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Research Article

FORMULATION AND EVALUTION OF ZIDOVUDINE CONTAINING SODIUM ALGINATE MICRO BEADS

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Abstract:

Aim: The objective of the present study was to prepare and evaluate Beads for the controlled release of Zidovudine from the prepared beads using different polymers. Methods: The microbeads were prepared by ionic gelation method. The prepared microbeads were characterized for FTIR, scanning electron microscopy (SEM), the percentage drug content, entrapment efficiency, and in vitro dissolution studies. Results: Micromeritic properties like Angle of repose, Hausner's Ratio, Carr's Index, Bulk density, true density etc., it shows the excellent flow property best formulation is ZB1 &ZB3. The swelling Index of Zidovudine containing sodium alginate beads ZB 1 is 2.76 ZB 3 is 2.98 %. The FT-IR and DSC study confirmed that no chemical interaction took place during encapsulation process. Entrapment efficiency was in range of 76.2-77.3%. Conclusion: *In-vitro* release of zidovudine was prolonged release of drug ranges from 60 to 70 % of zidovudine get released within 30 mints. Among the 6 formulation the best formulation is ZB 1 & ZB3.

Keywords: Controlled release, entrapment efficiency, ionic gelation, Micro Beads, Zidovudine.

Introduction

The Term BEADS is defined as a "spherical particle with a size varying from 50 nm (or) 2mm, containing a core substance". There are various approaches in delivering a therapeutic substance to the target site in a sustained release.

One such approach is using beads as carriers for drugs. To obtain maximum therapeutic efficacy it is necessary to delivery that agent to the target tissue is in the optimal amount in the right periods of time there by cavity of little toxicity of minimal side effects[1].

Microspheres, Microcapsules, Mill spheres, Thallaspheres, Microbeads, or Pearls are included in this category. All these different systems share a common spherical form, which is either a matrix or reservoir type They vary in size ranging from 5 mm (microsphere) to several millimeters (micro beads) and in the material from which they are composed (e.g., polyamides, collagens, polysaccharides).

The *Beads* are Targeted drug delivery systems have been designed on the concept of magic bullets given by "Dr. Paul Ehrlich". This concept is associated with the development of such systems which when introduced in the body, direct the drug only to its site of action there by providing maximum therapeutic response accompanied with reduced toxic effects due to decreased distribution of drug to other body tissues[2].

Azidothymidine (AZT) is the early name. Zidovudine is the generic name. Zidovudine is a thymidine analogue in which the 3-hydroxyl (OH) group is replaced by an azido ($-N_{3)}$ group, it forms a nucleoside which exists in two isomeric forms, unphosphorylated inactive stereo isomer and tri phosphate active erythro isomer. Phosphorylation occurs at the 5-hydroxyl group.

Targeted drug delivery systems are those in which maximum drug concentrations is achieved at the specific site of drug action either by using inert forms of active dug or by utilizing specially designed polymers. Targeted drug delivery systems which employ a biologically inert polymer as a carrier to carry the drug to its site of action are referred to as drug carrier delivery systems. In these the drug can be either entrapped within the carrier or covalently bonded to it. In 1986, the first step was taken in AIDS prevention. AZT is a pill that has prolonged the lives of HIV infected patients. Ninety percent of patients who have taken the AZT pill are still alive after one year of being diagnosed. This is an increase of 50% without the pill[3].

Antiretroviral medication can prolong the time between HIV infection and the onset of AIDS and hence reduces both the mortality and the morbidity of HIV infection. Introduction of highly active antiretroviral treatment (HAART) in industrialized countries has considerably reduced disease progression to AIDS and transformed HIV infection from a lethal disease to an effectively manageable chronic disease (Girard, 2006).

Material: Zidovudine is obtained from Aurbindo pharma Ltd. Sodium alginate is collected from Arihant Trading Company, Mumbai. Pectin is obtained from Signet, Mumbai, Liquid paraffin, Calcium chloride, Sodium di hydrogen orthophosphate is analytical grades.

Methodology:

The following pre formulation studies were performed for Zidovudine and polymers.

1. Determination of melting point of Zidovudine
2. Drug – polymer compatibility studies

Determination of melting point [4]:

Melting point was determined by taking small amount of zidovudine in a capilliary tube closed at one end. The capillary tube containing drug is placed inside and kept in melting point apparatus and the temperature at which the drug melts was recorded. This was performed thrice and average value was calculated.

Pre-Formulation Study of Zidovudine:

Drug –Polymer Compatability studies [5]:

- **FT-IR Spectra:**

Prior to the development of the dosage forms, infrared spectra of the physical mixture of the *zidovudine*, polymers individually and the mixture of drug and polymer were taken.

The drug-Polymer Interaction were studied by FTIR spectrometer, shimadzu 8400S 2% w/w of the sample with respect to a potassium Bromide (KBr) was mixed with drug KBr. The mixture was mixed into a fine powder using mortar and then compressed into a KBr discs in a hydraulic press at a pressure of 10000 PSI. Each KBr disc was scanned for 10 times at a resolution of $2cm^{-1}$ using Happ-Genzel apodization. The characteristic peaks were recorded.

- **Differential Scanning Calorimetry (DSC):**

DSC studies are a qualitative identification of substance in the pure form and in combination with polymers and excipients. DSC was carried out by the action of Argon purging with 10ml/min, where it is hermetically sealed with Aluminum Pans, from this Sample 40µl is used. The program is run at 10^0C/min. The onset peak and end set peaks are recorded for individual pure drug, polymer and in combination of drug and polymers.

Preparation of Zidovudine containing Sodium alginate Micro beads:

Formulation Design [6]:

The technique involved in the preparation of zidovudine containing Sodium alginate micro beads was Ionotropic gelation technique. Polymer was dissolved in water with continuous stirring. The polymer solution was added into the drug. The mixture was homogenized for 15 minutes was extruded via needle having the diameter 0.8 mm distance 5 cm. Prepare 5% $CaCl_2$ solution with gently agitation at room temperature. The dropping rate was 2 ml per minute. Finally beads are dried in a tray dryer at room temperature 40^oC for 5 minutes. The time of drying was optimized by weighing the micro beads repeat it until, to obtain their constant weight.

The formula for preparation of Zidovudine contaning Sodium alginate Micro beads:

Table No.1: Ingredients used in the formulation.

SI.No	Formulation Code	Zidovudine (gms)	Pectin (gms)	Sodium alginate (gms)	$CaCl_2$	Distilled water
1	ZB1	2	5	3	5	100 ml
2	ZB2	1.5	6	5	5	100 ml
3	ZB3	1	4	6	5	100 ml
4	ZB4	2.5	7	8	5	100 ml
5	ZB5	3	2	7	5	100 ml
6	ZB6	3.5	3	2	5	100 ml

Evaluation of Beads:

Pre-compression parameters [7]:

I. **Bulk density:** Both loose bulk density (LBD) and tapped bulk density (TBD) were determined. An amount of powder blend was introduced in a 100 ml measuring cylinder. Then the weight of micro Beads was determined by subtracting the weight of empty measuring cylinder from final weight of measuring cylinder. The cylinder was allowed to fall onto a hard surface from a height of 2.5 cm at 2 sec intervals. The tapping was continued till no volume change was noted. LBD and TBD were calculated by following formulas;

$$LBD = \frac{\text{Weight of the powder}}{\text{Volume of the packing}} \longrightarrow (a)$$

$$TBD = \frac{\text{Weight of the powder}}{\text{Tapped volume of the packing}} \longrightarrow (b)$$

II. Carr's Compressibility Index:

An important measure that can be obtained from bulk density determinations is the percent compressibility C, grading of the powders for their flow properties according to Carr's index is given in Table No.2

Table No.2: Grading of the powders for their flow properties according to Carr's Index

Consolidation index (Carr %)	Flow
5-15	Excellent
12-16	Good
18-21	Fair to passable
23-35	Poor
33-38	Very poor
>40	Very very poor

% Carr's Index can be calculated by using the following formula.

$$\text{Carr's Index (\%)} = \frac{\text{TBD-LBD}}{\text{TBD}} \times 100 \longrightarrow (c)$$

III. Hausner's ratio: Hausner ratio is an indirect index of ease of measuring the Beads. It is calculated by the following formula

$$\text{Hausner's ratio} = \frac{\text{Tapped density}}{\text{Bulk density}} \longrightarrow (d)$$

Lower hausner ratio (<1.25) indicates better flow properties than higher ones (>1.25).

IV. Angle of repose: The angle of repose of the Beads was determined by using funnel method. The accurately weighed powder was taken in a funnel. The height of the funnel was adjusted in such a way that the tip of the funnel just

touched the apex of the heap of the powder. The diameter of the powder cone was measured and angle of repose was calculated by using the equation

$$\tan\theta = \frac{h}{r} \longrightarrow \quad \text{(e)}$$

Where, h and r are the height of pile and radius of the base of pile.

Different ranges of flow ability in terms of angle of repose are given below in the table no.3

Table No.3: Relationship between Angle of Repose (θ) and flow properties.

Angle of Repose (θ) (degrees)	Flow
<25	Excellent
25-30	Good
30-40	Passable
>40	Very poor

Surface Morphology Characterization:

SEM (Scanning Electron Microscopy)[8]:

The shape and surface characerization of the beads were studied by SEM. The Beads were mounted directly on to the sample tube and coated with silver film (200 nm) under reduced pressure.

Drug entrapment efficiency [9]:

Zidovudine content in the micro beads was estimated by a UV-spectrophotometric method Accurately weighed 100mg of micro beads (100 mg) were suspended in 7.4 pH phosphate buffer. The resulting solution was kept for 24hrs. Next day it was stirred for 20min using ultra sonicator. The solution was filtered through a 0.45 µm membrane filter, after suitable dilution, Zidovudine content in the filtrate was analysed at 266nm using UV-Visible spectrophotometer. The obtained absorbance was plotted on the standard curve to get the exact concentration of the entrapped drug. Calculating this concentration with dilution factor the percentage of actual drug encapsulated in microbeads was calculated. The drug entrapment efficiency was determined using following relationship

The yield was calculated.

$$\text{Percentage yield} = \frac{\text{Actual drug content}}{\text{Theoretical drug content}} \times 100$$

Swelling degree determination [10]:-

For estimation of swelling Index microbeads were suspended into 0.1 NHcl. The swelling degree of equilibrium of micro beads was calculated by using formula.

SDs= (We-Wo)/ Wo

Where:

We : Equilibrium weight of beads in Hcl

Wo : Absolutely dried weight of Beads.

In Vitro Drug release [11]:

The In Vitro release of the drug from Sodium alginate microbeads was studied in Phosphate buffer pH 7.4, by using 900 ml of USP basket type dissolution rate test apparatus at 100 or 25 RPM. The samples were withdrawn at different time intervals and get the Absorbance at UV- spectrophotometer at the Lambda max 266 nm.

Results and Discussion:

Preformulation studies

Identification

Determination of melting point:

The melting point of Zidovudine was found to be in the range of 121^0C to 124^0C in melting point apparatus it indicates the purity of the drug sample. Any impurity, if present, will cause variation in the melting point of a given drug substance.

Drug –Polymer Compatability studies:

Excipients were integral components of almost all pharmaceutical dosage forms. The successful formulation of a stable and effective dosage forms depends on the selection of excipients, which are added to facilitate administration of the drug and protect it from degradation

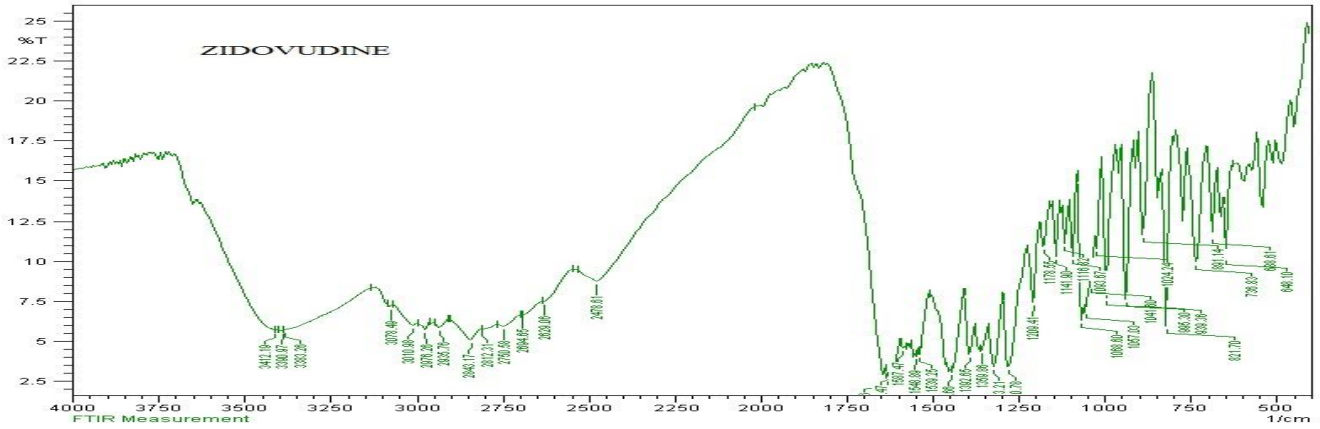
Fourier Transform Infra Red Spectroscopy (FT - IR SPECTRA)

The FT-IR study revealed that the scanning range The FT-IR spectra of Zidovudine C-H stretching was 2976.26-2812.31, C-H bending was 1587.47-1392.65, C-F stretching was 1068.60-1024.24, Alkene was 3010.98, Aliphatic aldehyde was 2750.58-2629.06, C-O stretching was 1209.41-939.36, C-C stretching was 821.70-891.14. The FT-IR spectra of sodium alginate C-H stretching was 2872.10-2852.81, C-F stretching was 1022.31, Aliphatic aldehyde was 1701.27, C-O stretching was 924.18. The FT-IR spectra of pectin C-H stretching was 2924.18-2854.74, C-H bending was 1375.29-1319.35, C-F stretching was 1091.75-1033.88, Alkene was 1612.54, C-O stretching was 1124.54-947.08, C-C stretching was 1572.04-1560.48.

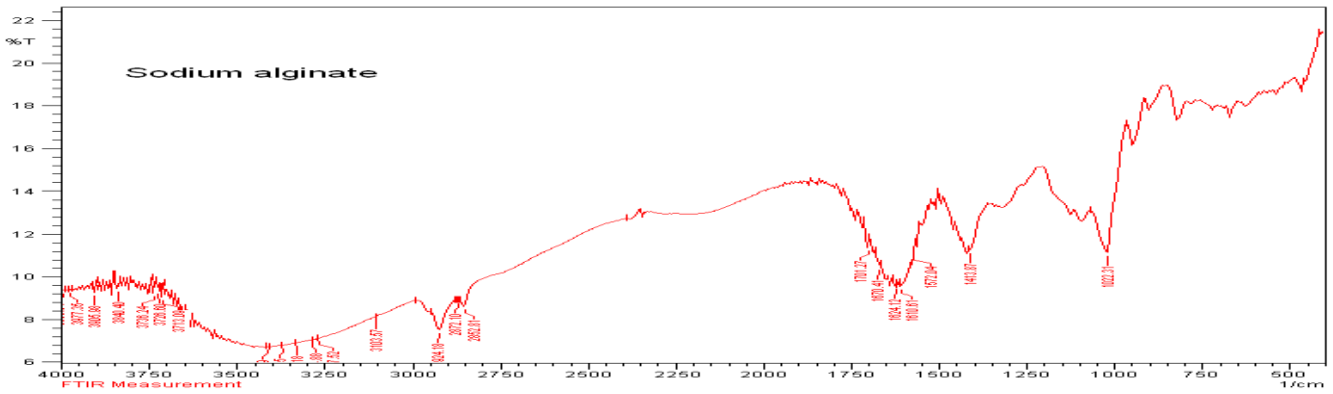
FT-IR spectrometer is shown in Figure.4 to 6. This was compared with standard functional group frequencies as shown in Table.7. .

Compatability Studies.

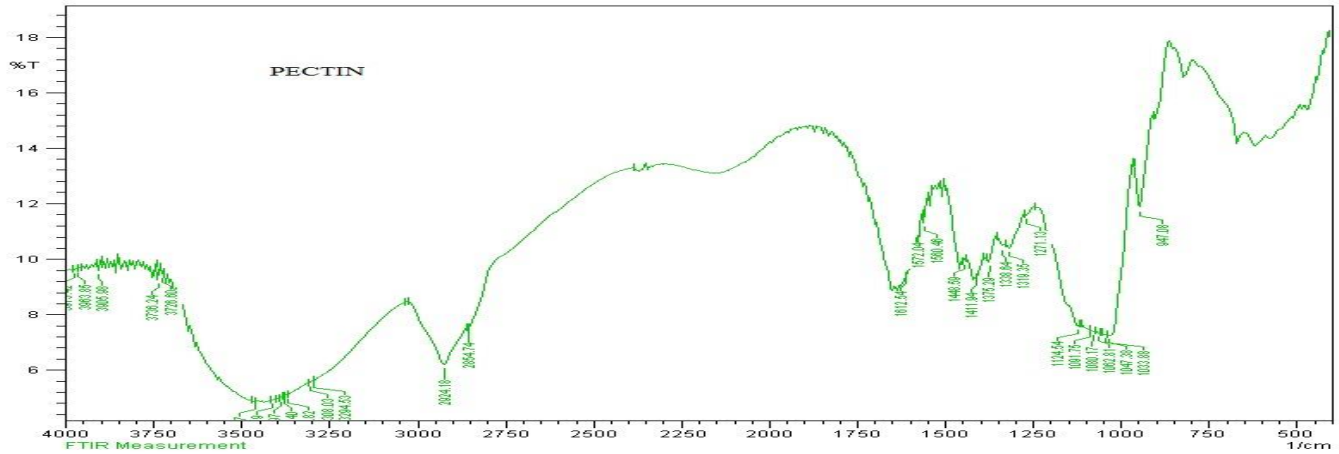
Fouruer Transform Infra Red Spectroscopy.



FT –IR Spectra of Zidovudine



FTIR Spectra of Sodium alginate



FTIR Spectra of Pectin.

Table N0.7: Comparison of the Peak of Functional Groups Observed In IR Spectra of Compatibility Studies.

Drug	Important IR spectral peaks of different groups expressed in wave number (cm^{-1})						
	C-H Stretching	C-H Bending	C-F Stretching	Alkenes	Aliphatic aldehyde	C-O Stretching	C-C Stretchig
Zidovudine	2976.26-2812.31	1587.42-1392.65	1068.60-1024.24	3010.98	2750.58-2629.06	1209.41-939.36	821.70-891.14
Sodium alginate	2872.10-2852.81	------	1022.31	-----	1701.27	924.18	------
Pectin	2924.18-2854.74	1375.29-1319.35	1091.75-1033.88	1612.54	------	1124.54-947.08	1572.04-1560.48

(Differential Scanning Calorimetry)

The Pure drug Zidovudine shown as an Exothermic peak value was 123.7^0 C, the physical mixture of zidovudine and sodium alginate the exothermic peak value was 68.08^0C and 123.59^0C., the endothermic peak value was found to be 122.2 and 37.24J/G. The DSC spectra of pectin the exothermic value was found to be 72.20^0C, the endothermic peak value was found to be 101.3J/G. In Zidovudine DSC Spectrum there is no Glass transition, Crystallization, & Endothermic peak there is no compatibility in the formulation. The FT-IR spectra as shown in Fig.

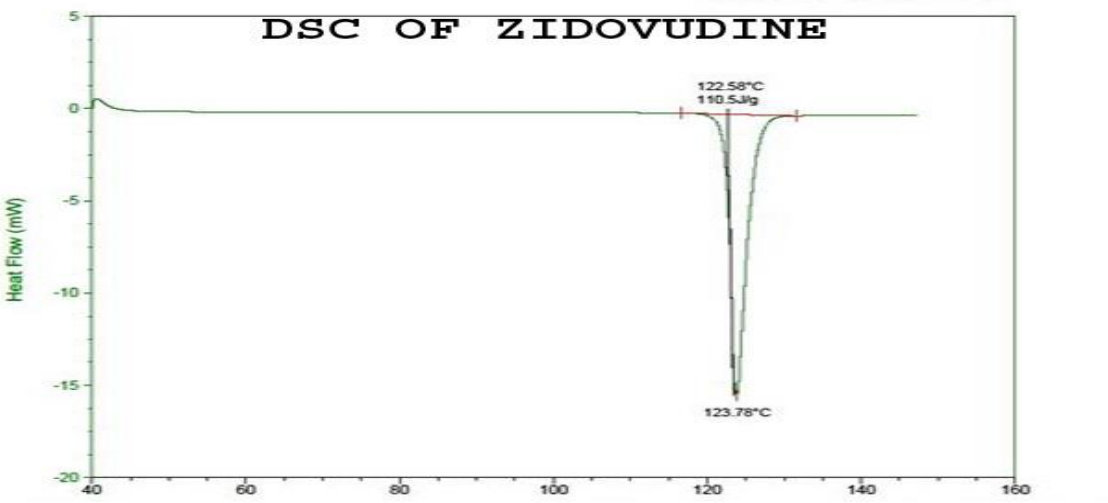


Fig. DSC of zidovudine.

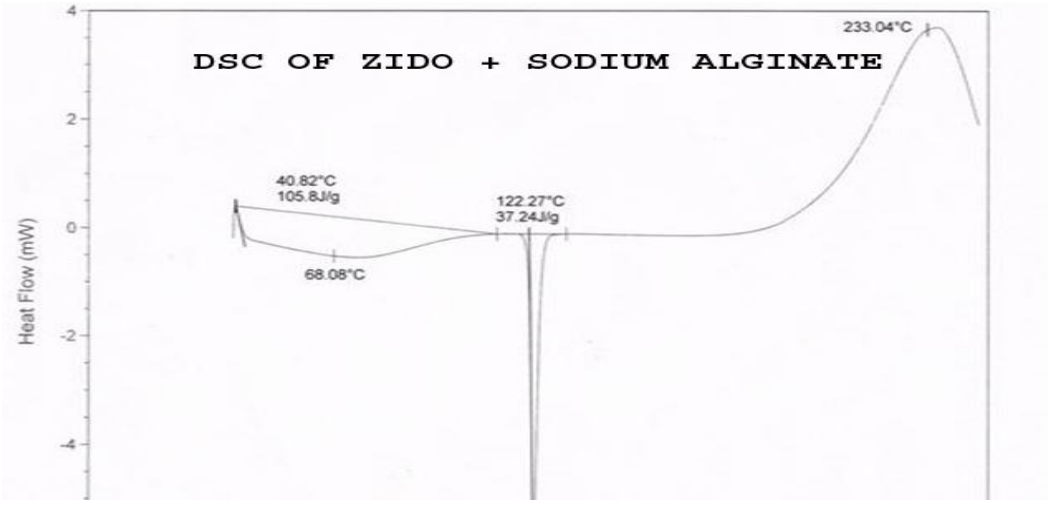


Fig. DSC of Zido + Sodium Alginate.

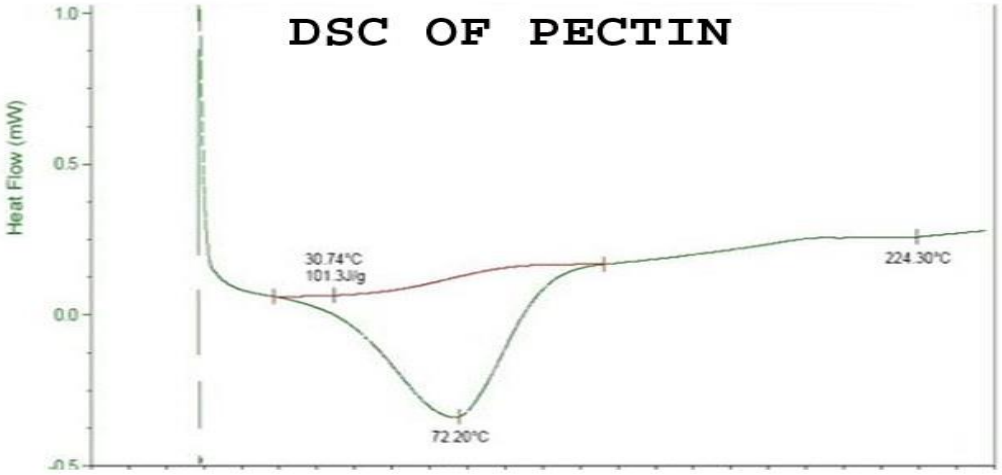


Fig. DSC of Pectin.

Pre-compression parameters:

The method employed for beads in this study was Ionotropic gelation technique for which the drug or the mixture of drug and polymer should possess good flow properties. Beads ready for pre-compression parameters (Micromeritic properties) to study the flow properties of beads, to achieve constant uniformity of beads weight.

Angle of repose (θ):

The data obtained for angle of repose for all the formulations were tabulated in the Table no. 11. The values were found to be in the range of 25.3 and 46.3. All the formulations showed the angle of repose less than 30^0, which reveals the good flow property.

Table No. 11: Angle of Repose of Zidovudine Containing Sodium Alginate Beads.

SI. No	Formulation Code	Weight of the samples in gms	Height of the cone in cms	Radius of cone in cm	Tan θ =h/r	Tan^{-1} h/r	Average
1	**ZB1**	**15 gm**	**3.5**	**8**	**0.43**	**23.2**	**25.7**
		15 gm	**4.5**	**8.2**	**0.54**	**28.3**	
2	ZB 2	15 gm	4	7.5	0.53	27.9	28.5
		15 gm	4.5	8	0.56	29.2	
3	**ZB 3**	**15 gm**	**3**	**7**	**0.42**	**22.7**	**25.3**
		15 gm	**4**	**7.5**	**0.55**	**27.7**	
4	ZB 4	15 gm	3.5	8	0.43	23.2	28.3
		15 gm	4	6	0.66	33.4	
5	ZB 5	15 gm	6	5	1.2	50.1	55.1
		15 gm	7	4	1.75	60.2	
6	ZB6	15 gm	6	4.5	1.33	53	46.3
		15 gm	5	6	0.83	39.6	

Bulk density:

Bulk density and True density for the Beads is shown in table no. 12. The bulk density for the entire formulation Beads varied from 2.5 to 5 gm/mg respectively. The True density for the entire formulation Beads varied from 5 to 10 gm/mg respectively.

Fig.12: Bulk Density of Zidovudine containing Sodium alginate Beads.

SI.No	Formulation Code	Weight of Beads	Bulk Volume		Average
			Initial Volume	Tapped Volume	
1	**ZB 1**	**10 gms**	**10**	**8**	**5 gm/mg**
2	ZB 2	10 gms	10	9	10 gm/mg
3	**ZB 3**	**10 gms**	**10**	**6**	**2.5 gm/mg**
4	ZB 4	10 gms	10	7	3.33 gm/mg
5	ZB 5	10 gms	10	6	2.5 gm/mg
6	ZB 6	10 gms	10	5	5 gm/mg

Fig. 13: True density of Zidovudine containing Sodium alginate Beads.

SI.No	Formulation Code	Weight of Beads	True Volume		Average
			Initial Volume	Tapped Volume	
1	**ZB 1**	**10 gms**	**10**	**8**	**10 gm/mg**
2	ZB 2	10 gms	10	7	5 gm/mg
3	**ZB 3**	**10 gms**	**10**	**7**	**5 gm/mg**
4	ZB 4	10 gms	10	9	10 gm/mg
5	ZB 5	10 gms	10	8	5 gm/mg
6	ZB 6	10 gms	10	7	5 gm/mg

Carr's consolidation index and Hausners ratio:

The results of Carr's consolidation index or compressibility index (%) for the entire formulation ranged from 0.5 to 2.0. The Beads showed excellent compressibility index values upto 15% result in good to excellent flow properties. It was further supported by Hausner's ratio ranged from 0.5 to 2.0 Lower Hausner ratio (<1.25) indicates better flow properties than higher ones (>1.25). The results for all the formulations were shown in Table no.14.

Table No.14: Hausners Ratio and Carr's Index of Zidovudine Containing Sodium alginate Beads.

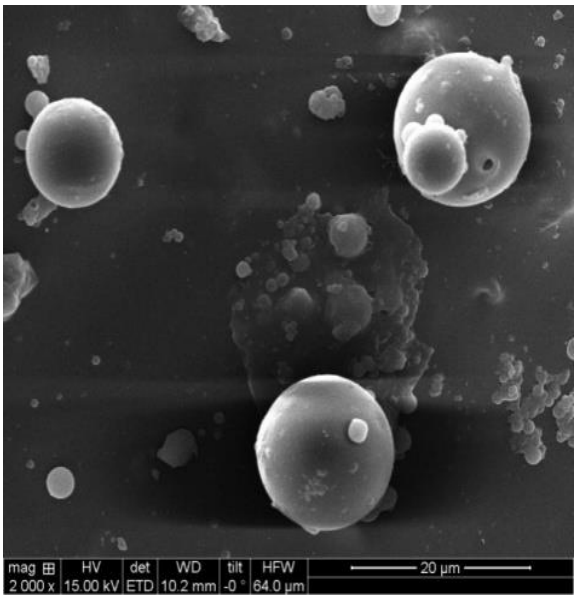
SI.No	Formulation Code	Hausners Ratio	Carr's Index
1	**ZB 1**	**2**	**50**
2	ZB 2	0.5	100
3	**ZB 3**	**2**	**50**
4	ZB 4	3	66.7
5	ZB 5	2	50
6	ZB 6	1	0

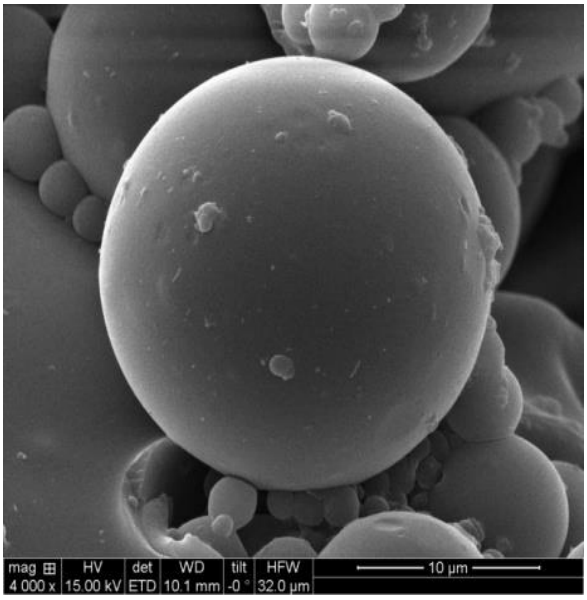
Shape and Surface Morphology

SEM (Scanning electron microscopy)

The developed Ionotropic gelation of ZB1 to ZB6 were freeze-dried both in the presence and in the absence of a cryoprotectant (5%, w/w mannitol), formed a solid residue which could be easily redispersed in NaCl (0.9%, w/v) solution. The Morphology and structure of stealth SLNs were determined using scanning electron microscopy (SEM) (Hitachis- 2600N Japan), and photomicrographs were taken at suitable magnifications. The photographs of the optimized ZB1 & ZB3 formulation taken by Scanning electron microscopy are shown in the figure.,

SEM Picture of Zidovudine containing Sodium alginate Micro Beads.





Shape and Surface Morphology

Swelling degree determination:-

The swelling Index Zidovudine containing sodium alginate beads were suspended into 0.1 NHcl. To determine the swelling degree of various formulation equilibrium of beads was calculated by using formula.

SDs= (We-Wo)/ Wo

Where:

We: Equilibrium weight of beads in Hcl

Wo: Absolutely dried weight of Beads.

Table No. 16: Percentage swelling index of Beads of Zidovudine.

Formulation Code	% Swelling Index
ZB 1	**2.98**
ZB 2	1.77
ZB 3	**2.76**
ZB 4	1.86
ZB 5	1.99
ZB 6	2.00

Drug entrapment efficiency (%EE)

Percentage entrapment efficiency of ZB 1, ZB 2, ZB 3, ZB 4, ZB 5, ZB 6 was found to be satisfactorily high, that is, 76.2 ± 0.19, 75.8 ± 0.25, 77.3 ± 1.78, 72.6.8 ± 1.78, 75.8 ± 1.90, 73.6 ± 2.10 respectively. The high drug incorporation may be attributed to the fact that rapid quenching of drug occurred in Polymer phase due to presence of Pectin, Sodium alginate and the drug incorporation followed core-shell model with drug-enriched core. The ZB1 & ZB 3 shows the good formulation & high loading. Results as shown in Table No. 17.

Table No. 17: Entrapment efficiency of Zidovudine Beads.

Formulation Code	Entrapment efficiency
ZB1	**76.2 ± 0.19**
ZB 2	75.8 ± 0.25
ZB 3	**77.3 ± 1.78**
ZB 4	72.6.8 ± 1.78
ZB 5	75.8 ± 1.90
ZB 6	73.6 ± 2.10

***In Vitro* Drug release:**

The *In Vitro* release of the drug from Sodium alginate beads was studied in Phosphate buffer pH 7.4, 900 ml by using USP basket type dissolution rate test apparatus at 100 or 25 RPM. The samples were withdrawn at different time intervals and get the Absorbance at UV- spectrophotometer at the Lambda max 266 nm. Percentage cumulative drug release was calculated. The values and graphs are represented in Table18-23 and graph no.24.

Table No.18: Drug release profile of ZB 1 formulation.

SI.No	Time Mint.	Absorbance	Conc.	Amt. Of drug release	Cum. Amt of drug release	% Amt of drug release	Cum. % Amt of drug release
1	5	0.1	0.14	10.8	10.800	2,230	2,2300
2	10	0.8	0.88	72.3	72.300	15,016	15,0160
3	15	1.4	1.59	149.1	149.100	29,090	29,0900
4	20	1.9	2.49	190.0	190.000	42,780	42,7800
5	25	2.5	3.49	290.0	290.000	56,800	56,8000
6	30	3.1	3.80	411.0	411.000	69,100	69,1000

Table No.19: Drug release profile of ZB 2 formulation.

SI.No	Time Mint.	Absorbance	Conc.	Amt. Of drug release	Cum. Amt of drug release	% Amt of drug release	Cum. % Amt of drug release
1	5	0.1	0.14	11.8	11.800	2,440	2,4400
2	10	0.7	0.79	70.3	70.300	14,050	14,0500
3	15	1.3	1.57	140.5	140.500	28,090	28,0900
4	20	1.8	2.22	199.0	199.000	40,780	40,7800
5	25	2.4	3.00	270.0	270.000	54,820	54,8200
6	30	2.9	3.65	328.6	328.600	66,520	66,5200

Table No.20: Drug release profile of ZB 3 formulation.

SI.No	Time Mint.	Absorbance	Conc.	Amt. Of drug release	Cum. Amt of drug release	% Amt of drug release	Cum. % Amt of drug release
1	5	0.2	0.15	11.8	11.800	3,440	3,4400
2	10	0.9	0.89	73.3	73.300	16,015	16,0150
3	15	1.5	1.60	150.1	150.100	30,090	30,0900
4	20	2.0	2.50	210.0	210.000	43,780	43,7800
5	25	2.6	3.50	300.0	300.000	57,820	57,8200
6	30	3.2	3.81	412.0	412.000	70,100	70,1000

Table No.21: Drug release profile of ZB 4 formulation.

SI.No	Time Mint.	Absorbance	Conc.	Amt. Of drug release	Cum. Amt of drug release	% Amt of drug release	Cum. % Amt of drug release
1	5	0.0	0.12	10.7	10.700	1.320	1.3200
2	10	0.5	0.77	69.1	69.100	13.040	13.0400
3	15	1.1	1.55	139.3	139.300	27.080	27.0800
4	20	1.6	2.20	197.9	197.900	38.780	38.7800
5	25	2.2	2.98	268.1	268.100	52.022	52.0220
6	30	2.7	3.63	326.6	326.600	64.021	64.0210

Table No.22: Drug release profile of ZB 5 formulation.

SI.No	Time Mint.	Absorbance	Conc.	Amt. Of drug release	Cum. Amt of drug release	% Amt of drug release	Cum. % Amt of drug release
1	5	0.1	0.13	117	11,700	2,340	2,3400
2	10	0.6	0.78	70.2	70,200	14,040	14,0400
3	15	1.2	1.56	140.4	140,400	28,080	28,0800
4	20	1.7	2.21	198.9	198,000	39,780	39,7800
5	25	2.3	2.99	269.1	269,000	53,820	53,8200
6	30	2.8	3.64	327.6	327,000	65,520	65,5200

Table No.23: Drug release profile of ZB 6 formulation.

SI.No	Time Mint.	Absorbance	Conc.	Amt. Of drug release	Cum. Amt of drug release	% Amt of drug release	Cum. % Amt of drug release
1	5	0.0	0.11	10.6	10.600	0.320	0.3200
2	10	0.4	0.76	68.1	68.100	12,040	12,0400
3	15	1.0	1.54	138.3	138.300	26,080	26,0800
4	20	1.5	2.19	196.9	196.900	37.280	37.2800
5	25	2.1	2.97	267.1	267.100	51.072	51.0720
6	30	2.6	3.62	325.6	325.600	63.021	63.0210

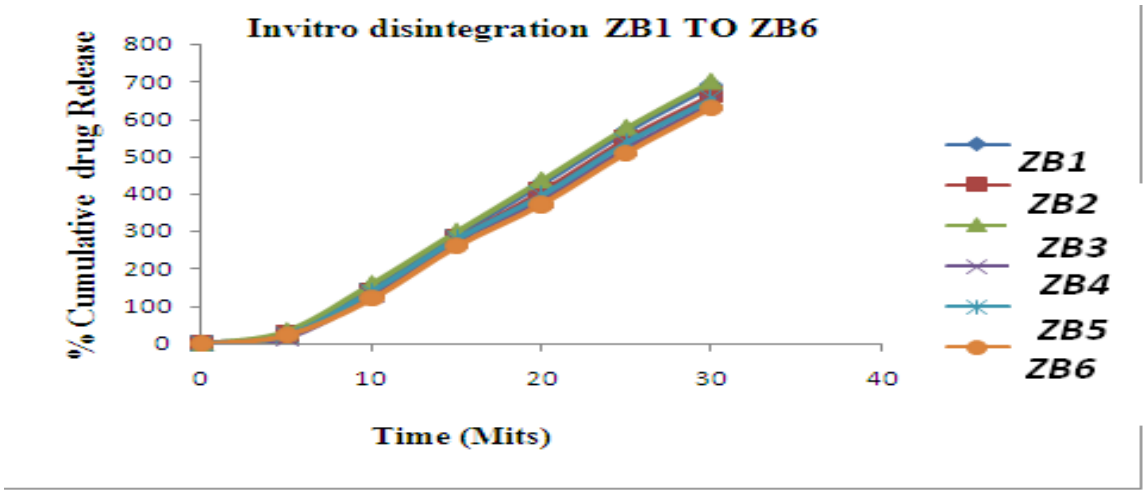


Fig.24: *In Vitro* drug Release Profile of Zidovudine Containing Sodium alginate Beads.

Conclusion

The present work was carried out to develop Zidovudine containing sodium alginate Beads can be prepared by Ionotropic gelation method. It was evaluated by Micromeritic properties like Angle of repose, Hausner's Ratio, Carr's Index, Bulk density, True density etc., it shows the excellent flow property best formulation is ZB1 &ZB3. The swelling Index of Zidovudine containing sodium alginate beads ZB 1 is 2.76 ZB 3 is 2.98 %. The SEM study shows

that almost spherical shape Beads with rough surface can be obtained from Sodium alginate & Pectin. The FT-IR and DSC study confirmed that no chemical interaction a*In-vitro* release of zidovudine was prolonged release of drug ranges from 60 to 70 % of zidovudine get released within 30 mints. Among the 6 formulation the best formulation is ZB 1 & ZB3.

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