alginate</b> | <b>CMC</b> | <b>Poloxamer 188</b> | <b>HPMC E4</b> | <b>Carbopol 940</b> |
|-------------------------------|------------------------|------------|----------------------|----------------|---------------------|
| Grittiness                    | Yes (++++)             | NO         | Yes (+++)            | Yes (++)       | NO                  |
| Stickiness                    | Yes (++++)             | NO         | Yes (++)             | Yes (++)       | NO                  |
| Spreadability                 | Very low (++++)        | VERY GOOD  | Fairly good          | Low (++)       | EXCELLENT           |
| Formation of clumps           | Yes (+++++)            | Low        | NO                   | NO             | NO                  |

**Table S2** Different gel compositions of carbopol 940

| Component                                    | Formulation code |        |        |        |        |        |
|----------------------------------------------|------------------|--------|--------|--------|--------|--------|
|                                              | HG-1             | HG-2   | HG-3   | HG-4   | HG-5   | HG-6   |
| Carbopol 940 (w/v %)                         | 0.2              | 0.5    | 0.8    | 1      | 1.2    | 1.5    |
| Propylene glycol: distilled water ratio (ml) | 30:70            | 30:70  | 30:70  | 30:70  | 30:70  | 30:70  |
| Triethanolamine (ml)                         | 2                | 2      | 2      | 2      | 2      | 2      |
| ODHP -NS                                     | 0.15mg           | 0.15mg | 0.15mg | 0.15mg | 0.15mg | 0.15mg |
| Methyl paraben (gram)                        | 1                | 1      | 1      | 1      | 1      | 1      |
| Distilled water (w/w %) (q.s)                | 100              | 100    | 100    | 100    | 100    | 100    |

**Table S3** Evaluation of different carbopol 940 hydrogel formulations

| <b>Visual characteristics</b> | <b>HG1</b> | <b>HG2</b>  | <b>HG3</b>  | <b>HG4</b>  | <b>HG5</b>  | <b>HG6</b>  |
|-------------------------------|------------|-------------|-------------|-------------|-------------|-------------|
| <b>Grittiness</b>             | Yes (+++)  | NO          | Yes (+)     | NO          | NO          | NO          |
| <b>Stickiness</b>             | Yes (+++)  | NO          | Yes (++)    | NO          | NO          | NO          |
| <b>Spreadability</b>          | Bad        | Bad         | Fairly good | Good        | Good        | Good        |
| <b>Homogeneity</b>            | CLUMPS     | YES         | YES         | NO          | Yes         | NO          |
| <b>Syneresis</b>              | NO         | NO          | NO          | NO          | NO          | NO          |
| <b>Color</b>                  | White      | Translucent | Translucent | Translucent | Translucent | Translucent |

**Table S4** Comparison of correlation coefficient ( $R^2$ ) of different kinetic models

|                         | <b>Zero order</b> | <b>First order</b> | <b>Korsmeyer and Peppas</b> | <b>Hixson and Crowell model</b> | <b>Higuchi ' s model</b> |
|-------------------------|-------------------|--------------------|-----------------------------|---------------------------------|--------------------------|
| <b><math>R^2</math></b> | 0.9165            | 0.9451             | 0.923                       | 0.936                           | 0.9976                   |

**Table S5** Stability studies data

| Storage conditions             | Physical appearance               | Mean data $\pm$ (SD) |                 |                   |
|--------------------------------|-----------------------------------|----------------------|-----------------|-------------------|
|                                |                                   | pH                   | Viscosity (cps) | Drug content      |
| <b>Initial</b>                 | Translucent-smooth<br>homogenous  | 6.75 $\pm$ 0.13      | 1092 $\pm$ 4    | 90.96 $\pm$ 0.32% |
| <b>Room temperature</b>        | Translucent -smooth<br>homogenous | 6.92 $\pm$ 0.1       | 1060 $\pm$ 5    | 86.07 $\pm$ 0.16% |
| <b>5 <math>\pm</math> 3 °C</b> | Translucent -smooth<br>homogenous | 6.80 $\pm$ 0.02      | 1185 $\pm$ 10   | 89.41 $\pm$ 0.58% |