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Study on preparation of squash by blending of watermelon and sugar beet pulp and its storage for quality product

Vinod Yadav, VM Prasad, Devi Singh and Yash Kr. Singh

Abstract
The present investigation was carried out at the laboratory, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture Technology and Sciences, Prayagraj, Uttar Pradesh during the session 2021-22 with a view to determine the effect of storage period of squash for its proximate analysis and organoleptic quality after 30 days of storage. Under this experiment, overall 11 treatment was taken T_1 (Watermelon pulp 90% + Sugar beet pulp 10%+ 0.2% Citric acid + Sugar (200 g)), T_2 (Watermelon pulp 80% + Sugar beet pulp 20%+ 0.2% Citric acid + Sugar (200 g)), T_3 (Watermelon pulp 70% + Sugar beet pulp 30%+ 0.2% Citric acid + Sugar (200 g)), T_4 (Watermelon pulp 60% + Sugar beet pulp 40%+ 0.2% Citric acid + Sugar (200 g)), T_5 (Watermelon pulp 50% + Sugar beet pulp 50%+ 0.2% Citric acid + Sugar (200 g)), T_6 (Watermelon pulp 40% + Sugar beet pulp 60%+ 0.2% Citric acid + Sugar (200 g)), T_7 (Watermelon pulp 30% + Sugar beet pulp 70%+ 0.2% Citric acid + Sugar (200 g)), T_8 (Watermelon pulp 20% + Sugar beet pulp 80%+ 0.2% Citric acid + Sugar (200 g)), T_9 (Watermelon pulp 10% + Sugar beet pulp 90%+ 0.2% Citric acid + Sugar (200 g)),T_{10} (Watermelon pulp 100%+ 0.2% Citric acid + Sugar (200 g)), T_{11} (Sugar beet pulp 100%+ 0.2% Citric acid + Sugar (200 g)). On the basis of present investigation it was concluded that the Treatment T_5 (Watermelon Pulp 50% + Sugar beet pulp 50%+ 0.2% Citric acid + Sugar (200 g)) was found to be the best in terms of TSS, color and appearance, overall acceptability and shelf life.

Keywords: Squash, sugar beet, watermelon, pulp, proximate analysis, organoleptic quality

Introduction

Fruits and vegetables have historically held a place in dietary guidance because of their concentrations of vitamins, especially vitamin A, B, C and E; minerals like Iron, Zinc, Magnesium *etc.* especially electrolytes; and more recently phytochemicals especially antioxidant. India ranked amongst the world's five largest producers of over 80% agricultural produce items, encounters a waste of close to 25% worth of produce (Source: statistics on horticulture at a glance, 2018). Agricultural waste is the material obtained due to crop production or from plant growth. Due to their perishable nature, a high percentage of food is lost because of the lack of conservation technologies and post-harvest storage, as well as damages caused during handling and transportation. Value addition and conservation can be a best solution of reducing these food losses. These losses can be avoided by converting the commodities into various value added products and by developing efficient, economic as well as environmentally friendly technologies. The various technologies used for extension of shelf life of the produce include ready-to-eat, squashes, jam, jellies, dehydration, osmotic dehydration, intermediate moisture foods, high temperature preservation and low temperature preservation etc. Watermelon (*Citrullus lanatus*) is a flowering plant species of the Cucurbitaceae family and the name of its edible fruit. Watermelon is grown in favourable climates from tropical to temperate regions worldwide for its large edible fruit, which is a berry with a hard rind and no internal divisions, and is botanically called a pepo. The sweet, juicy flesh is usually deep red to pink, with many black seeds, although seedless varieties exist. The fruit can be eaten raw or pickled, and the rind is edible after cooking. It may also be consumed as a juice or an ingredient in mixed beverages. Watermelon fruit is 91% water, contains 6% sugars, and is low in fat. As per National Institute of Nutrition (NIN, 2008), nutritional composition of beetroot constituted Moisture (90.2 g), Protein (2.7 g), Fat (0.9 g), Mineral (0.8 g), Crude fibre (0.4 g), Carbohydrates (7.55 g),Calories (30 Kcal),Calcium (7 mg/100 g), Phosphorus (11 mg/100 g) and Iron (0.24 µg), Vitamin B3 (0.045 mg), Vitamin C (8.1 mg). Watermelon pulp contains carotenoids, including lycopene.

The amino acid citrulline is produced in watermelon rind. Carotenoids such as lycopene and β-carotene are responsible for the red and orange colours of the watermelon, respectively. The sweetness of watermelon is mainly due to a combination of sucrose, glucose, and fructose. Sucrose and glucose account for 20–40% and fructose for 30–50% of total sugars in a ripe watermelon. Bailey *et al*. found that supplementation with watermelon juice improves aspects of vascular health in individual with hypertension. Presence of vitamins makes watermelon to be helpful in supporting normal vision and skin health, managing cholesterol, supporting normal appetite and nervous system function and may be involved in normal muscle contraction. Beetroot (vernacular name: chukundar), botanically known as *Beta vulgaris* L. is one of the well-known plant belonging Amaranthaceae family. As per National Institute of Nutrition (NIN, 2008), nutritional composition of beetroot constituted Moisture (87.7 g), Protein (1.7 g), Fat (0.7 g), Mineral (0.8 g), Crude fibre (0.9 g), Carbohydrates (8.8 g), Calories (43 Kcal), Calcium (18.3 mg/100 g), Phosphorus (55 mg/100 g) and Iron (1.19 mg). Beetroot has excellent physiological properties. Its macro- and micro biomolecule content is remarkable and its vitamin content is high. Its vitamin A and C content is substantial and its vitamin B is outstanding. Vitamin B_1 (thiamine), vitamin B_2 (riboflavin), and vitamin B_3 (niacin) can be found in most root vegetables with dark green leaf, such as in beetroot. Beetroots play a vital role due to their remarkable folate content. Folic acid helps to prevent cancer and in cooperation with vitamin B contributes to the proper functioning of the nervous system. Betalain {water-soluble, nitrogen-containing plant pigments} gives the red colour of red beet (Ravichandran *et al.*, 2013) [21]. Beetroot has a lot of worth full properties for the human body. It has antioxidant, anti-inflammatory, hepato-preventive, and anti-carcinogenic effects. Blended Squash, as product sweetened with fruit pulp or juice concentrates, are now the fastest- growing part of the preserves market. The great potentiality for processing into quality products, which may have great demand, after value addition in flavor, taste and nutritional values, increases the demand in local, national and international markets. More processing industry can be established and the post-harvest losses of melon and beet could be reduced considerably. Not much work has been done on blending of squash from melon and beet. Therefore, it is very important to work on value addition of melon and beet base products like RTS, Jelly, Squash and Jam. Keeping these above point the present investigation was undertaken with following mentioned objectives: to study the proximate analysis of squash developed from blending of watermelon and sugar-beet pulp, to study the shelf life of products, to find out the best product on the basis of organoleptic test.

Material and Methods

The present investigation entitled "Study on preparation of squash by blending of watermelon and sugar beet pulp and its storage for quality product" was done to understand the effect of different treatment combination of watermelon and beetroot pulp for making squash and its effect on proximate analysis and organoleptic quality. The details of the materials used and the procedures adopted in the investigation, which was carried out at Laboratory, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Prayagraj during the session 2021-22 are described under the following heads. Watermelon (*Citrullus lanatus)* fruit and Beetroot (*Beta vulgaris* L.) fruit were collected from local market of Prayagraj, which was first cleaned properly from tap water and green leaves, seeds were separated manually, fruits were cut into pieces and prepared for different treatments. The fruit pulp was extracted and mixed for squash preparation. In the present investigation the design used for analysis of variables were Completely Randomized Design (CRD) comprising 4 replications in terms of days of storage *viz.* 0 day (initial day), 10 days, 20 days, 30 days and ten treatment combinations was prepared by the ingredients given below in table 1. Squash is affected by a number of independent variables, *viz*., sample solution ratio, solution concentration, duration of osmosis, solution temperature, sample shape and size as well as dependent variables such as sugar gain, mass reduction, water loss, etc. Figure 1 depicts the flowchart of preparation of squash. The washed fruits are peeled and sliced into pieces, then they are crushed by various treatment combination followed by squeezing of juices and after different storage period evaluated for proximate analysis and organoleptic analysis.

Table 1: Treatment details

Symbols	Treatment combinations
T_1	Watermelon Pulp 90% + Sugar beet pulp 10% + 0.2% Citric acid + Sugar (200 g)
T_2	Watermelon Pulp 80% + Sugar beet pulp 20% + 0.2% Citric acid + Sugar (200 g)
T_3	Watermelon Pulp 70% + Sugar beet pulp 30% + 0.2% Citric acid + Sugar (200 g)
T_4	Watermelon Pulp 60% + Sugar beet pulp 40% + 0.2% Citric acid + Sugar (200 g)
T_5	Watermelon Pulp 50% + Sugar beet pulp 50% + 0.2% Citric acid + Sugar (200 g)
T_6	Watermelon Pulp 40% + Sugar beet pulp 60% + 0.2% Citric acid + Sugar (200 g)
T_7	Watermelon Pulp 30% + Sugar beet pulp 70% + 0.2% Citric acid + Sugar (200 g)
T_8	Watermelon Pulp 20% + Sugar beet pulp 80% + 0.2% Citric acid + Sugar (200 g)
T_9	Watermelon Pulp 10% + Sugar beet pulp 90% + 0.2% Citric acid + Sugar (200 g)
T_{10}	Watermelon Pulp 100% + 0.2% Citric acid + Sugar (200 g)
T_{11}	Sugar beet pulp 100% + 0.2% Citric acid + Sugar (200 g)

For proximate analysis TSS were calculated and analyzed. TSS was calculated using refractometer technique, acidity was calculated using The titratable acidity was expressed as g citric acid/Litre squash, according to the following equation: Titratable acidity (g citric acid/Litre of squash) = (V × 0.1 × 1000 × 0.064)/ m, While prepared fruit squash packed in polymer bottle were evaluated for appearance and colour, overall acceptability and shelf life were rated on 9 point Hedonic Scale. The data were statistically analysed by the method suggested by Fisher and Yates, 1936 [5].

Results and Discussion

In the present investigation an attempt has been made to study quality of watermelon and beetroot squash at various storage period. The results obtained are presented in relevant Tables as follows.

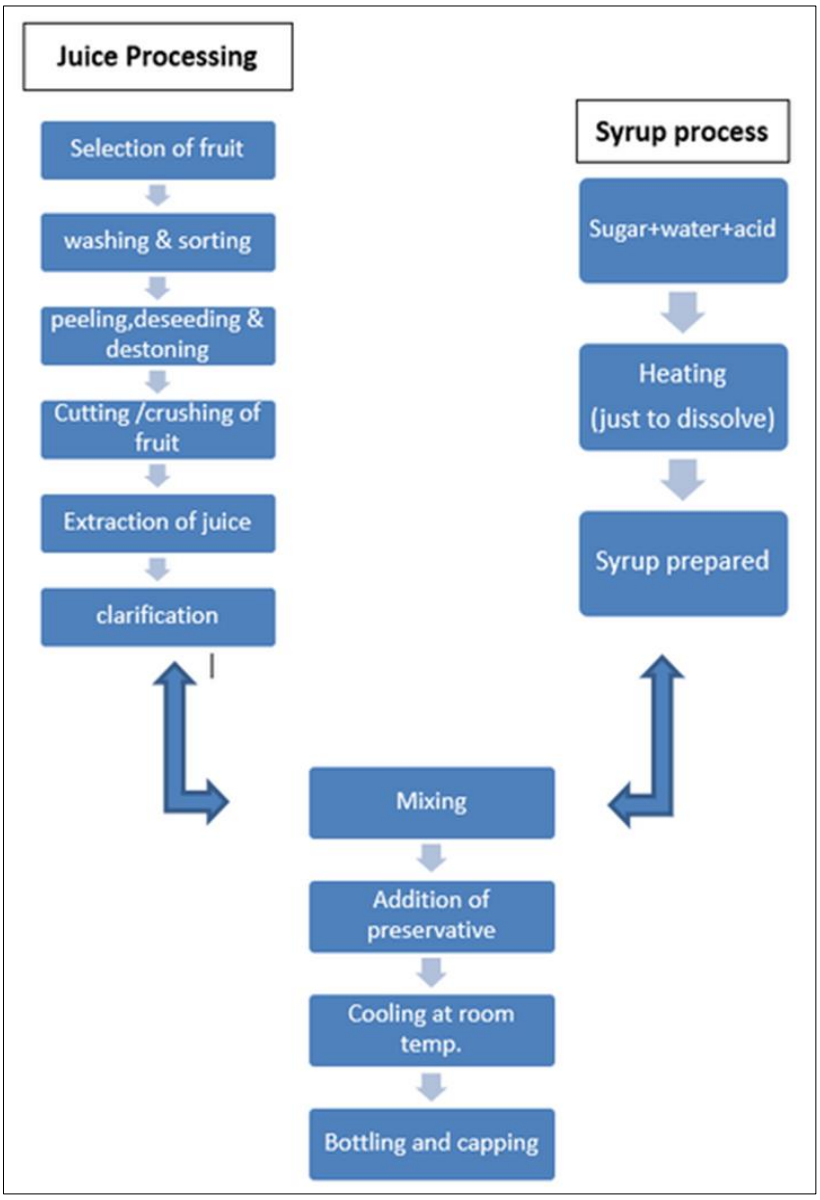

Fig 1: Flow Chart of Squash Preparation

Effect of various treatment combinations on T.S.S. of watermelon and beetroot squash at different days of storage [in ^{0}Brix]

The data presented in table 2 showed significant differences in TSS of watermelon and beetroot squash present among the different treatment in fresh i.e. 0 days as well as 10, 20 and 30 days of storage. In general the TSS of watermelon and beetroot squash increased during advancement of storage. At initial day of storage, significantly maximum T.S.S. was recorded in treatment T_5 (Watermelon Pulp 50% + Sugar beet pulp 50%+ 0.2% Citric acid + Sugar (200 g)) with value of 74.76. However, significantly minimum T.S.S. was recorded T_{11} (Sugar beet pulp 100% + 0.2% Citric acid + Sugar (200 g)) with value of 73.15. After 10 days of storage significantly maximum T.S.S. was recorded in treatment T_5 (Watermelon Pulp 50% + Sugar beet pulp 50% + 0.2% Citric acid + Sugar (200 g)) with value of 74.92. However, significantly minimum T.S.S. was recorded T_{11} (Sugar beet pulp 100%+ 0.2% Citric acid + Sugar (200 g)) with value of 73.24. After 20 days of storage significantly maximum T.S.S. was recorded in treatment T_5 (Watermelon Pulp 50% + Sugar beet pulp 50%+ 0.2% Citric acid + Sugar (200 g)) with value of 75.26. However, significantly minimum T.S.S. was recorded T_{11} (Sugar beet pulp 100%+ 0.2% Citric acid + Sugar (200 g)) with value of 73.45. After 30 days of storage significantly maximum T.S.S. was recorded in treatment T_5 (Watermelon Pulp 50% + Sugar beet pulp 50%+ 0.2% Citric acid + Sugar (200 g)) with value of 75.26. However, significantly minimum T.S.S. was recorded T_{11} (Sugar beet pulp 100% + 0.2% Citric acid + Sugar (200 g)) with value of 73.67. T.S.S. of watermelon and beetroot squash is affected by its chemical composition and also due to various treatment combination used. Therefore, the variation in ranges for different treatment and also at different days of storage was observed. Similar results were reported for T.S.S. Khan *et al*. (2013) [11] in plum squash; Relekar *et al*. (2013) [22] in sapota squash; Selvi *et al*. (2013) [25] in mixed fruit squash; Kaysher *et al*. (2014) [10] in mixed squash; Rani and Rao (2014) [20] in sapota and aloe

vera squash; Deep *et al*. (2017) [4] in jamun RTS; Meena *et al*. (2017) [16] in anola squash; Mishra and Sangma (2017) [17, 18] in *Aloe vera* juice extract; Modgil *et al*. (2018) [19] in papaya squash; Gupta (2020) [6] in phalsa guava squash; Hamza *et al*. (2020) [7] in olive apple squash and Mani and Reddy (2022) [15] in muskmelon squash.

Table 2: Effect of various treatment combinations on T.S.S. [in ^{0}Brix] of watermelon and beetroot squash at different days of storage.

T.S.S. (^{0}Brix)				
Treatment	**INITIAL**	**10 DAYS**	**20 DAYS**	**30 DAYS**
T_1	74.43	74.63	74.85	75.01
T_2	73.33	73.53	73.74	73.96
T_3	73.76	73.95	74.14	74.36
T_4	74.65	74.86	75.07	75.17
T_5	74.76	74.92	75.26	75.26
T_6	73.82	74.02	74.24	74.46
T_7	74.26	74.44	74.66	74.87
T_8	74.56	74.73	74.95	75.14
T_9	73.54	73.76	73.96	74.16
T_{10}	73.95	74.13	74.35	74.56
T_{11}	73.15	73.24	73.45	73.67
'F' Test	S	S	S	S
S. E. (d)	0.023	0.017	0.018	0.013
C. V.	0.037	0.028	0.029	0.021
C. D.	0.047	0.035	0.037	0.027

2. Effect of various treatment combinations on colour and appearance score of watermelon and beetroot squash at different days of storage.

The data presented in table 3 showed significant differences in Colour and appearance score of watermelon and beetroot squash present among the different treatment in fresh i.e. 0 days as well as 30, 45 and 60 days of storage. In general the colour and appearance score of squash decreased during advancement of storage. At initial day of storage significantly maximum colour and appearance score was recorded in treatment T_5 (Watermelon Pulp 50% + Sugar beet pulp 50% + 0.2% Citric acid + Sugar (200 g)) with value of 8.53. However, significantly minimum colour and appearance score was recorded T_{11} (Sugar beet pulp 100% + 0.2% Citric acid + Sugar (200 g)) with value of 6.86. After 10 days of storage significantly maximum colour and appearance score was recorded in treatment T_5 (Watermelon Pulp 50% + Sugar beet pulp 50% + 0.2% Citric acid + Sugar (200 g)) with value of 8.41. However, significantly minimum colour and appearance score was recorded T_{11} (Sugar beet pulp 100% + 0.2% Citric acid + Sugar (200 g)) with value of 6.60. After 20 days of storage significantly maximum colour and appearance score was recorded in treatment T_5 (Watermelon Pulp 50% + Sugar beet pulp 50% + 0.2% Citric acid + Sugar (200 g)) with value of 8.35. However, significantly minimum colour and appearance score was recorded T_{11} (Sugar beet pulp 100%+ 0.2% Citric acid + Sugar (200 g)) with value of 6.40. After 30 days of storage significantly maximum colour and appearance score was recorded in treatment T_5 (Watermelon Pulp 50% + Sugar beet pulp 50% + 0.2% Citric acid + Sugar (200 g)) with value of 8.30. However, significantly minimum colour and appearance score was recorded T_{11} (Sugar beet pulp 100%+ 0.2% Citric acid + Sugar (200 g)) with value of 6.33. Colour and appearance score of squash is also affected by various treatment combination used and storage period. Therefore, the variation in ranges for different treatment and also at different days of storage was observed. Similar results were reported for Colour and appearance score Khan *et al*. (2013) [11] in plum squash; Vijayan and Prabhat (2015) [30] in watermelon; Hossain *et al*. (2016) [9] in mixed fruit squash; Sharma (2016) [27] in bitter gourd and kiwi squash; Yadav *et al*. (2016) [31] in guava squash; Chaudhary *et al*. (2017) [3] in mango and *Aloe vera* squash; Deep *et al*. (2017) [4] in jamun RTS; Meena *et al*. (2017) [16] in anola squash; Mishra and Sangma (2017) [17, 18] in *Aloe vera* juice extract; Modgil *et al*. (2018) [19] in papaya squash; Gupta (2020) [6] in phalsa guava squash; Hamza *et al*. (2020) [7] in olive apple squash and Mani and Reddy (2022) [15] in muskmelon squash.

Table 3: Effect of various treatment combinations on colour and appearance score of watermelon and beetroot squash at different days of storage

Colour and Appearance Score				
Treatment	**INITIAL**	**10 DAYS**	**20 DAYS**	**30 DAYS**
T_1	8.32	8.25	8.16	8.06
T_2	8.42	8.28	8.22	8.12
T_3	4.46	7.35	7.14	7.06
T_4	8.45	8.36	8.33	8.20
T_5	8.53	8.41	8.35	8.30
T_6	7.33	7.23	7.02	6.96
T_7	8.02	7.97	7.86	7.76
T_8	7.75	7.56	7.31	7.88
T_9	7.15	7.07	6.88	6.72
T_{10}	6.92	6.74	6.48	6.40
T_{11}	6.86	6.60	6.40	6.33
'F' Test	S	S	S	S
S. E. (d)	0.023	0.025	0.022	0.14
C. V.	0.359	0.389	0.365	2.313
C. D.	0.047	0.05	0.046	0.292

3. Effect of various treatment combinations on Overall acceptability score of watermelon and beetroot squash at different days of storage.

The data presented in table 4 showed significant differences in Overall acceptability score of watermelon and beetroot squash present among the different treatment in fresh i.e. 0 days as well as 30, 45 and 60 days of storage. In general the Overall acceptability score of watermelon and beetroot squash decreased during advancement of storage. At initial day of storage significantly maximum overall acceptability score was recorded in treatment T_5 (Watermelon Pulp 50% + Sugar beet pulp 50%+ 0.2% Citric acid + Sugar (200 g)) with value of 8.64. However, significantly minimum overall acceptability score was recorded T_{11} (Sugar beet pulp 100%+ 0.2% Citric acid + Sugar (200 g)) with value of 6.92. After 10 days of storage significantly maximum overall acceptability score was recorded in treatment T_5 (Watermelon Pulp 50% + Sugar beet pulp 50%+ 0.2% Citric acid + Sugar (200 g)) with value of 8.44. However, significantly minimum overall acceptability score was recorded T_{11} (Sugar beet pulp 100%+ 0.2% Citric acid + Sugar (200 g)) with value of 6.55. After 20 days of storage significantly maximum overall acceptability score was recorded in treatment T_5 (Watermelon Pulp 50% + Sugar beet pulp 50%+ 0.2% Citric acid + Sugar (200 g)) with value of 8.26. However, significantly minimum overall acceptability score was recorded T_{11} (Sugar beet pulp 100%+ 0.2% Citric acid + Sugar (200 g)) with value of 6.55. After 30 days of storage significantly maximum overall acceptability score was recorded in treatment T_5 (Watermelon Pulp 50% + Sugar beet pulp 50%+ 0.2% Citric acid + Sugar (200 g)) with value of 8.15. However, significantly minimum overall acceptability score was recorded T_{11} (Sugar beet pulp 100%) with value of

6.43. Overall acceptability score of squash is also affected by various treatment combination used and storage period. Therefore, the variation in ranges for different treatment and also at different days of storage was observed. Similar results were reported for Overall acceptability score in Khan *et al*. (2013) [11] in plum squash; Relekar *et al*. (2013) [22] in sapota squash; Selvi *et al*. (2013) [25] in mixed fruit squash; Kaysher *et al*. (2014) [10] in mixed squash; Rani and Rao (2014) [20] in sapota and aloe vera squash; Hossain *et al*. (2015) [8] in strawberry squash; Yadav *et al*. (2016) [31] in guava squash; Chaudhary *et al*. (2017) [3] in mango and *Aloe vera* squash; Deep *et al*. (2017) [4] in jamun RTS; Meena *et al*. (2017) [16] in anola squash; Mishra and Sangma (2017) [17, 18] in *Aloe vera* juice extract; Modgil *et al*. (2018) [19] in papaya squash; Gupta (2020) [6] in phalsa guava squash; Hamza *et al*. (2020) [7] in olive apple squash.

Table 4: Effect of various treatment combinations on overall acceptability score of watermelon and beetroot squash at different days of storage

Overall Acceptability Score				
Treatment	**INITIAL**	**10 DAYS**	**20 DAYS**	**30 DAYS**
T_1	7.92	7.82	7.69	7.50
T_2	7.38	7.32	7.23	7.08
T_3	7.85	7.72	7.52	7.41
T_4	8.52	8.37	8.20	8.09
T_5	8.64	8.44	8.26	8.15
T_6	7.71	7.61	7.44	7.35
T_7	8.10	8.34	8.12	8.04
T_8	8.25	8.14	8.04	7.94
T_9	7.60	7.45	7.31	7.23
T_{10}	8.03	7.94	7.90	7.80
T_{11}	6.92	6.77	6.55	6.43
'F' Test	S	S	S	S
S. E. (d)	0.021	0.018	0.014	0.021
C. V.	0.31	0.28	0.228	0.337
C. D.	0.043	0.037	0.03	0.043

4. Effect of various treatment combinations on shelf life of watermelon and beetroot squash after 30 days after storage

The data presented in table 5 showed significant differences in shelf life of watermelon and beetroot squash present among the different treatment after 30 days of storage significantly maximum shelf life was observed for T_5 (Watermelon Pulp 50% + Sugar beet pulp 50%+ 0.2% Citric acid + Sugar (200 g)) with value of 37.58, while minimum shelf life was observed in T_{11} (Sugar beet pulp 100%+ 0.2% Citric acid + Sugar (200 g)) with value of 25.64. Similar results were reported for shelf life by Khan *et al*. (2013) [11] in plum squash; Relekar *et al*. (2013) [22] in sapota squash; Selvi *et al*. (2013) [25] in mixed fruit squash; Kaysher *et al*. (2014) [10] in mixed squash; Rani and Rao (2014) [20] in sapota and aloe vera squash; Hossain *et al*. (2015) [9] in strawberry squash; Sasikumar (2015) [24] in aloe vera and bael RTS beverages; Vijayan and Prabhat (2015) [30] in watermelon; Hossain *et al*. (2016) [8] in mixed fruit squash; Sharma (2016) [27] in bitter gourd and kiwi squash; Yadav *et al*. (2016) [31] in guava squash; Chaudhary *et al*. (2017) [3] in mango and *Aloe vera* squash; Deep *et al*. (2017) [4] in jamun RTS; Meena *et al*. (2017) [16] in anola squash; Mishra and Sangma (2017) [17, 18] in *Aloe vera* juice extract; Modgil *et al*. (2018) [19] in papaya squash; Gupta (2020) [6] in phalsa guava squash; Hamza *et al*. (2020) [7] in olive apple squash and Mani and Reddy (2022) [15] in muskmelon squash.

Table 5: Effect of various treatment combinations on shelf life of watermelon and beetroot squash at 15 days after storage

Shelf life		
Notion	**Treatment**	**Shelf life**
T_1	Watermelon Pulp 90% + Sugar beet pulp 10% + 0.2% Citric acid + Sugar (200 g)	29.49
T_2	Watermelon Pulp 80% + Sugar beet pulp 20% + 0.2% Citric acid + Sugar (200 g)	27.66
T_3	Watermelon Pulp 70% + Sugar beet pulp 30%+ 0.2% Citric acid + Sugar (200 g)	29.67
T_4	Watermelon Pulp 60% + Sugar beet pulp 40% + 0.2% Citric acid + Sugar (200 g)	35.27
T_5	Watermelon Pulp 50% + Sugar beet pulp 50% + 0.2% Citric acid + Sugar (200 g)	37.58
T_6	Watermelon Pulp 40% + Sugar beet pulp 60% + 0.2% Citric acid + Sugar (200 g)	26.33
T_7	Watermelon Pulp 30% + Sugar beet pulp 70% + 0.2% Citric acid + Sugar (200 g)	32.33
T_8	Watermelon Pulp 20% + Sugar beet pulp 80% + 0.2% Citric acid + Sugar (200 g)	29.33
T_9	Watermelon Pulp 10% + Sugar beet pulp 90% + 0.2% Citric acid + Sugar (200 g)	28.46
T_{10}	Watermelon Pulp 100% + 0.2% Citric acid + Sugar (200 g)	26.43
T_{11}	Sugar beet pulp 100% + 0.2% Citric acid + Sugar (200 g)	25.64
'F' Test		S
S. E. (d)		2.012
C. V.		9.324
C. D.		4.024

Conclusion

On the basis of present investigation it was concluded that the Treatment T_5 (Watermelon Pulp 50% + Sugar beet pulp 50% + 0.2% Citric acid + Sugar (200 g)) was found to be the best in terms of TSS, Acidity, color and appearance. The study needs to the further researches to prevent reduction in colour,

and to avoid loss of nutritional content of watermelon and beetroot during storage. This study also paved the ways of process optimization of watermelon and beetroot squash with its natural colour, flavour and texture with a potential prolonged shelf life. The beetroot sample have betalain as red pigment so it can be used further as a colourant in food industries. Beetroot has good iron and antioxidant content so that it can be used to fortify different food products like yoghurt. Watermelon is rich in an amino acid called citrulline that may help move blood through your body and can lower our blood pressure, extraction of citrulline can be done.

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