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To study the changes in chemical quality parameters of *Aloe vera* pulp powder prepared by different drying methods during storage

Harshada M Pawar, Dr. Gargi D Shirke, Vishal B Yadav and Dr. Jitendra H Kadam

Abstract
The present research work was carried at department of PHM of MAPSF of PGI PHM Killa, Roha, Dist. Raigad, (Dr. B. S. K. K. V., Dapoli, Dist. Ratnagiri) Maharashtra. India, during the year 2020-21. The main objective of the research was to study the changes in chemical quality parameters of *Aloe vera* pulp powder prepared by different drying methods during storage. Which evaluates chemical properties and storage stability of *Aloe vera* pulp powder. By using convective tray drying method at 50° C made the good quality powder with better shelf life. Standardized powder was packed in polyethylene bags. *Aloe vera* pulp powder was kept at room temperature for further storage studies after packaging. *Aloe vera* pulp powder for analyzing with different quality parameters during storage were conducted at 0, 30, 60 and 90 days. During the storage total ash, titrable acidity, fat, protein, fiber and solubility decreased with increase in storage period. The, TSS, moisture content, pH were increased with increase in storage period. All the parameters were significantly influenced packaging material and storage time. In the process of preparation of *Aloe vera* pulp powder by different drying methods, convective tray drying method gave significant results. In chemical parameters total ash was 14.08%, titrable acidity 0.47%, fat 2.16%, protein 4.18%, fiber 16.54%, pH 4.31, TSS 4.50 ^{0}Brix, moisture content 3.85% and solubility 3.16 minute respectively. From overall observation it was concluded that convective tray drying was the suitable method for preparation of *Aloe vera* pulp powder followed by microwave drying, Polytunnel drying and Sun drying. In convective tray drying at 50 °C was suitable temperature for preparation of *Aloe vera* pulp powder and it was stored for 90 days at room temperature without affecting its quality and also found suitable for human consumption.

Keywords: *Aloe vera* leaves, Fresh *Aloe vera* pulp, *Aloe vera* powder, Drying, Convective drying, storage of *Aloe vera* powder etc.

1. Introduction
Aloe vera is a short-stemmed juicy plant with green pointed and fleshy leaves entrapping a clear viscous gel. It can achieve a stature of 10-20 m with a stem girth up to 3 m. The annually produced flowers are orange in colour with the spikes reaching up to 90 cm tall. The plant has triangular, fleshy leaves with serrated edges, yellow tubular flowers and fruits that contain numerous seeds. Each leaf is composed of three layers: 1) An inner clear gel that contains 99% water and rest is made of glucomannans, amino acids, lipids, sterols and vitamins. 2) The middle layer of latex of bitter yellow sap and contains anthraquinones and glycosides. 3) The outer thick layer of 15–20 cells called as rind which has protective function and synthesizes carbohydrates and proteins. Inside the rind are vascular bundles responsible for transportation of substances such as water (xylem) and starch (phloem). (Joseph and Raj, 2010) [13].
Aloe products are sensitive to spoilage due to the high moisture content. Unfortunately, due to lack of proper processing techniques, many of these products spoil even before reaching the consumers causing a huge loss to the cultivator and processor. The *Aloe* leaves possessing posses the wide spectrum of biological activities and having extensive use, has become very vital to develop a better method of preservation for enhancing the shelf life while maintaining the quality.
Drying is one of the best methods for preserving the food materials as compared to other methods. It increases the shelf life by decreasing the water activity in the product which inhibits the growth of microorganisms while decreasing spoilage reactions. Another important benefits of dried product is the reduction in the cost of packaging, storage and transportation due to their comparatively smaller volume and mass.

The challenge of drying of *Aloe vera* is to maximize the retention of nutrients while minimizing the moisture content of product to a level where microbiological growth should not occur. There is requirement of faster method of dehydration that yields higher quality products. It is generally known that freeze-drying produces highest quality dehydrated products, but this technique is very expensive and requires skilled operators. Hence, a method of convective drying could be a good solution. However some problems like considerable shrinkage due to cell collapse following the loss of water, poor re-hydration characteristics of dried products and unfavourable changes in colour, texture, flavour and nutritive value may occur. This can be solved by controlled drying which helps in overall improvement in the quality of the final product (Ahmed and Singh, 2013) [1].

2. Materials and Methods

The present research entitled, "To study the changes in chemical quality parameters of *Aloe vera* pulp powder prepared by different drying methods during storage." was conducted at the Department of Post Harvest Management of Medicinal, Aromatic, Plantation, Spices and Forest Crops, Post Graduate Institute of Post-Harvest Management, Killa - Roha, Dist. Raigad, Maharashtra India, north konkan (18°42'5947" N, 73°17'9361" E) during the year 2020-2021.

2.1 Experimental materials

2.1.1 *Aloe vera* leaves

The fresh *Aloe vera* leaves of species *Aloe barbadenesis* were obtained from the farmers field.

2.1.2 Chemicals

Food grade and analytical grade chemicals obtained from department of Medicinal, aromatic, plantation, spices and forest crops were used for carrying out analysis of the samples.

2.1.3 Packaging Materials

The high -density polyethylene (HDPE) pouch/bag packaging materials were obtained from the local market.

2.1.4 Equipments

The equipment used in this investigation was grinder, peeler, cutting knife, weighing balance, autoclave, different types of dryers, hot air oven, sieve shaker, muffle furnace, soxhlet extraction apparatus, kjeldahal distillation unit etc.

Experimental details

Storage of *Aloe vera* powder

Product: *Aloe vera* powder.

Main treatments: 4(Sun drying, Polytunnel drying, Microwave drying, Convection drying)

Sub Treatments: 4 (Storage period: 0, 30, 60 and 90 days)

Treatment combinations: 16

Replications: 3

Statistical design: FCRD

Treatment details

T_1: Sun Drying

T_2: Polytunnel drying

T_3: Microwave drying

T_4: Convection drying

Sub treatments

Sub treatments: Storage period (Days)

1. S 1: 0
2. S2: 30
3. S 3: 60
4. S4: 90

2.1.5 Preparation of *Aloe vera* pulp powder and storage study

Fresh, healthy and matured leaves of *Aloe vera* were selected for conducting the experiments. The leaves were brought from *Aloe vera* farm Nashik. The leaves were cut in the early morning to avoid moisture loss and spoilage. Each leaf was cut manually by using stainless steel knife and pulled carefully from the mother plant to avoid breaking of rind. The leaves were transported from farm to the working place in a covered polyethylene bag to avoid oxidation or contamination and were kept in upright position in order to drain out the 'aloin' (yellow sap) present in it. After that the *Aloe vera* leaves were washed with water to remove sticking materials and dirt. The spikes, placed along the margins, were removed before slicing the leaves. The thick dark green outer skin was peeled out manually from the thick gel fillet using a stainless steel knife. The fillets were cut into 5 × 3 × 1 cm cuboids with the help of stainless steel cutter and stored in an air tight container till the experiment was started. The fresh *Aloe vera* cubes fillet were transferred into a tray for different drying studies such as sun drying, Polytunnel drying, Convective drying and Microwave drying. The temperature of convective dryer was kept 50° C and Microwave dryer was 60 °C. The sample was dried still constant weight is observed. After complete drying of sample, sample was transferred into a grinder and used sieve to obtained the fine powder. The powder was packed in small polyethylene bag with the help of packaging machine.

To find out suitable drying method and storage study, 60-80 gm sample was filled in polyethylene bag. The storage was for 90 days and sample were analysed for different quality parameters at 30 days interval. The experiments were done with three replication. The preparation of *Aloe vera* powder was given in flow chart.

Fresh *Aloe vera* leaves
↓
Washing
↓
Removal of spikes
↓
Slicing the leaves
↓
Separation of mucilage /pulp fillets
↓
Cutting of fillets
↓
Drying
↓
Grinding
↓
Powder packaging
↓
Storage

Flow chart 1: Process flowchart for preparation of *Aloe vera* pulp powder

3. Results and Discussion

The fresh *Aloe vera* leaves were selected for the present investigation which was undertaken to study the changes in chemical quality parameters and to study storage behaviour of *Aloe vera* pulp powder. The experiment consisted of four treatments and four sub tretments. The experimental data was analysed statistically using Factorial Completely Randomized Design (FCRD). The observations on the changes in chemical parameters of *Aloe vera* pulp powder during storage were recorded at 0, 30, 60 and 90 days of room temperature storage. The results obtained from the investigation are presented and discussed in this chapter.

3.1 Changes in the chemical quality parameters of the *Aloe vera* pulp powder during storage periods

3.1.1 Total ash (%)

The data for ash percent of *Aloe vera* pulp powder during storage period are presented in table (4.6) and graphically depicted in fig (4.9). Total ash content in the food sample gives an idea about mineral element present in the food sample. As temperature of drying increases ash content also increases. Ash percent of *Aloe vera* powder which decreases with corresponding increase in storage period.

The treatment T_2 (17.08) recorded the highest mean total ash percent followed by treatment T_1 (16.08) whereas treatment T_4 (14.08) recorded the lowest mean ash percent which was followed by treatment T_3 (15.08). The ash percent during storage of 0 to 90 days also decreased significantly.

Ash percent in *Aloe vera* pulp powder decreased with increase in storage period from 15.70 to 15.49 upto 90 days storage. Interaction effect between storage period and different treatments was found to be statistically non significant. Similarly effect of drying method was found to be non significant and effect of storage period on ash also found non significant.

Similar work done in Ash percent in *Aloe vera* powder by Sabat, Patel and Kalne, (2018) [39] was found 15.48% to 15.50% ash respectively as an effect of temperature rise from 50 to 80 °C. Gautam and Awasthi, (2007) [7] found 14% ash content in the whole leaf tray dried *Aloe vera* powder sample at 50 °C.

Table 1: Effect of different drying methods and storage periods on the ash percent of *Aloe vera* pulp powder during sorage.

Treatments	Ash (%) Storage period (days)				Mean
	0	30	60	90	
T_1	16.20	16.10	16.03	15.99	16.08
T_2	17.20	17.10	17.03	16.99	17.08
T_3	15.20	15.10	15.03	14.99	15.08
T_4	14.20	14.10	14.03	13.99	14.08
Mean	15.70	15.60	15.53	15.49	15.58
	Treatment		**Storage**		**Interactions (Txs)**
S.Em±	1.27		1.27		2.54
CD at 5%	Non significant		Non significant		Non significant

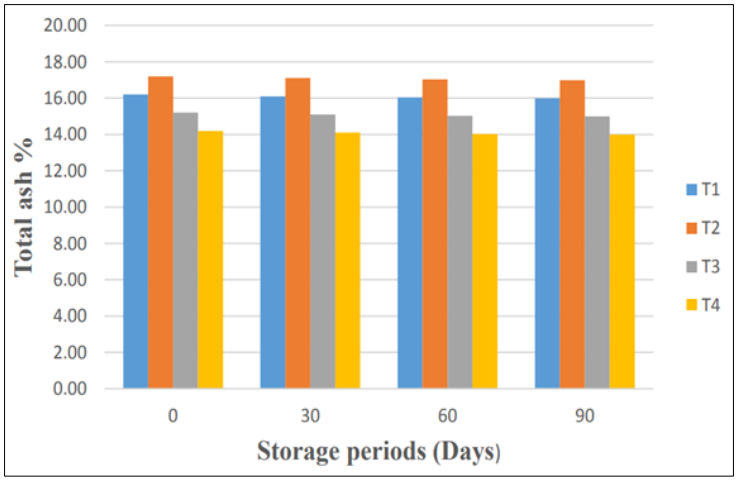

Fig 1: Effect of different drying methods and storage period on the total ash percent of *Aloe vera* pulp powder

3.1.2 Titrable acidity (%)

The data for titrable acidity of *Aloe vera* pulp powder during storage period are presented in table (4.7) and graphically mentioned in fig (4.10). Titrable acidity is the total amount of acid in the solution or sample. Hydrolysis of polysaccharide is the main reason for changes in titrable acidity. Titrable acidity of Aloe powder decreasesd with corresponding increase in storage period.

The treatment T_4 (0.47) recorded the highest mean titrable acidity followed by treatment T_3 (0.39). The treatment T_1(0.18) recorded the lowest mean titrable acidity percent followed by the treatment T_2 (0.28). The titrable acidity percent during storage of 0 to 90 days also decreased significantly.

Titrable acidity percent in *Aloe vera* pulp powder decreased with increase in storage period from 0.40 to 0.27 upto 90 days of storage. Interaction effect between storage period and different tretments was found to be statistically non significant.

Similar trend of titrable acidity percent in *Aloe vera* powder noticed by Gautam and Awasthi, (2007) [7] they found 0.27% titrable acidity.

Table 2: Effect of different drying methods and storage periods on the titrable acidity percent of *Aloe vera* pulp powder.

Treatments	Titrable acidity (%) Storage period (days)				Mean
	0	30	60	90	
T_1	0.25	0.20	0.15	0.11	0.18
T_2	0.35	0.30	0.25	0.21	0.28
T_3	0.46	0.40	0.36	0.33	0.39
T_4	0.53	0.49	0.46	0.41	0.47
Mean	0.40	0.35	0.31	0.27	0.33
	Treatment		Storage		Interactions (Txs)
S.Em±	0.003		0.003		0.006
CD at 5%	0.009		0.009		Non significant

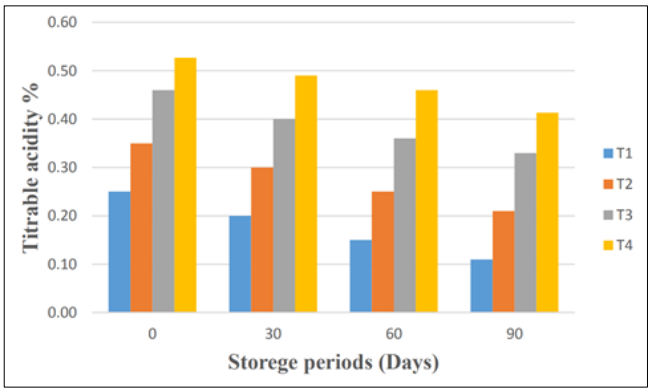

Fig 2: Effect of different drying methods and storage periods on the titrable acidity percent of *Aloe vera* pulp powder

3.1.3 Fat content (%)

The data for content of *Aloe vera* pulp powder during storage period are presented in table (4.8) and graphically depicted in fig (4.11). Fats are the esters of fatty acid which gives us energy. It help in absorption of fat soluble vitamins. Fat percent of Aloe pulp powder which decreases with corresponding increase in storage period.

The treatment T_4 (2.16) recorded the significant highest mean fat content which was followed by treatment T_3 (2.12) and treatment T_1(1.72) recorded the significant lowest mean fat percent which was followed by the treatment T_2 (1.77). The fat content during storage of 0 to 90 days also decreased significantly.

Fat content in *Aloe vera* pulp powder decreased with increase in storage period from 1.98 to 1.90 upto 90 days of stoarage. Interaction effect between storage periods and different treatments was found to be statistically non significant.

Fat content in *Aloe vera* powder at different drying methods are revealed by Sabat, Patel and Kalne, (2018) [39]. They found 2.21% to 2.31% fat after hot air oven drying from 50 °C to 80 °C respectively. Gautam and Awasthi, (2007) [7] was found 2.2% fat in whole leaf tray dried *Aloe vera* powder at 50 °C.

Table 3: Effect of different drying methods and storage periods on the fat content percent of *Aloe vera* pulp powder

Treatments	Fat content (%)				Mean
	Storage period (days)				
	0	30	60	90	
T_1	1.79	1.74	1.69	1.64	1.72
T_2	1.81	1.78	1.75	1.73	1.77
T_3	2.14	2.12	2.11	2.10	2.12
T_4	2.20	2.18	2.14	2.11	2.16
Mean	1.98	1.96	1.92	1.90	1.94
	Treatment		Storage		Interactions (Txs)
S.Em±	0.01		0.01		0.03
CD at 5%	0.03		0.03		Non significant

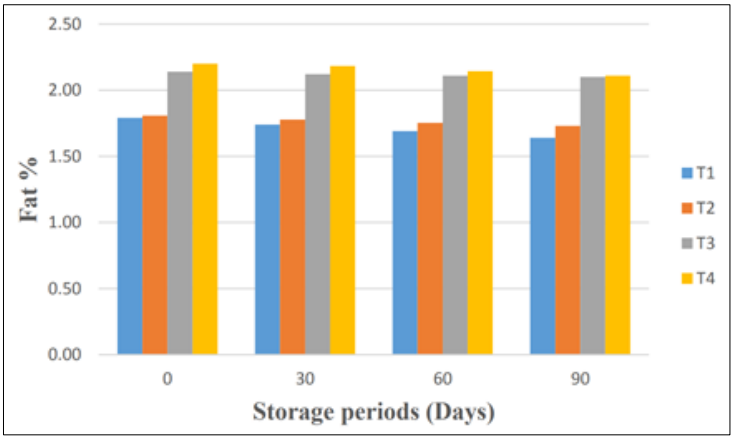

Fig 3: Effect of different drying methods and stoarage periods on the fat content% of *Aloe vera* pulp powder

3.1.4 Protein content (%)

The data for protein content of *Aloe vera* pulp powder during storage periods are presented in table (4.9) and graphically depicted in fig (4.12). Protein is the large group of nitrogenous organic compound that are the essential constituents of living cells; consist of polymer of amino acid essential in the diet of animals for growth and repair of tissues. Protein percent of Aloe powder which decreased with corresponding increase in storage period.

The treatment T_4 (4.78) recorded the highest mean protein content which was at par with treatment T_3 (4.75) and followed by treatment T_2 (4.75). Treatment T_2(3.25) recorded the significant lowest mean protein content. The protein content during storage of 0 to 90 days also decreased significantly.

Protein content in *Aloe vera* pulp powder decreased with increase in storage period from 3.83 to 3.69 upto 90 days of storage. Interaction effect between storage period and different treatments was found to be statistically non significant.

Protein content in *Aloe vera* powder was recorded by Sabat, Patel, and Kalne, (2018) [39]. They found 4.83, 4.90, 4.96 and 4.53% protein at temperatures 50, 60, 70 and 80 °C in hot air oven dried *Aloe vera* powder. Also Gautam and Awasthi (2007) [7] was found 4.8% protein in whole leaf tray dried *Aloe vera* powder at 50 °C.

Table 4: Effect of different drying methods and storage periods on the protein content percent of *Aloe vera* powder

Treatments	Protein content (%)				Mean
	Storage period (days)				
	0	30	60	90	
T_1	2.41	2.33	2.23	2.15	2.28
T_2	3.30	3.27	3.23	3.19	3.25
T_3	4.80	4.77	4.73	4.69	4.75
T_4	4.83	4.80	4.77	4.72	4.78
Mean	3.83	3.79	3.74	3.69	3.76
	Treatment		Storage		Interactions (Txs)
S.Em±	0.04		0.04		0.08
CD at 5%	0.12		0.12		Non significant

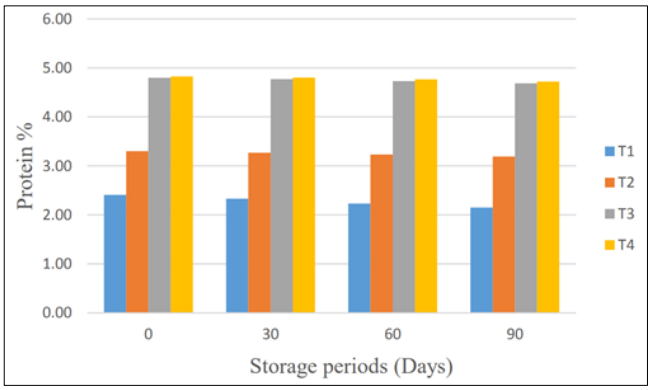

Fig 4: Effect of different drying methods and storage periods on the protein content percent of *Aloe vera* pulp powder

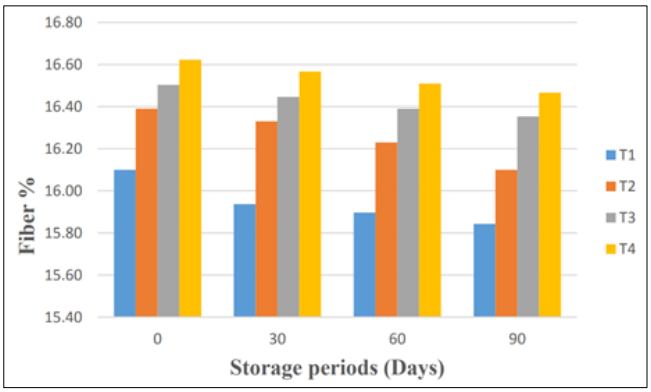

Fig 5: Effect of different drying methods and storage periods on the fiber percent of *Aloe vera* pulp powder

3.1.5 Fiber content (%)

The data for fiber content percent of *Aloe vera* pulp powder during storage periods are presented in table (4.10) and graphically mentioned in fig (4.13). The presence of fibre in diet increasesd the bulk of faeces, which has a laxative effect in the gut. Fiber percent of Aloe powder was decreased with corresponding increase in storage period.

The treatment T_4 (16.54) recorded the highest mean fiber percent which was at par with treatment T_3 (16.42) and treatment T_1 (15.94) recorded the significant lowest mean fiber percent which was followed by treatment T_2 (16.27). The fiber percent during storage of 0 to 90 days also decreased significantly.

Fiber percent in *Aloe vera* pulp powder decreased with increase in storage period from 16.40 to 16.19 upto 90 days of storage. Interaction effect between storage period and different treatments was found to be statistically non significant.

These results are supported by findings of Fiber content percent in *Aloe vera* powder by Sabat, Patel and Kalne, (2018) [39]. They found 16.16, 16.20, 16.33 and 16.53% fat at 50, 60, 70 and 80 °C in hot air oven dried *Aloe vera* powder. Also Gautam and Awasthi, (2007) [7] found 18% fiber in whole leaf tray dried *Aloe vera* powder at 50 °C.

3.1.6 pH

The data for pH content of *Aloe vera* pulp powder during storage periods are presented in table (4.11) and graphically mentioned in fig (4.14). The pH scale is logarithmic and inversely proportional to concentration of hydrogen ions in the solution. As acidity decreses pH of powder increases. pH of Aloe pulp powder which increases with corresponding increase in storage period.

The treatment T_4 (4.31) recorded the highest mean value of pH which was at par with treatment T_3 (4.16) and treatment T_1(3.11) recorded the significant lowest mean value of pH which was followed by treatment T_2 (4.12). The pH during storage of 0 to 90 days also increased significantly.

pH in *Aloe vera* pulp powder increased with increase in storage period from 3.61 to 4.34 upto 90 days of storage. Interaction effect between storage period and different treatments was found to be statistically non significant.

pH of *Aloe vera* powder at different drying methods was recorded by Sabat, Patel and Kalne, (2018) [39]. They found 3.98, 4.09, 4.17 and 4.33 pH in hot air oven dried *Aloe vera* powder at 50, 60, 70 and 80 °C respectively. Also Gautam and Awasthi, (2007) [7] was found 4.8 pH in tray dried whole leaf *Aloe vera* powder. Hendravati, (2015) [12] was found 4.98, 4.99, 4.97 and 4.98 pH of spray dried *Aloe vera* powder at 140, 130, 120 and 110 °C respectively

Table 5: Effect of different drying methods and storage periods on the fiber content percent of *Aloe vera* pulp powder

Treatments	Fiber content (%)				Mean
	Storage period (days)				
	0	30	60	90	
T_1	16.10	15.94	15.90	15.84	15.94
T_2	16.39	16.33	16.23	16.10	16.27
T_3	16.50	16.45	16.39	16.35	16.42
T_4	16.62	16.57	16.51	16.47	16.54
Mean	16.40	16.32	16.26	16.19	16.29
	Treatment		Storage		Interactions (Txs)
S.Em±	0.04		0.04		0.08
CD at 5%	0.12		0.12		Non significant

Table 6: Effect of different drying methods and storage period on the pH of *Aloe vera* pulp powder

Treatments	pH				Mean
	Storage period (days)				
	0	30	60	90	
T_1	2.89	2.92	3.17	3.47	3.11
T_2	3.92	3.94	4.13	4.47	4.12
T_3	3.93	4.22	5.13	5.47	4.16
T_4	3.70	4.16	4.64	4.73	4.31
Mean	3.61	3.74	4.07	4.34	3.92
	Treatment		Storage		Interactions (Txs)
S.Em±	0.06		0.06		0.12
CD at 5%	0.17		0.17		Non significant

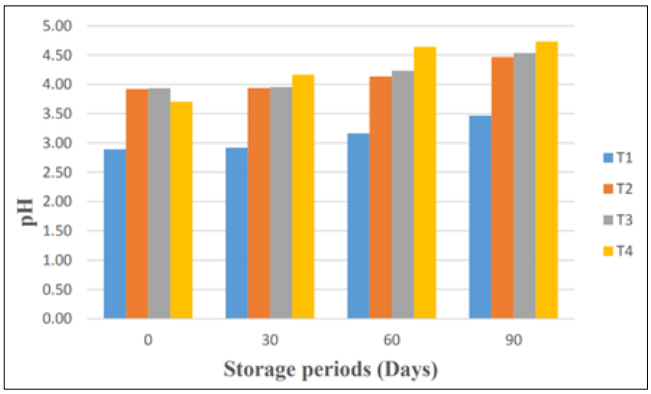

Fig 6: Effect of diferent drying methods and storage period on the pH of *Aloe vera* pulp powder

3.1.7 TSS (^{0}Brix)

The data for TSS of *Aloe vera* pulp powder during storage period are presented in table (4.12) and graphically depicted in fig (4.15). The TSS or sugar content measures and includes the carbohydrates, organic acids, proteins, fats and minerals of sample. TSS of *Aloe vera* pulp powder increased with corresponding increase in storage period.

The treatment T_4 (4.50) recorded the significant highest mean value of TSS which was followed by treatment T_3 (3.65) and treatment T_1 (2.59) recorded the significant lowest mean value of TSS which was followed by treatment T_2 (3.60). The TSS during storage of 0 to 90 days also increased significantly.

TSS in *Aloe vera* pulp powder increased with increase in storage period from 3.06 to 4.05 upto 90 days of storage. Interaction effect between storage period and different treatments was found to be statistically non significant.

TSS of *Aloe vera* powder recorded by Preetinder, Amrit and Kumar Rao (2017) [36]. They was found 2.6 TSS of spray dried *Aloe vera* powder.

Table 7: Effect of different drying methods and storage periods on the TSS of *Aloe vera* pulp powder

Treatments	TSS (0Brix) Storage period (days)				Mean
	0	30	60	90	
T_1	2.08	2.45	2.65	3.17	2.59
T_2	3.03	3.48	3.86	4.03	3.60
T_3	3.10	3.57	3.88	4.03	3.65
T_4	4.03	4.35	4.65	4.95	4.50
Mean	3.06	3.46	3.76	4.05	3.58
	Treatment		Storage		Interactions (Txs)
S.Em±	0.03		0.03		0.06
CD at 5%	0.08		0.08		Non significant

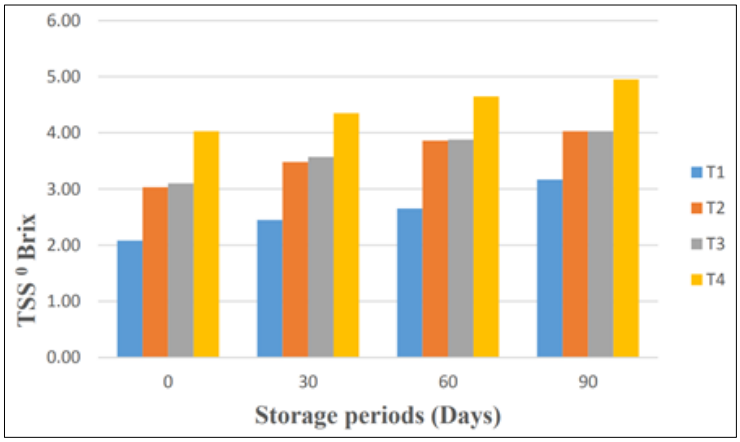

Fig 7: Effect of different drying methods and storage periods on the TSS of *Aloe vera* pulp powder

3.1.8 Moisture content (%)

The data for moisture content percent in *Aloe vera* pulp powder during storage periods are presented in table (4.13) and graphically mentioned in fig (4.16). Moisture content of *Aloe vera* pulp powder increased with corresponding increase in storage period.

The treatment T_4 (3.85) recorded the highest mean value of moisture which was at par with treatment T_3 (3.75) and treatment T_1 (2.25) recorded the significant lowest mean value of moisture which was followed by treatment T_2 (2.75). The moisture content during storage of 0 to 90 days also increased significantly.

Moisture content in *Aloe vera* pulp powder increased with increase in storage period from 3.00 to 3.30 upto 90 days of storage. Interaction effect between storage period and different treatments was found to be statistically non significant.

These results are in confirmative with moisture content of *Aloe vera* powder as recorded by Ramachandra and Srinivasa Rao, (2011) [37]. They found that increase in moisture content in *Aloe vera* powder during storage of 0 to 49 days in three different packaging materials AF, PP and BOPP. Preetinder, Amrit and Kumar Rao, (2017) [36] was found 3.59% moisture in spray dried *Aloe vera* powder. Hendravati, (2015) [12] was found 2.88, 4.04, 4.89 and 4.89% moisture in spray dried *Aloe vera* powder at temperature 140, 130, 120 and 110 °C, respectively.

Table 8: Effect of different drying methods and storage period on the moisture content percent of *Aloe vera* pulp powder

Treatments	Moisture content (%) Storage period (days)				Mean
	0	30	60	90	
T_1	2.10	2.20	2.30	2.40	2.25
T_2	2.60	2.70	2.80	2.90	2.75
T_3	3.60	3.70	3.80	3.90	3.75
T_4	3.70	3.80	3.90	4.00	3.85
Mean	3.00	3.10	3.20	3.30	3.15
	Treatment		Storage		Interactions (Txs)
S.Em±	0.05		0.05		0.10
CD at 5%	0.15		0.15		Non significant

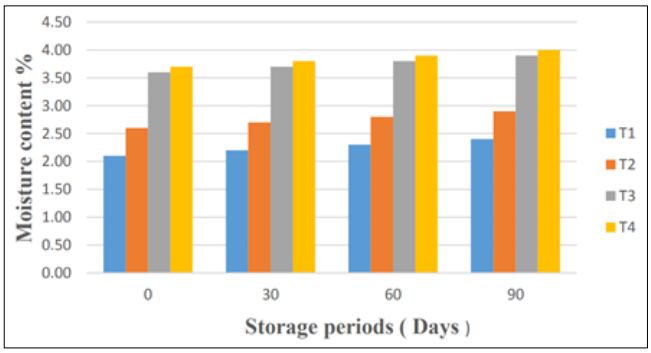

Fig 8: Effect of different drying methods and storage period on the moisture percent of *Aloe vera* pulp powder

3.1.9 Solubility (Minute)

The data for solubility of *Aloe vera* pulp powder during storage periods are presented in table (4.14) and graphically mentioned in fig (4.17). Solubility is defined as the maximum amount of substance that will dissolve in given amount of solvent at a specified temperature. The minute solubility of *Aloe vera* pulp powder slightly increased with corresponding increased in storage period.

The treatment T_1 (5.16) and T_2 (5.16) recorded the highest mean value minute of solubility which was followed by treatment T_3 (4.16) and the treatment T_4 (3.16) recorded the significant lowest mean value minute of solubility. The minute of solubility during storage of 0 to 90 days also increased.

Minute of solubility in *Aloe vera* pulp powder increased with increase in storage period from 4.35 to 4.47 upto storage of 90 days that means solubility of *Aloe vera* pulp powder slightly decreases. Interaction effect between storage period and different treatments was found to be statistically non significant.

Minute of solubility of *Aloe vera* powder recorded by Preetider, Amrit and Kumar Rao, (2017) [36] was found 100.54 sec. Gore and Devdas, (2011) [8] found solubility of spray dried *Aloe vera* powder 173 sec. Hendravati, (2015) [12] found 2.26, 1.93, 2.94 and 2.94 minute of solubility of spray dried *Aloe vera* powder at temperature 140, 130, 120 and 110 °C respectively.

Table 9: Effect of different drying methods and storage periods on the solubility of *Aloe vera* pulp powder

Treatments	Solubility (min) Storage period (days)				Mean
	0	30	60	90	
T_1	5.10	5.14	5.18	5.22	5.16
T_2	5.10	5.14	5.18	5.22	5.16
T_3	4.10	4.14	4.18	4.22	4.16
T_4	3.10	3.14	3.18	3.22	3.16
Mean	4.35	4.39	4.43	4.47	4.41
	Treatment		Storage		Interactions (Txs)
S.Em±	0.02		0.02		0.04
CD at 5%	0.06		0.06		Non significant

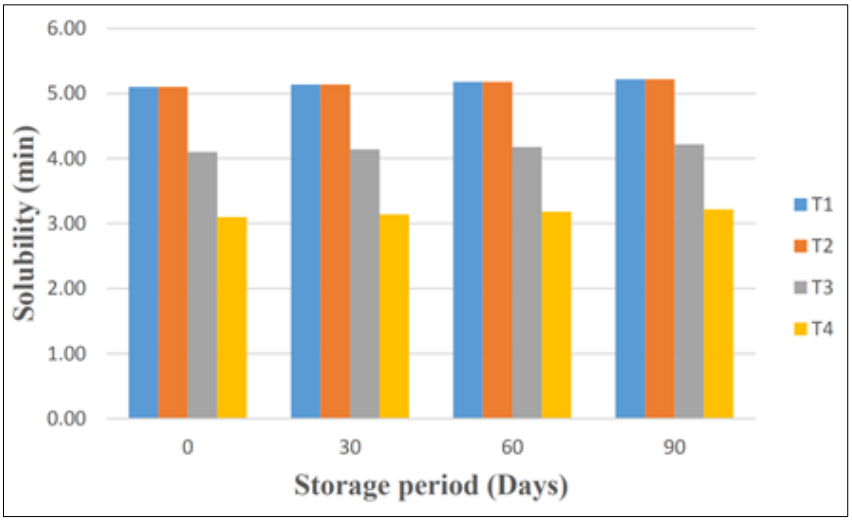

Fig 9: Effect of different drying methods and storage periods on the solubility of *Aloe vera* pulp powder

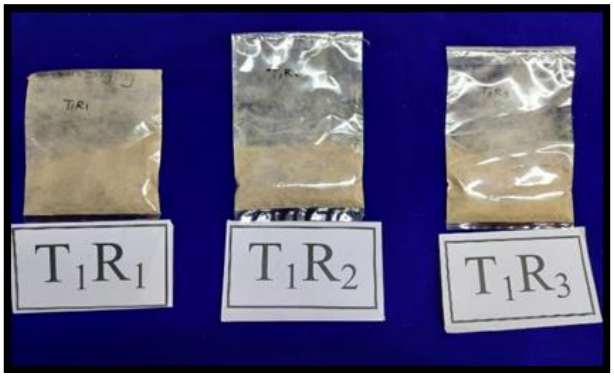

Plate 1: *Aloe vera* pulp powder prepared from sample dried by sun drying method

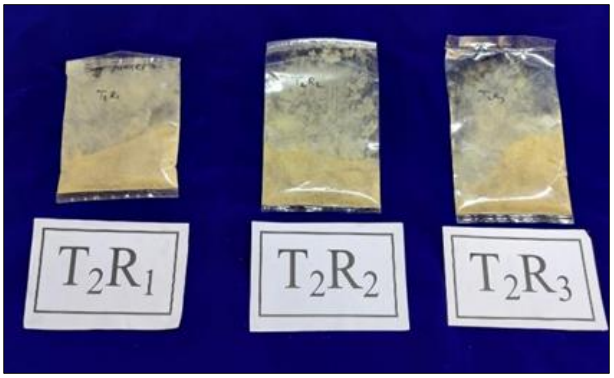

Plate 2: *Aloe vera* pulp powder prepared from sample dried by polytunnel drying method

Plate 3: *Aloe vera* pulp powder prepared from sample dried by microwave drying method

Plate 4: *Aloe vera* pulp powder prepared from sample dried by convective drying method

4. Conclusion

1. From overall recorded observation it was concluded that Convective drying was the suitable method for preparation of *Aloe vera* pulp powder. Followed by microwave drying, Polytunnel drying and Sun drying.
2. Convective tray drying at 50 °C was suitable temperature for preparation of *Aloe vera* pulp powder.
3. *Aloe vera* pulp powder was stored for 90 days at room temperature without affecting its quality and also found suitable for human consumption.

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