

Supplementary Data

Optimization and enhancement of Oral Bioavailability of Dabrafenib as Nanobubbles using quality by design approach

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Table S1: Selection of QTPP and CQAs and justification

QTPP	Target	Justification
Formulation	Nanobubble	The selected formulation strategy facilitates targeted drug distribution to the intended site of action while improving half-life, stability, and bioavailability.
Route of administration	Oral	The available formulation in the market is oral; hence, we are attempting to increase the half-life and bioavailability.
In vitro release	More significant as compared to PD (Plain drug)	Decreased size can improve the rate of drug release.
Stability	Up to thirty days following formulation, no outward indications of aggregation or cake formation	Because particle size affects this formulation's efficiency, it is critical to keep it constant.
CQAs		
CQA	Target	Justification
Particle size	In Nano-range	Reducing the size of the nanoscale increases surface area, which boosts release and distribution to the site.
PDI	Less than 0.4	PDI values larger than 0.4 are hetero-disperse, meaning they have a wider distribution and are inappropriate for DLS particle size assessment.
EE	High	Higher E.E helps to release the drug at the site

Table S2 Design confirmation and validation results

<i>Solution 1 of 33 Response</i>	Predicted Mean	Predicted Median	Observed	Std Dev	n	SE Pred	95% PI low	Data Mean	95% PI high
Particle size	207.79	207.79	190.6 ± 18.4	2.19898	1.90159	202.901	212.678	192.124	223.455
PDI	0.300999	0.300999	0.397 ± 0.096	0.0241039	0.0208439	0.247419	0.35458	0.129281	0.472718
EE	89.3299	89.3299	87.21 ± 3.8	0.982627	0.849733	87.1456	91.5142	82.3296	96.3303

Supplementary Figures

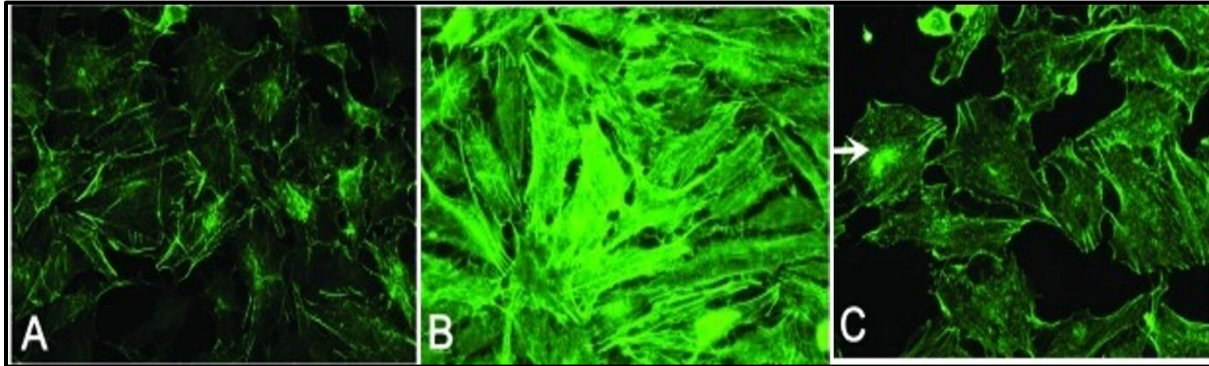


Figure S1: Cellular images with a fluorescence A) Control; B) Standard; C) Test

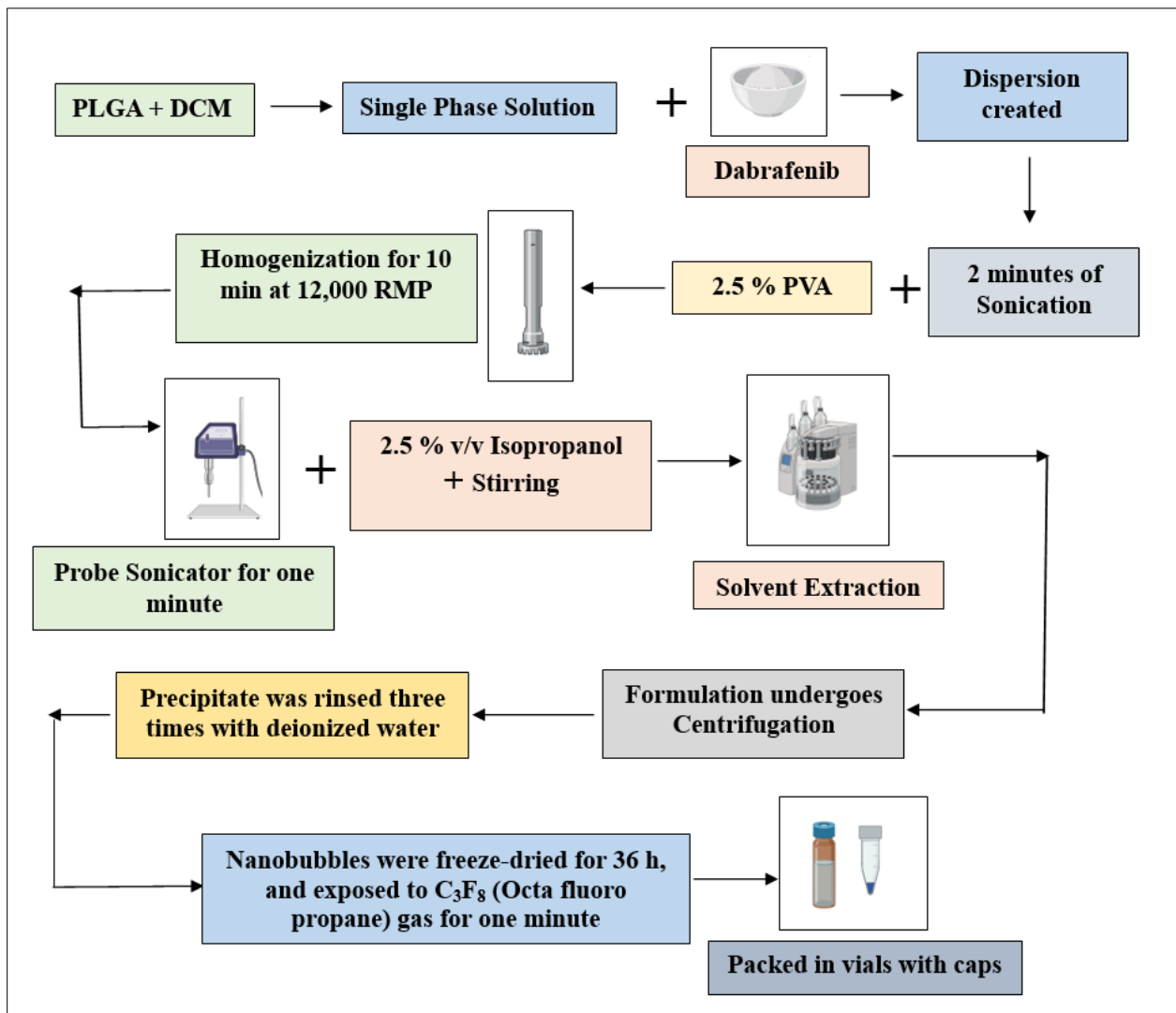


Figure S2: Preparation of Dabrafenib Nanobubbles (DBF - NBs) Formulation by Solvent Evaporation method