

Preliminary Screening on Components Selection of a Quercetin-Loaded Self-Nanoemulsifying Drug Delivery System Formulation

Presented by:

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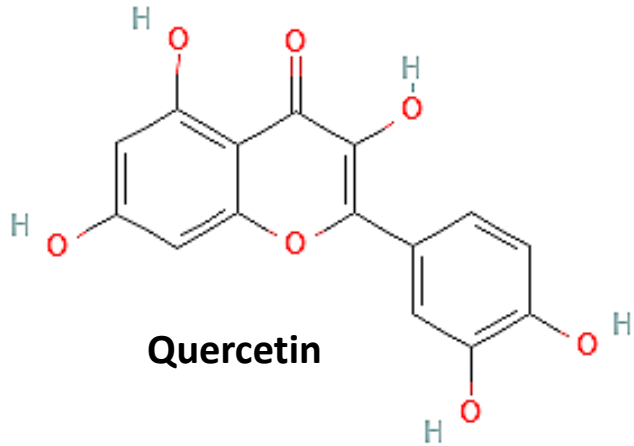
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Outline

- Introduction
- Method
- Result & Discussion
- Conclusion
- Acknowledgement

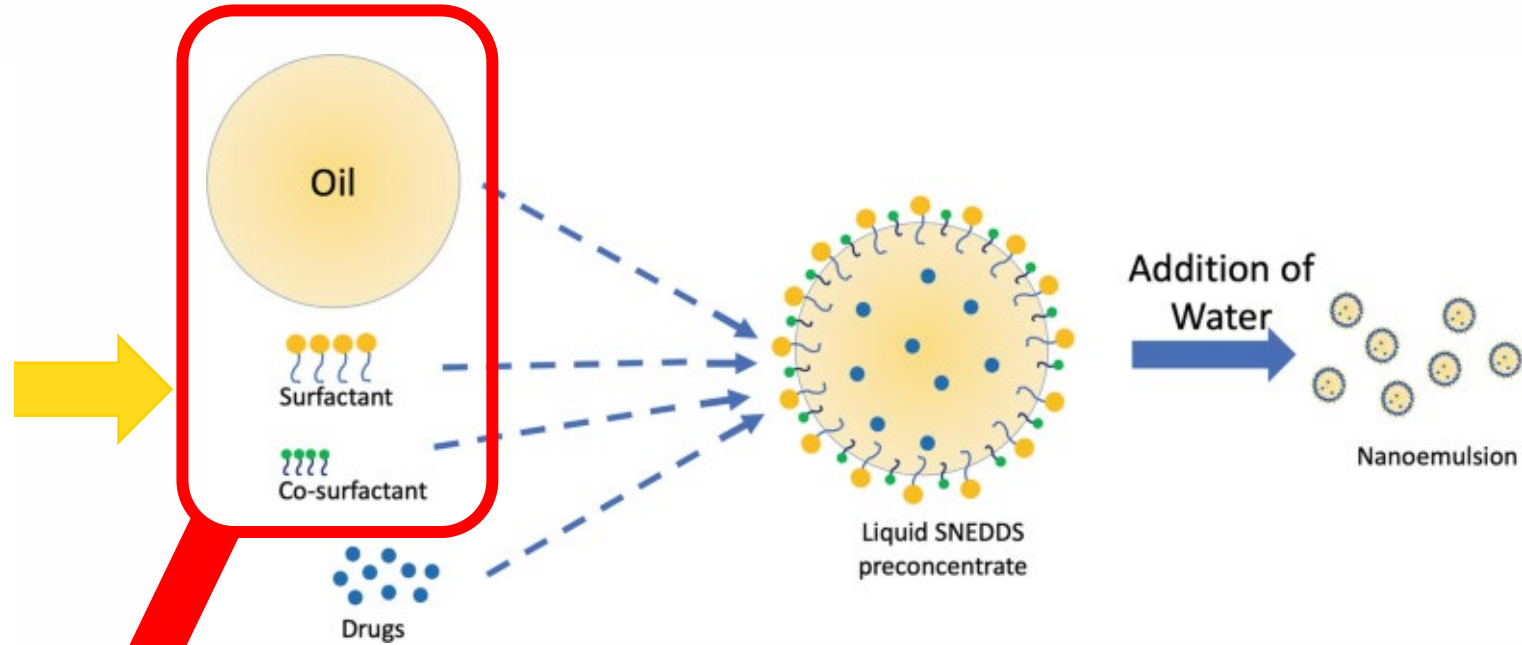
INTRODUCTION

Introduction



- High antioxidant activity
- Poorly soluble in water

Aim: to appropriately select composition of the oil, surfactant, and co-surfactant and its ratio, used for encapsulating quercetin into SNEDDS



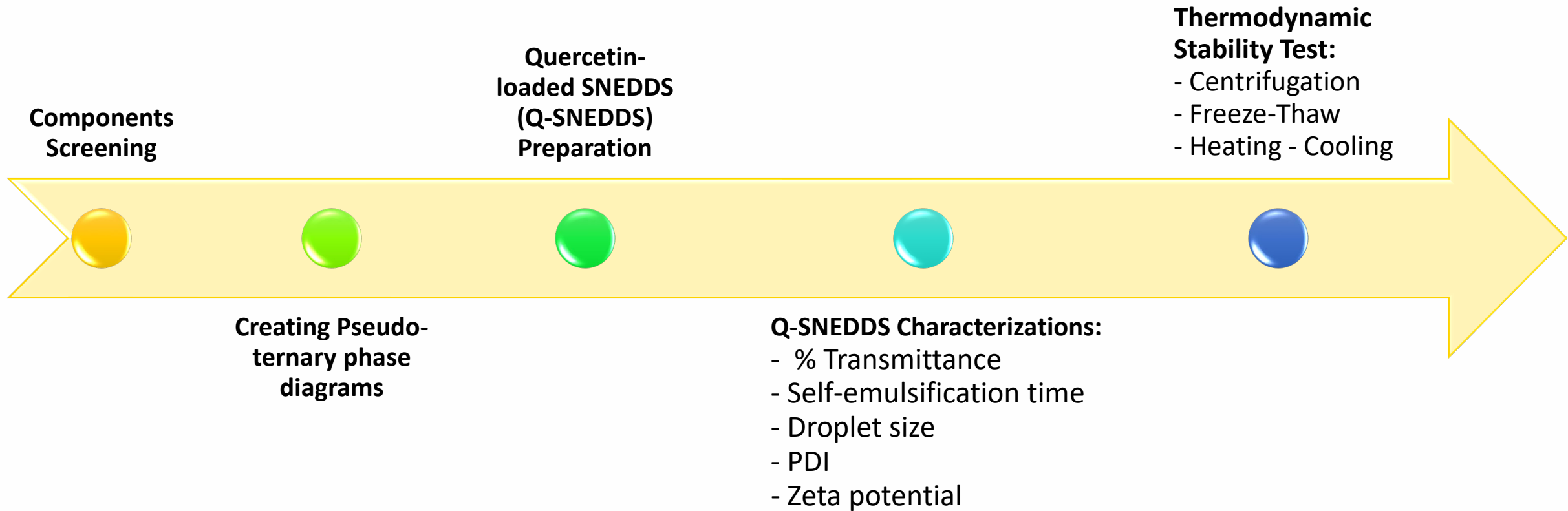
Enhance drug solubility

Enhance oral drug absorption

Increase oral bioavailability

Method

Method



RESULT & DISCUSSION

Components Screening →

Component	TCT-based SNEDDS	CTP-based SNEDDS
Oil	Triacetin	Capryol® 90
Surfactant	Cremophor® RH40	Tween 80
Co-surfactant	Transcutol® HP	PEG 400

TCT-based SNEDDS

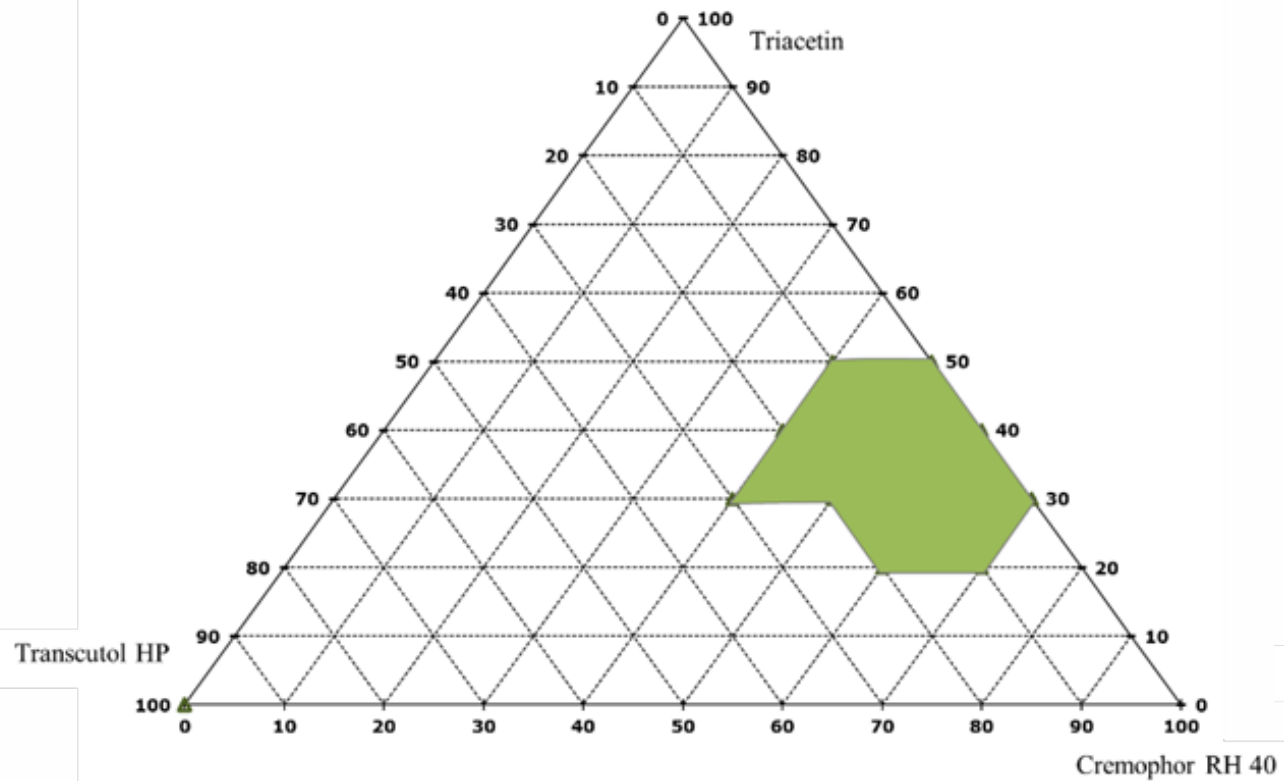
Formulation	SNEDDS Composition (% v/v)			Physical Appearance	Inference
	Oil	Surfactant	Co-surfactant		
	Triacetin (%)	Cremophor RH40 (%)	Transcutol HP (%)		
TCT 1	20	80	0	Milky	Fail
TCT 2	20	70	10	Bluish	Pass
TCT 3	20	60	20	Bluish	Pass
TCT 4	20	50	30	Milky	Fail
TCT 5	30	70	0	Transparent	Pass
TCT 6	30	60	10	Bluish	Pass
TCT 7	30	50	20	Bluish	Pass
TCT 8	30	40	30	Bluish	Pass
TCT 9	40	60	0	Transparent	Pass
TCT 10	40	50	10	Bluish	Pass
TCT 11	40	40	20	Transparent	Pass
TCT 12	40	30	30	Milky	Fail
TCT 13	50	50	0	Transparent	Pass
TCT 14	50	40	10	Transparent	Pass
TCT 15	50	30	20	Milky	Fail
TCT 16	60	40	0	Turbid	Fail
TCT 17	60	30	10	Turbid	Fail

CTP-based SNEDDS

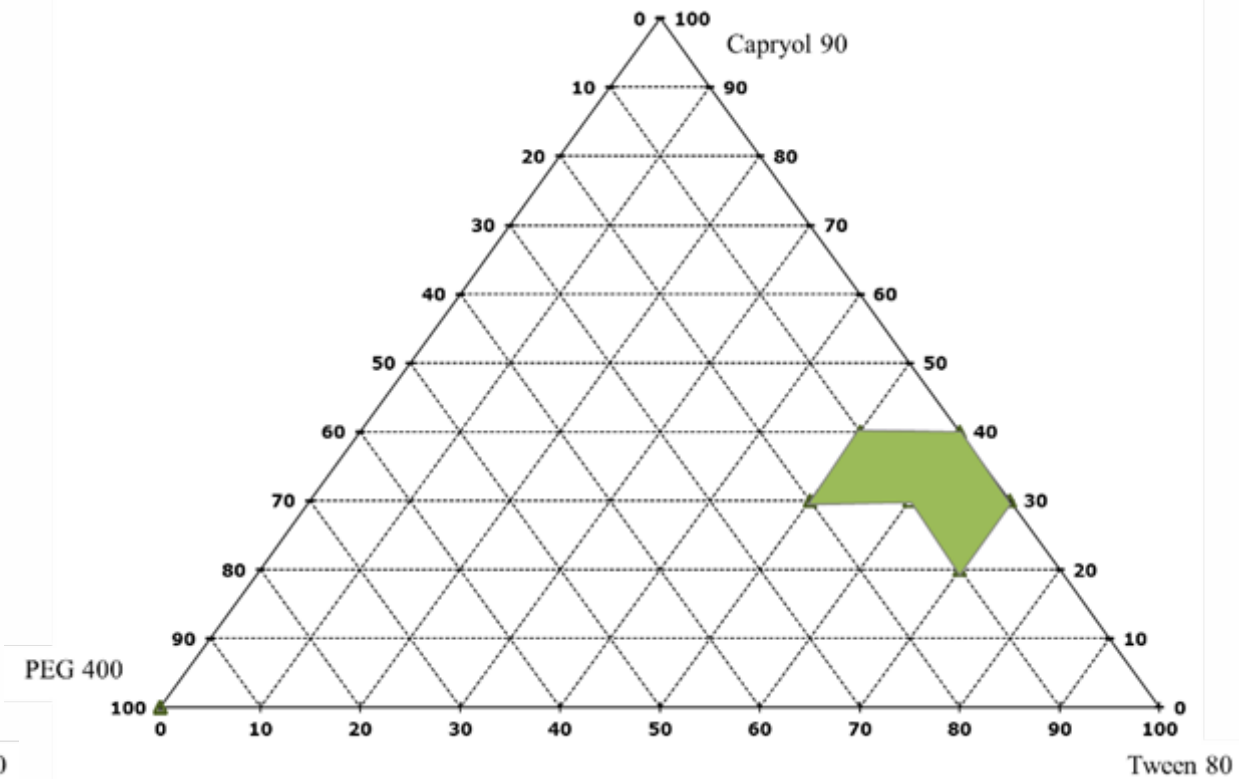
Formulation	SNEDDS Composition (% w/w)			Physical Appearance	Inference
	Oil	Surfactant	Co-surfactant		
	Capryol 90 (%)	Tween 80 (%)	PEG 400 (%)		
CTP 1	20	80	0	Milky	Fail
CTP 2	20	70	10	Bluish	Pass
CTP 3	20	60	20	Milky	Fail
CTP 4	20	50	30	Milky	Fail
CTP 5	30	70	0	Transparent	Pass
CTP 6	30	60	10	Bluish	Pass
CTP 7	30	50	20	Bluish	Pass
CTP 8	30	40	30	Milky	Fail
CTP 9	40	60	0	Transparent	Pass
CTP 10	40	50	10	Transparent	Pass
CTP 11	40	40	20	Milky	Fail
CTP 12	40	30	30	Milky	Fail
CTP 13	50	50	0	Turbid	Fail
CTP 14	50	40	10	Turbid	Fail
CTP 15	50	30	20	Turbid	Fail
CTP 16	60	40	0	Turbid	Fail
CTP 17	60	30	10	Turbid	Fail

Pseudo-ternary Phase Diagram

TCT-based SNEDDS



CTP-based SNEDDS



Characterizations of Q-SNEDDS

Formulation	%T	Self-emulsification time (s)	Droplet Size (nm)	PDI	Zeta Potential (mV)
TCT 2	98.38±0.23	11.13±0.68	126.7±3.98	0.183	-11.24±0.32
TCT 3	98.16±0.18	14.56±1.12	118.4±4.32	0.195	-13.53±0.12
TCT 5	99.68±0.13	21.14±0.32	97.35±4.12	0.251	-9.74±0.23
TCT 6	99.21±0.36	18.12±0.76	134.6±2.83	0.225	-10.84±0.17
TCT 7	98.92±0.28	16.42±1.27	128.2±3.45	0.272	-7.31±0.26
TCT 8	98.62±0.41	17.61±0.35	141.1±2.78	0.248	-6.08±0.37
TCT 9	99.54±0.15	27.17±1.39	95.25±6.61	0.293	-11.87±0.21
TCT 10	98.87±0.27	25.72±1.57	157.8±4.87	0.315	-5.94±0.29
TCT 11	99.45±0.16	23.23±0.85	102.5±5.29	0.267	-9.79±0.41
TCT 13	99.53±0.15	28.11±1.03	113.1±4.26	0.302	-8.15±0.16
TCT 14	99.32±0.39	24.08±0.71	96.45±6.77	0.324	-6.67±0.35

Presented as mean±SD (n=3)

Thermodynamic Stability Test

Formulation	Centrifugation	Freeze-Thaw	Heating-Cooling	Inference
TCT 2	✓	✓	✓	Pass
TCT 3	✓	✓	✓	Pass
TCT 5	x	x	✓	Fail
TCT 6	✓	x	✓	Fail
TCT 7	✓	✓	x	Fail
TCT 8	✓	x	✓	Fail
TCT 9	x	x	✓	Fail
TCT 10	x	✓	x	Fail
TCT 11	x	✓	✓	Fail
TCT 13	x	✓	x	Fail
TCT 14	x	x	x	Fail

CONCLUSION

- SNEDDS with a composition of triacetin (20%, v/v), Cremophor® RH 40 (60-70%, v/v), and Transcutol® HP (10-20%, v/v) is preferred for quercetin-loaded SNEDDS.
- This composition and ratio enables the production of Q-SNEDDS with desirable physical characteristics and good thermodynamical stability.

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