Fig1: Peptides forming organogels

Peptides forming organogels in organic solvents

Peptide sequences comprising of polar amino acid head group

Sr. No.	Peptide sequence	
1.	Ac-ID-COOH(L)	Dimer
2.	Ac-IVD-COOH(L)	Trimer
3.	Ac-LIVAGD-COOH(L)	Hexamer

Peptide sequences comprising of aliphatic amino acid (tail)+ aromatic amino acid (head)

Sr. No.	Peptide sequence	
1.	Ac-IVW-COOH(L)	Trimer
2.	Ac-IVF-COOH(L)	Trimer
3.	Ac-LIVAGF-COOH(L)	Hexamer

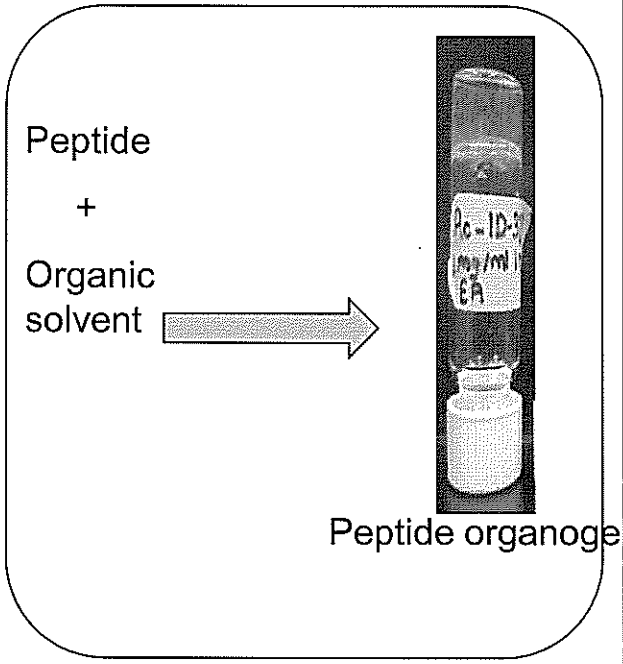
Peptide forming organogels in sunflower oil and solvent mixtures

Sr. No.	Peptide sequence	
1.	Ac-IVD-COOH(L)	Trimer

Peptides forming emulsions in solvent mixtures (water:oil or org. sol:water:oil)

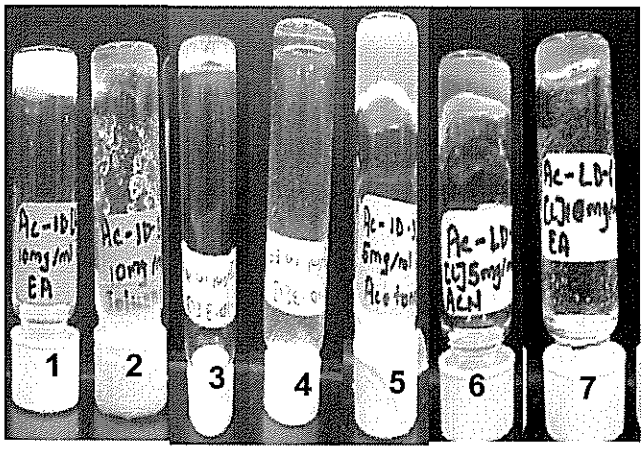
Sr. No.	Peptide sequence	
1.	Ac-IVD-COOH(L)	Trimer
2.	Ac-LIVAGD-COOH(L)	Hexamer

Fig2: Formulation of peptide (polar amino acid - head group) organogels in organic solvents



Solvent	Hexamer	Trimer	Dimer
Methanol	C	C	C
Ethanol	C	C	C
Acetonitrile	G	G	A
Acetone	G	G	C
Ethyl Acetate	G	G	G
Chloroform	A	A	A
Toluene	A	G (partial)	G (partial)
Hexane	S	S	S

C - clear ; A – Aggregated ; S – Suspension; G - Gelation



Figure

2.1 Ac-ID-COOH (L) 10mg/ml in ethyl acetate

2.2 Ac-ID-COOH (L) 10mg/ml in toluene

2.3 Ac-IVD-COOH (L) 2mg/ml in acetonitrile

2.4 Ac-IVD-COOH (L) 2mg/ml in ethyl acetate

2.5 Ac-IVD-COOH (L) 5mg/ml in acetone

2.6 Ac-LIVAGD-COOH (L) 5mg/ml in toluene

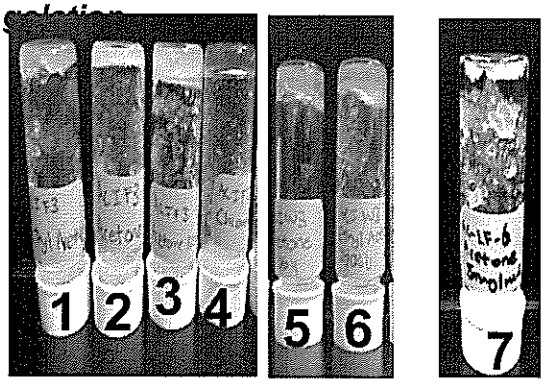
2.7 Ac-LIVAGD-COOH (L) 10mg/ml in ethyl acetate

Fig3: Formulation of peptide (aromatic amino acid - head group) organogels in organic solvents

Solvent	Trimer		Hexamer
	Ac-IVW-COOH(L)	Ac-IVF-COOH(L)	Ac-LIVAGF-COOH (L)
Acetonitrile	S	G	A
Acetone	G	G	G (partial)
Ethyl acetate	G	G	A
Chloroform	A	G	A
Toluene	A	A	A

Peptide concentration used for organogels is 0.5%

A – Aggregated ; S – Suspension; G – Gelation; PG – Partial



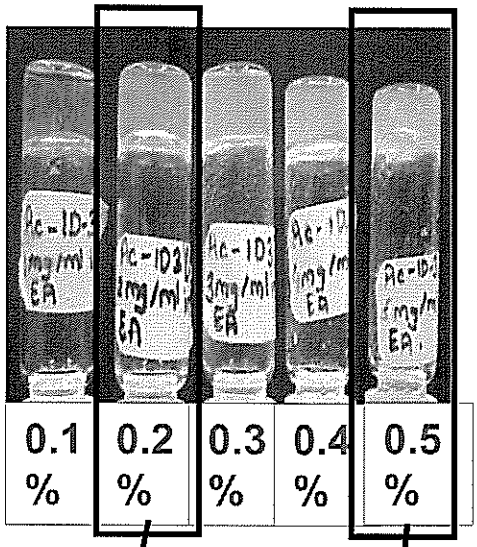
Trimer Hexamer

Figure:

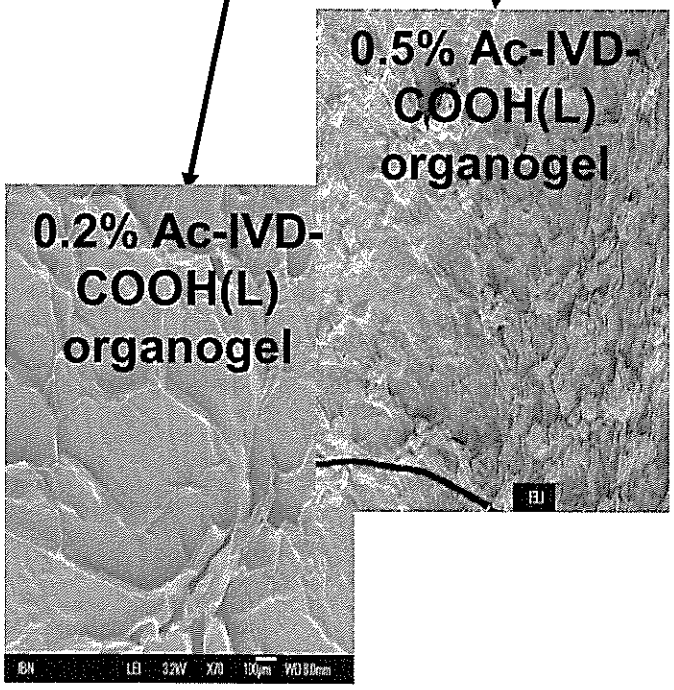
3.1 Ac-IVF-COOH (L) 5mg/ml in ethyl acetate
3.2 Ac-IVF-COOH (L) 5mg/ml in acetone
3.3 Ac-IVF-COOH (L) 5mg/ml in acetonitrile
3.4 Ac-IVF-COOH (L) 5mg/ml in chloroform
3.5 Ac-IVW-COOH (L) 5mg/ml in acetone
3.6 Ac-IVW-COOH (L) 5mg/ml in ethyl acetate
3.7 Ac-LIVAGF-COOH (L) 5mg/ml in acetone

Fig4a: Peptide concentration effect on organogelation (Trimer)

Effect of Ac-IVD-COOH(L) concentration on gelation in ethyl acetate



Gels with increasing concentration of Ac-IVD-COOH (L) were prepared in ethyl acetate. i.e 1mg/ml, 2 mg/ml, 3 mg/ml, 4 mg/ml, 5 mg/ml (L to R). After 10mg/ml partial gelation was observed.

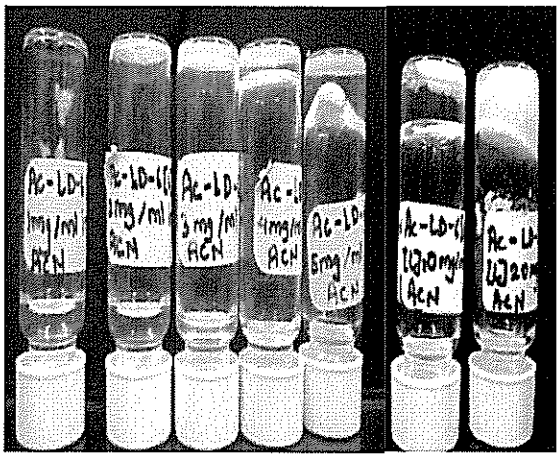


FESEM of Ac-IVD-COOH (L) organogel in ethyl acetate 2 mg/ml and 5 mg/ml.

FESEM Images

Fig4b: Peptide concentration effect on organogelation (Hexamer)

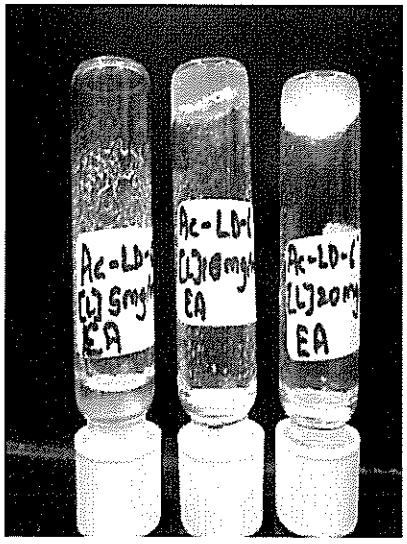
Effect of Ac-LIVAGD-COOH(L) concentration on gelation in acetonitrile



Gels with increasing concentration of Ac-LIVAGD-COOH (L) were prepared in acetonitrile. i.e 1mg/ml, 2 mg/ml, 3 mg/ml, 4 mg/ml, 5 mg/ml, 10mg/ml, 20mg/ml (L to R).

Thickness of the gels increased with increasing concentration of Ac-LIVAGD-COOH(L)

Effect of Ac-LIVAGD-COOH(L) concentration on ethyl acetate organogels



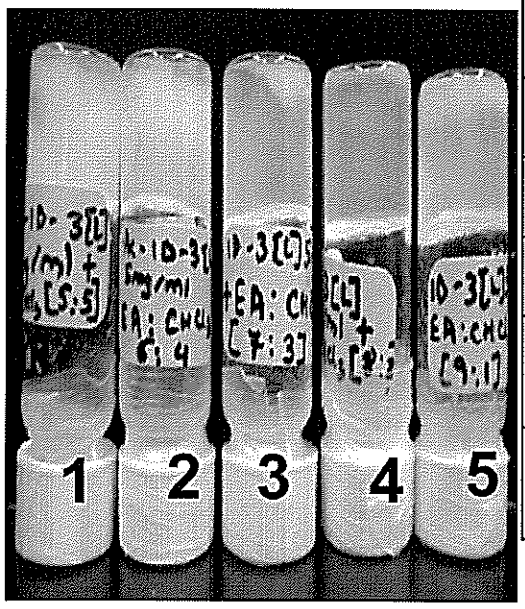
Gels with increasing concentration of Ac-LIVAGD-COOH (L) were prepared ethyl acetate. i.e 5 mg/ml, 10mg/ml, 20mg/ml (L to R).

Partial gelation of Ac-LD_6-COOH(L) in ethyl acetate

Fig5a:Application of Ac-IVD-COOH (L) organogel – organic solvent

Part 1: Since quantum dots were soluble in chloroform while Ac-IVD-COOH (L) gelled in ethyl acetate, thus solvent mixtures of ethyl acetate : chloroform were screened.

Gels of Ac-IVD-COOH (L) 5mg/ml were prepared in the solvent mixtures of ethyl acetate: chloroform.

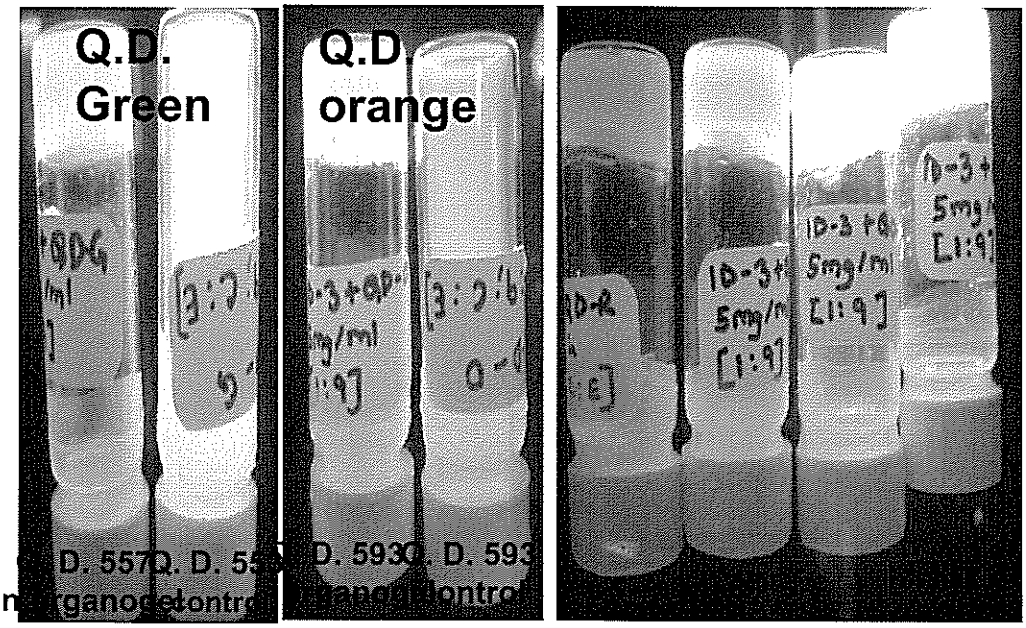


Sr. No.	Ethyl acetate: Chloroform	Observation (gels)
1.	5:5	Opaque
2.	6:4	Opaque
3.	7:3	Semi Opaque
4.	8:2	Translucent and stable in comparison to above
5.	9:1	Semi opaque and stable in comparison to above

Peptide organogel in solvent mixture of ethyl acetate: chloroform (8:2) was selected for quantum dot loading

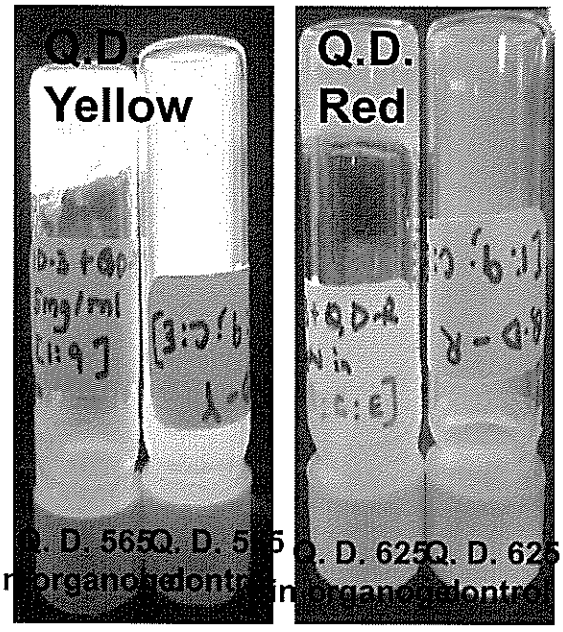
Fig5b: Application of Ac-IVD-COOH (L) organogel – Organic solvent

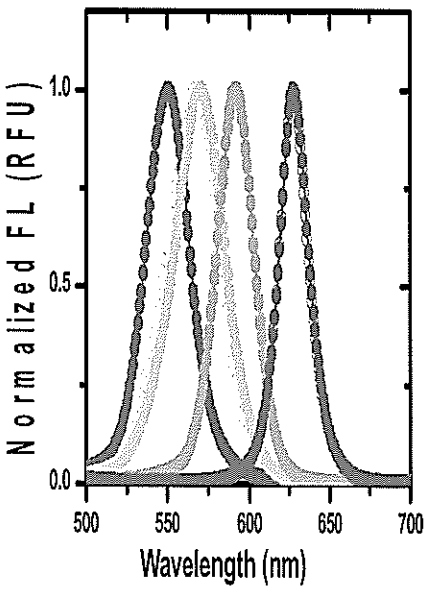
Quantum dot (Q. D.)loaded gel of Ac-IVD-COOH (L) **5mg/ml, Q. D. 0.2 mg/ml** were prepared in the solvent mixture of **ethyl acetate: chloroform, 8:2,**



Fluorescence measurement, ex:480nm

Quantum Dot used: CdS-CdSe-ZnS





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Fig6a: Formulation of peptide organogels in oil

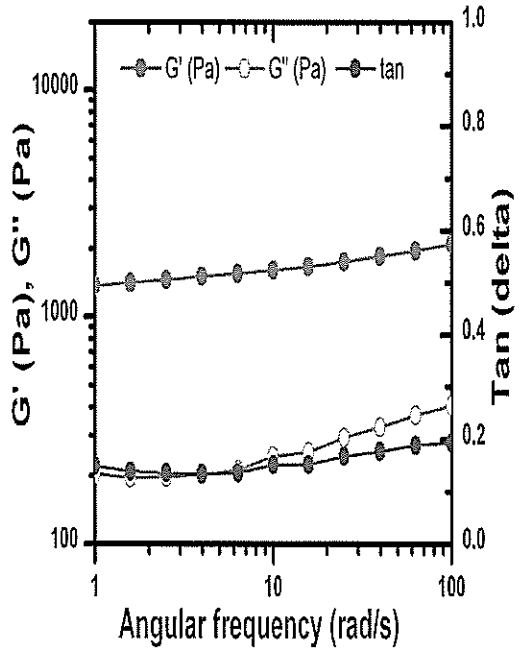
Different concentrations of Ac-IVD-COOH were screened for organogelation in sunflower oil.

Sr. No.	Conc. Of Ac-IVD-COOH(L)	Observation
1.	5mg/ml	No gelation
2.	10mg/ml	Partial gelation
3.	15mg/ml	Partial gelation
4.	20mg/ml	Gelation



Ac-IVD-COOH (L) 20mg/ml in Oil

Rheology study- Oscillation frequency sweep



Geometry: 8mm serrated parallel plate
Strain: 0.1%
Transducer mode: FRT
N =1

Fig6b: Formulation of peptide organogels in solvent mixtures

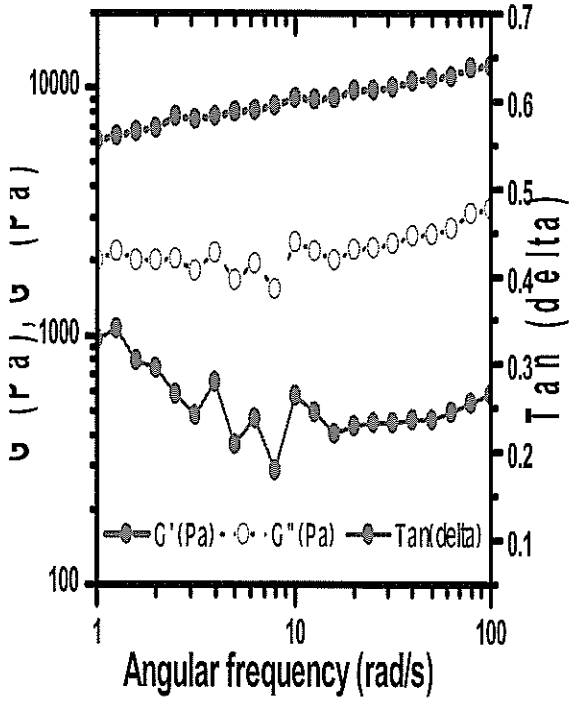
Ac-IVD-COOH 20mg/ml in (1) sunflower oil : ethanol (4:1),
(2) sunflower oil : acetone (4:1).



Ac-IVD-COOH (L) 20mg/ml in oil: acetone (4:1)

Rheology study- Oscillation frequency sweep

Ac-IVD-COOH (L) 20mg/ml in oil: acetone (4:1)



Geometry: 8mm serrated parallel plate
Strain: 0.1%
Transducer mode: FRT

Fig6c: Formulation of peptide emulsions in solvent mixture of water+oil

Ac-IVD-COOH 7.5mg/ml in solvent mixture of oil : water (50:50, 80:20, 20:80),

No phase separation were observed in the peptide based formulations in comparison to controls.

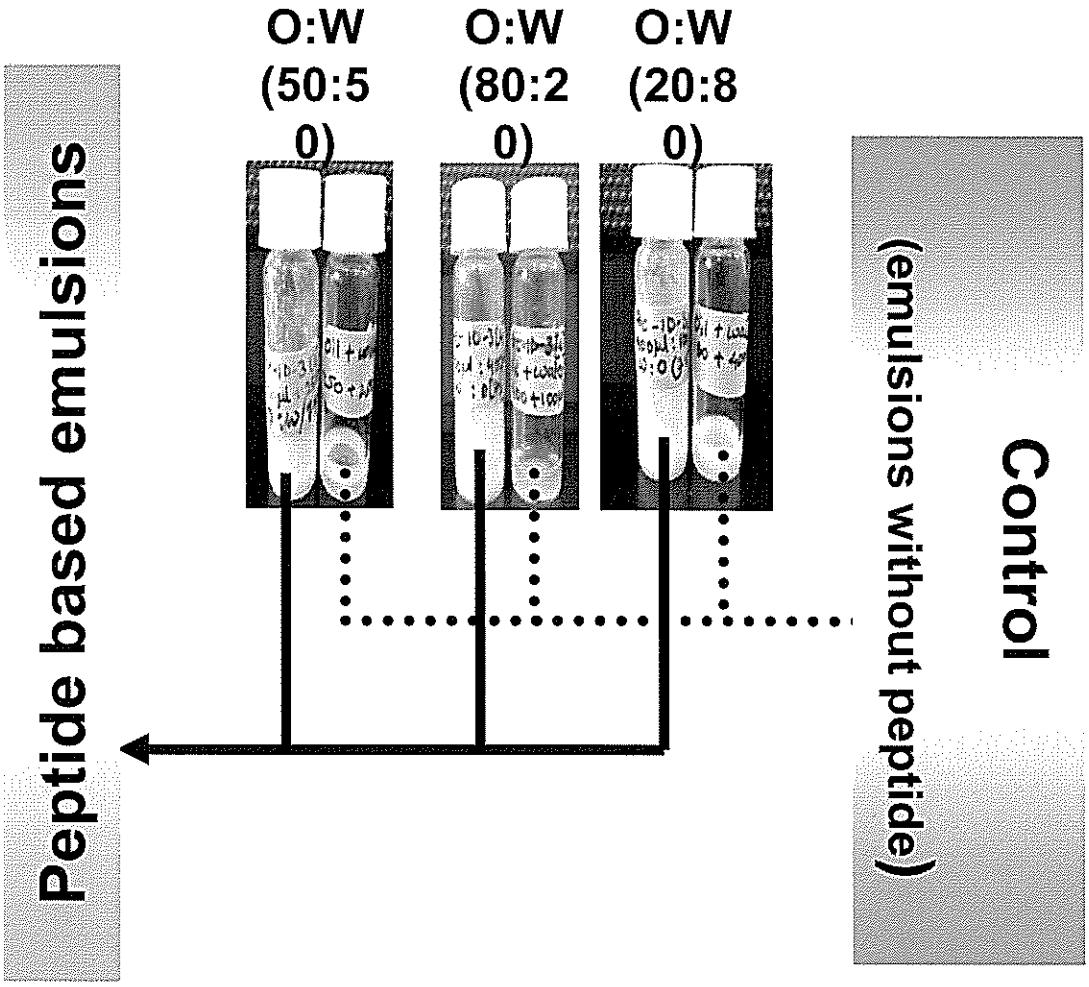
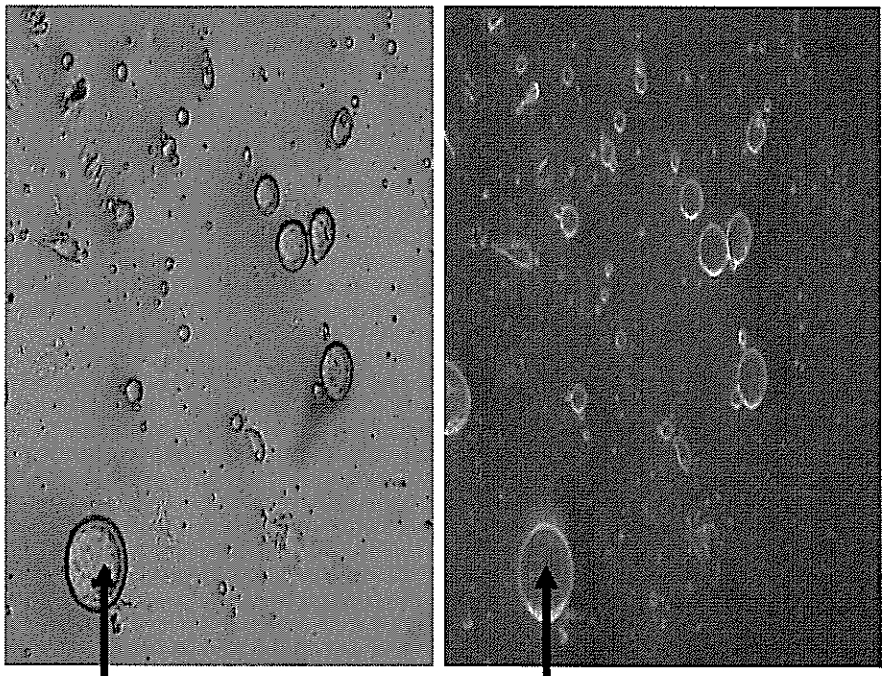


Fig6d: Alcian blue dye loaded Ac-IVD-COOH(L) emulsion (water:oil – 40:60)



Alcian blue dye encapsulated in peptide based emulsion

