"Recipe standardization of strawberry jam through sensory evaluation during storage"

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ABSTRACT

Strawberry is one of the most important temperate fruit, belongs to the family Rosaceae. Strawberry plant is treasured in garden as well as in commercial field for its beautiful red fruit that has a tantalizing aroma. Strawberry is a small fruit having 98% edible portion. The mature fruits are quite delicious, refreshing, and attractive with distinct and pleasant aroma and healthy composition. It is widely consumed, both as fresh fruit and as an ingredient in processed products. Fruits are highly perishable, efficient post-harvest management has become an absolute necessity. The alternate way of extending their shelf life, availability in off-season and reduction of post-harvest losses is processing. These losses can be reduced by developing techniques for the preparation of different value-added products. A research trial was conducted at Horticulture Processing Laboratory of Department of Fruit Science, IGKV, Raipur (C.G.) during the year 2019-20 and 2020-21 to standardize the recipe for strawberry jam by sensory evaluation during entire storage period. The experiment was carried out in Factorial Completely Randomized Design (FCRD) with 9 treatment combinations of 3 levels of pulp (45, 50 and 55% pulp) and 3 levels of TSS % (60, 65 and 70% TSS) with three replications. Result regarding sensory evaluation of strawberry jam revealed that recipe T_5 (50 % Pulp + 65 % TSS + 0.3 % Acidity) recorded maximum score for all the sensory parameters *i.e.*, Colour, appearance, flavour and aroma, taste and texture, while the minimum was recorded in recipe T_1 (45 % Pulp + 60 % TSS + 0.3 % Acidity). During entire storage period of jam, the minimum decrease in organoleptic scores and maximum storability is found in the treatment or recipe T_5 (50 % Pulp + 65 % TSS + 0.3 % Acidity) whereas, the maximum decrease in scores during storage and minimum storability was recorded under treatment T_1 (45 % Pulp + 60 % TSS + 0.3 % Acidity).

KEY WORDS: Standardization, Recipe, Strawberry, Jam, Sensory evaluation, Storability etc.

INTRODUCTION

Strawberry is one of the most important temperate fruit, belongs to the family Rosaceae. The strawberry is a fruit characterized by a fantabulous aroma and a sweet taste. Strawberry is a small fruit having 98% edible portion. It is widely consumed, both as fresh fruit and as an ingredient in processed products. It is a very rich source of bioactive compounds including vitamin C, E and phenolic compounds. Nutritionally, it contains more vitamin C than oranges. It is an excellent source of anthocyanin and have tonic, depurative, diuretic, re-mineralizing and astringent properties (Hannum, 2004). The chemical composition of strawberry is ascorbic acid (64.0mg), water (91.75g), protein (0.61g), fat (0.37g), carbohydrate (7.02g), fiber (2.3g), calcium (14.0mg), potassium (166.0 mg/160g) and vitamin-A (27 IU) (Han *et al.*,2005). The fruit of strawberry is good for those people suffering from anemia biliousness and indigestion.

Fruits are highly perishable, efficient post-harvest management has become an absolute necessity. It is also important for effective exploitation of the export potential of fruits. Fruit losses are estimated at 10-55% due to improper post-harvest management. The utilization of fruits for processing is estimated to be around 2-20 per cent of the total production. About 10-15% fresh fruits shrivel and decay, lowering their market value and consumer acceptability. Minimizing these losses can increase their supply without bringing additional land under cultivation. Postharvest processes include the integrated functions of harvesting, cleaning, grading, cooling, storing, packaging, transporting and marketing.

As the shelf-life of fresh produce is limited to 1-2 days at room temperature, the fresh fruits of strawberry can't be stored for long time due to their inherent compositional and textural characteristics. The alternate way of extending their shelf life, availability in off-season and reduction of post-harvest losses is processing. These losses can be reduced by developing techniques for the preparation of different value-added products either in the form of whole fruit or pulp during peak harvesting season. To extend the shelf life of fruits and increase their market value, they are processed into suitable products like jams, jellies, marmalades, squashes, crushes and cordials etc. The products prepared from strawberry having characteristics flavor and taste is more remunerative. Therefore, in order to explore the perishability of utilizing the fruits for making different quality products which can be stored for longer period an investigation has been carried out in the Horticulture Processing Laboratory of Department of Fruit Science, IGKV, Raipur (C.G.) during the year 2019-20 and 2020-21 to standardize the recipe for strawberry jam by sensory evaluation during storage.

METHODS AND MATERIALS

The research trial was conducted at Horticulture Processing Laboratory of Department of Fruit Science, IGKV, Raipur (C.G.) during the year 2019-20. The experiment was carried out in Factorial Completely Randomized Design (FCRD) with 9 treatment combinations of 3 levels of pulp (45, 50 and 55% pulp) and 3 levels of TSS % (60, 65 and 70% TSS) with three replications. Jam is a processed product made by boiling fruit pulp with sufficient sugar to a reasonably thick consistency, firm enough to hold the fruit tissues in position. Ripe, healthy and fresh strawberry fruits were used for the preparation of the Jam.

Selected fresh mature strawberries were weighted and washed them thoroughly with cold water. Pulp was extracted from strawberry fruit and then filtered, strained and mixed. For formulation of recipe, the total soluble solids and total acidity present in the pulp were first determined and then remaining amount of sugar and citric acid were adjusted. 500 g of jam of each recipe is prepared by mixing the calculated amount of pulp, sugar and citric acid. Then cooking the pulp and sugar mix until its required TSS % (taken as treatments) tested by Refractometer. The cooking temperature maintained at 104-105°C. Then Citric acid and Sodium benzoate were added for each of the product. Pour the finished products into clear dry sterilized glass jars.

The processed products (jam) were subjected to sensory evaluation by a panel of judges following the Hedonic rating test as described by Ranganna (1997). The products were evaluated for colour, appearance, flavour and aroma, taste and texture. The samples were presented to the judges the way they are normally consumed. The characters with mean scores of 5 or more out of 9 marks were considered acceptable. The overall acceptability of products was based upon the mean scores obtained from all these characters studied under the test. The mean scores obtained by different products were calculated.

RESULTS AND DISCUSSION

The results of trial pertaining to various aspects of sensory evaluation of strawberry jam are summarized as follows:

Sensory evaluation of Strawberry Jam

In the present investigation fresh strawberry fruits were processed into jam. After processing, sensory evaluation of strawberry jam was done at 0, 30, 60, 90, 120 and 150 days of storage and the data were recorded for different variable namely colour, appearance, flavour and aroma, taste, overall acceptability, grittiness etc. They are presented in Table 1 to 6

1. Colour

The data pertaining to organoleptic score for colour of different treatments of strawberry jam recorded during the entire storage period during both the years and the pooled mean data are presented in Table 1

The data showed that there was a sharp decrease in organoleptic score for colour of different treatments of strawberry jam with increase in storage period. The initial organoleptic score for colour of different treatments of strawberry jam varied from 7.59 to 9.35 and at the end of storage period it was 4.44 to 8.04 during both the years and over pooled data mean. Organoleptic scores for colour of jam decreased during storage but still remained in the acceptable range even by three months of storage at room temperature.

It is revealed from the data recorded that among different pulp % in jam treatments, P_2 (50% pulp) treatment obtained the maximum score for colour (8.38), followed by P_3 (55% pulp) treatment having 8.22 score for colour, while P_1 (45% pulp) treatment obtained the minimum score (8.10) just after processing of jam during both the years and over pooled data mean. After 5 months of storage, organoleptic score for colour of strawberry jam was found to be decreased and varied significantly. At the end of 5 months of storage the highest organoleptic score for colour was found in the treatment P_2 (6.59) followed by P_3 (6.30), and the lowest organoleptic score for colour in P_1 treatment (5.34) during both the years and over pooled data mean. The maximum reduction in organoleptic score for colour of strawberry jam was noted in P_1 (2.76) followed by P_3 (1.92), while the minimum decrease (1.79) in P_2 after 5 months of storage during both the years and over pooled data mean.

Among different TSS % in jam treatments, at 0 days of storage organoleptic score for colour of strawberry jam was the maximum (9.08) in TSS_2 (65% TSS) followed by TSS_3 (70% TSS) having 7.93 organoleptic score for colour and at 150 days of storage it became 7.18 and 5.98 respectively, while the minimum organoleptic score for colour (7.70) was recorded in treatment TSS_1 (60% TSS), which decreased to 5.07 at the end of the storage period during both the years and over pooled data mean. The maximum reduction in organoleptic score for colour was noted in TSS_1 (2.63) followed by TSS_3 (1.95), while the minimum reduction (1.90) in TSS_2 after 5 months of storage during both the years and over pooled data mean.

Among interaction between pulp % and TSS % in jam treatments, the initial (at 0 days of storage) organoleptic score for colour of strawberry jam was the maximum in T_5 (9.35) followed by T_8 (9.01) and at the end of storage period (at 150 days of storage) it became 8.04 and 7.36 respectively, while the minimum organoleptic score for colour of strawberry jam was recorded in T_1 (7.59), which decreased to 4.44 at the end of the storage period during both the

years and over pooled data mean. The maximum reduction in organoleptic score for colour was noted in T_1 (3.15) followed by T_2 (2.76), while the minimum reduction (1.31) in T_5 after 5 months of storage during both the years and over pooled data mean.

It is evident from the result obtained that there was a sharp decrease in organoleptic score for colour of different treatments of strawberry jam with increase in storage period. It might be due to the browning reaction between reducing sugars and amino acids, accelerated by high temperature and oxidation of phenolic compounds. These results were in close agreement with the findings of Khan *et al.* (2012), Khan *et al.* (2014), Sharma (2014), Priyanka *et al.* (2015), Bishnoi *et al.* (2016), Parihar *et. al.* (2018) *etc*. in different processed products.

2. Appearance

The data pertaining to organoleptic score for appearance of different treatments of strawberry jam recorded during the entire storage period during both the years and the pooled mean data are presented in Table 2

The data showed that there was a sharp decrease in organoleptic score for appearance of different treatments of strawberry jam with increase in storage period. The initial organoleptic score for appearance of different treatments of strawberry jam varied from 7.78 to 9.59 and at the end of storage period it was 4.87 to 8.37 during both the years and over pooled data mean. Organoleptic scores for appearance of jam decreased during storage but still remained in the acceptable range even by three months of storage at room temperature.

It is revealed from the data recorded that among different pulp % in jam treatments, P_2 (50% pulp) treatment obtained the maximum score for appearance (8.59), followed by P_3 (55% pulp) treatment having 8.43 score for appearance, while P_1 (45% pulp) treatment obtained the minimum score (8.30) just after processing of jam during both the years and over pooled data mean. After 5 months of storage, organoleptic score for appearance of strawberry jam was found to be decreased and varied significantly. At the end of 5 months of storage the highest organoleptic score for appearance was found in the treatment P_2 (6.93) followed by P_3 (6.65), and the lowest organoleptic score for appearance in P_1 treatment (5.75) during both the years and over pooled data mean. The maximum reduction in organoleptic score for appearance of strawberry jam was noted in P_1 (2.55) followed by P_3 (1.78), while the minimum decrease (1.66) in P_2 after 5 months of storage during both the years and over pooled data mean.

Among different TSS % in jam treatments, at 0 days of storage organoleptic score for appearance of strawberry jam was the maximum (9.31) in TSS_2 (65% TSS) followed by TSS_3 (70% TSS) having 8.13 organoleptic score for appearance and at 150 days of storage it became

7.55 and 6.32 respectively, while the minimum organoleptic score for appearance (7.89) was recorded in treatment TSS_1 (60% TSS), which decreased to 5.46 at the end of the storage period during both the years and over pooled data mean. The maximum reduction in organoleptic score for appearance was noted in TSS_1 (2.43) followed by TSS_3 (1.81), while the minimum reduction (1.76) in TSS_2 after 5 months of storage during both the years and over pooled data mean.

Among interaction between pulp % and TSS % in jam treatments, the initial (at 0 days of storage) organoleptic score for appearance of strawberry jam was the maximum in T_5 (9.59) followed by T_8 (9.23) and at the end of storage period (at 150 days of storage) it became 8.37 and 7.71 respectively, while the minimum organoleptic score for appearance of strawberry jam was recorded in T_1 (7.78), which decreased to 4.90 at the end of the storage period during both the years and over pooled data mean. The maximum reduction in organoleptic score for appearance was noted in T_1 (2.91) followed by T_2 (2.55), while the minimum reduction (1.22) in T_5 after 5 months of storage during both the years and over pooled data mean.

It is evident from the result obtained that there was a sharp decrease in organoleptic score for appearance of different treatments of strawberry jam with increase in storage period. It might be due to the browning reaction between reducing sugars and amino acids, accelerated by high temperature and oxidation of phenolic compounds. These results were in close agreement with the findings of Khan *et al.* (2012), Khan *et al.* (2014), Sharma (2014), Priyanka *et al.* (2015), Bishnoi *et al.* (2016), Parihar *et. al.* (2018) *etc*. in different processed products.

3. Flavour and Aroma

The data pertaining to organoleptic score for flavour and aroma of different treatments of strawberry jam recorded during the entire storage period during both the years and the pooled mean data are presented in Table 3

The data showed that there was a sharp decrease in organoleptic score for flavour and aroma of different treatments of strawberry jam with increase in storage period. The initial organoleptic score for flavour and aroma of different treatments of strawberry jam varied from 6.91 to 8.51 and at the end of storage period it was 4.14 to 7.35 during both the years and over pooled data mean. Organoleptic scores for flavour and aroma of jam decreased during storage but still remained in the acceptable range even by three months of storage at room temperature.

It is revealed from the data recorded that among different pulp % in jam treatments, P_2 (50% pulp) treatment obtained the maximum score for flavour and aroma (7.63), followed by P_3 (55% pulp) treatment having 7.48 score for flavour and aroma, while P_1 (45% pulp)

treatment obtained the minimum score (7.37) just after processing of jam during both the years and over pooled data mean. After 5 months of storage, organoleptic score for flavour and aroma of strawberry jam was found to be decreased and varied significantly. At the end of 5 months of storage the highest organoleptic score for flavour and aroma was found in the treatment P_2 (6.05) followed by P_3 (5.79), and the lowest organoleptic score for flavour and aroma in P_1 treatment (4.94) during both the years and over pooled data mean. The maximum reduction in organoleptic score for flavour and aroma of strawberry jam was noted in P_1 (2.43) followed by P_3 (1.69), while the minimum decrease (1.58) in P_2 after 5 months of storage during both the years and over pooled data mean.

Among different TSS % in jam treatments, at 0 days of storage organoleptic score for flavour and aroma of strawberry jam was the maximum (8.26) in TSS_2 (65% TSS) followed by TSS_3 (70% TSS) having 7.21 organoleptic score for flavour and aroma and at 150 days of storage it became 6.59 and 5.50 respectively, while the minimum organoleptic score for flavour and aroma (7.01) was recorded in treatment TSS_1 (60% TSS), which decreased to 4.69 at the end of the storage period during both the years and over pooled data mean. The maximum reduction in organoleptic score for flavour and aroma was noted in TSS_1 (2.32) followed by TSS_3 (1.71), while the minimum reduction (1.67) in TSS_2 after 5 months of storage during both the years and over pooled data mean.

Among interaction between pulp % and TSS % in jam treatments, the initial (at 0 days of storage) organoleptic score for flavour and aroma of strawberry jam was the maximum in T_5 (8.51) followed by T_8 (8.20) and at the end of storage period (at 150 days of storage) it became 7.35 and 6.75 respectively, while the minimum organoleptic score for flavour and aroma of strawberry jam was recorded in T_1 (6.91), which decreased to 4.14 at the end of the storage period during both the years and over pooled data mean. The maximum reduction in organoleptic score for flavour and aroma was noted in T_1 (2.77) followed by T_2 (2.43), while the minimum reduction (1.16) in T_5 after 5 months of storage during both the years and over pooled data mean.

It is evident from the result obtained that there was a sharp decrease in organoleptic score for flavour and aroma of different treatments of strawberry jam with increase in storage period. It might be due to that butyl acetate, ethyl hexanate, and ethyl propionate are the main flavoring volatiles in strawberry in addition to other alcohols. The continuous decline in sensory scores during storage can be attributed to the loss and/or modification of many chemical constituents of the product, especially the flavorants. The slow change in sensory attributers during storage under refrigerated conditions is attributed to the decrease in the rate

of these deteriorative reactions at low temperature. These results were in close agreement with the findings of Khan *et al.* (2012), Khan *et al.* (2014), Sharma (2014), Priyanka *et al.* (2015), Bishnoi *et al.* (2016), Parihar *et. al.* (2018) *etc*. in different processed products.

4. Taste

The data pertaining to organoleptic score for taste of different treatments of strawberry jam recorded during the entire storage period during both the years and the pooled mean data are presented in Table 4

The data showed that there was a sharp decrease in organoleptic score for the taste of different treatments of strawberry jam with increase in storage period. The initial organoleptic score for the taste of different treatments of strawberry jam varied from 7.51 to 9.25 and at the end of storage period it was 5.71 to 8.60 during both the years and over pooled data mean. Organoleptic scores for the taste of jam decreased during storage but still remained in the acceptable range even by three months of storage at room temperature.

It is revealed from the data recorded that among different pulp % in jam treatments, P_2 (50% pulp) treatment obtained the maximum score for the taste (8.42), followed by P_3 (55% pulp) treatment having 8.27 score for the taste, while P_1 (45% pulp) treatment obtained the minimum score (8.14) just after processing of jam during both the years and over pooled data mean. After 5 months of storage, organoleptic score for the taste of strawberry jam was found to be decreased and varied significantly. At the end of 5 months of storage the highest organoleptic score for the taste was found in the treatment P_2 (7.33) followed by P_3 (7.09), and the lowest organoleptic score for the taste in P_1 treatment (6.46) during both the years and over pooled data mean. The maximum reduction in organoleptic score for the taste of strawberry jam was noted in P_1 (1.68) followed by P_3 (1.18), while the minimum decrease (1.09) in P_2 after 5 months of storage during both the years and over pooled data mean.

Among different TSS % in jam treatments, at 0 days of storage organoleptic score for the taste of strawberry jam was the maximum (9.13) in TSS_2 (65% TSS) followed by TSS_3 (70% TSS) having 7.97 organoleptic score for the taste and at 150 days of storage it became 7.97 and 6.78 respectively, while the minimum organoleptic score for the taste (7.74) was recorded in treatment TSS_1 (60% TSS), which decreased to 6.14 at the end of the storage period during both the years and over pooled data mean. The maximum reduction in organoleptic score for the taste was noted in TSS_1 (1.60) followed by TSS_3 (1.19), while the minimum reduction (1.16) in TSS_2 after 5 months of storage during both the years and over pooled data mean.

Among interaction between pulp % and TSS % in jam treatments, the initial (at 0 days of storage) organoleptic score for the taste of strawberry jam was the maximum in T_5 (9.40) followed by T_8 (9.05) and at the end of storage period (at 150 days of storage) it became 8.60 and 8.05 respectively, while the minimum organoleptic score for the taste of strawberry jam was recorded in T_1 (7.63), which decreased to 5.71 at the end of the storage period during both the years and over pooled data mean. The maximum reduction in organoleptic score for the taste was noted in T_1 (1.92) followed by T_2 (1.68), while the minimum reduction (0.80) in T_5 after 5 months of storage during both the years and over pooled data mean.

It is evident from the result obtained that there was a sharp decrease in organoleptic score for the taste of different treatments of strawberry jam with increase in storage period. It might be due to the oxidative and other deteriorative reactions occurring within the product during its storage accompanied with the degradation of ascorbic acid and furfural production. These results were in close agreement with the findings of Khan *et al.* (2012), Khan *et al.* (2014), Sharma (2014), Priyanka *et al.* (2015), Bishnoi *et al.* (2016), Parihar *et. al.* (2018) *etc.* in different processed products.

5. Grittiness /Texture

The data pertaining to organoleptic score for grittiness /texture of different treatments of strawberry jam recorded during the entire storage period during both the years and the pooled mean data are presented in Table 5

The data showed that there was a sharp decrease in organoleptic score for the grittiness of different treatments of strawberry jam with increase in storage period. The initial organoleptic score for the grittiness of different treatments of strawberry jam varied from 7.32 to 9.17 and at the end of storage period it was 5.12 to 8.10 during both the years and over pooled data mean. Organoleptic scores for the grittiness of jam decreased during storage but still remained in the acceptable range even by three months of storage at room temperature.

It is revealed from the data recorded that among different pulp % in jam treatments, P_2 (50% pulp) treatment obtained the maximum score for the grittiness (8.08), followed by P_3 (55% pulp) treatment having 7.93 score for the grittiness, while P_1 (45% pulp) treatment obtained the minimum score (7.81) just after processing of jam during both the years and over pooled data mean. After 5 months of storage, organoleptic score for the grittiness of strawberry jam was found to be decreased and varied significantly. At the end of 5 months of storage the highest organoleptic score for the grittiness was found in the treatment P_2 (6.83) followed by P_3 (6.59), and the lowest organoleptic score for the grittiness in P_1 treatment (5.89) during both

the years and over pooled data mean. The maximum reduction in organoleptic score for the grittiness of strawberry jam was noted in P_1 (1.92) followed by P_3 (1.34), while the minimum decrease (1.25) in P_2 after 5 months of storage during both the years and over pooled data mean.

Among different TSS % in jam treatments, at 0 days of storage organoleptic score for the grittiness of strawberry jam was the maximum (8.75) in TSS_2 (65% TSS) followed by TSS_3 (70% TSS) having 7.64 organoleptic score for the grittiness and at 150 days of storage it became 7.43 and 6.28 respectively, while the minimum organoleptic score for the grittiness (7.42) was recorded in treatment TSS_1 (60% TSS), which decreased to 5.59 at the end of the storage period during both the years and over pooled data mean. The maximum reduction in organoleptic score for the grittiness was noted in TSS_1 (1.83) followed by TSS_3 (1.36), while the minimum reduction (1.32) in TSS_2 after 5 months of storage during both the years and over pooled data mean.

Among interaction between pulp % and TSS % in jam treatments, the initial (at 0 days of storage) organoleptic score for the grittiness of strawberry jam was the maximum in T_5 (9.01) followed by T_8 (8.68) and at the end of storage period (at 150 days of storage) it became 8.10 and 7.54 respectively, while the minimum organoleptic score for the grittiness of strawberry jam was recorded in T_1 (7.32), which decreased to 5.12 at the end of the storage period during both the years and over pooled data mean. The maximum reduction in organoleptic score for the grittiness was noted in T_1 (2.20) followed by T_2 (1.92), while the minimum reduction (0.91) in T_5 after 5 months of storage during both the years and over pooled data mean.

It is evident from the result obtained that there was a sharp decrease in organoleptic score for the grittiness of different treatments of strawberry jam with increase in storage period. It might be due to the browning reaction between reducing sugars and amino acids, accelerated by high temperature and oxidation of phenolic compounds. These results were in close agreement with the findings of Khan *et al.* (2012), Khan *et al.* (2014), Sharma (2014), Priyanka *et al.* (2015), Bishnoi *et al.* (2016), Parihar *et. al.* (2018) *etc*. in different processed products.

6. Overall Acceptability

The data pertaining to organoleptic score for overall acceptability of different treatments of strawberry jam recorded during the entire storage period during both the years and the pooled mean data are presented in Table 6

The data showed that there was a sharp decrease in organoleptic score for the overall acceptability of different treatments of strawberry jam with increase in storage period. The

initial organoleptic score for the overall acceptability of different treatments of strawberry jam varied from 7.45 to 9.17 and at the end of storage period it was 4.86 to 8.09 during both the years and over pooled data mean. Organoleptic scores for the overall acceptability of jam decreased during storage but still remained in the acceptable range even by three months of storage at room temperature.

It is revealed from the data recorded that among different pulp % in jam treatments, P_2 (50% pulp) treatment obtained the maximum score for the overall acceptability (8.07), followed by P_3 (55% pulp) treatment having 7.89 score for the overall acceptability, while P_1 (45% pulp) treatment obtained the minimum score (7.94) just after processing of jam during both the years and over pooled data mean. After 5 months of storage, organoleptic score for the overall acceptability of strawberry jam was found to be decreased and varied significantly. At the end of 5 months of storage the highest organoleptic score for the overall acceptability was found in the treatment P_2 (6.75) followed by P_3 (6.48), and the lowest organoleptic score for the overall acceptability in P_1 treatment (5.68) during both the years and over pooled data mean. The maximum reduction in organoleptic score for the overall acceptability of strawberry jam was noted in P_1 (2.26) followed by P_3 (1.59), while the minimum decrease (1.47) in P_2 after 5 months of storage during both the years and over pooled data mean.

Among different TSS % in jam treatments, at 0 days of storage organoleptic score for the overall acceptability of strawberry jam was the maximum (8.91) in TSS_2 (65% TSS) followed by TSS_3 (70% TSS) having 7.78 organoleptic score for the overall acceptability and at 150 days of storage it became 7.34 and 6.17 respectively, while the minimum organoleptic score for the overall acceptability (7.55) was recorded in treatment TSS_1 (60% TSS), which decreased to 5.39 at the end of the storage period during both the years and over pooled data mean. The maximum reduction in organoleptic score for the overall acceptability was noted in TSS_1 (2.16) followed by TSS_3 (1.61), while the minimum reduction (1.57) in TSS_2 after 5 months of storage during both the years and over pooled data mean.

Among interaction between pulp % and TSS % in jam treatments, the initial (at 0 days of storage) organoleptic score for the overall acceptability of strawberry jam was the maximum in T_5 (9.17) followed by T_8 (8.83) and at the end of storage period (at 150 days of storage) it became 8.09 and 7.48 respectively, while the minimum organoleptic score for the overall acceptability of strawberry jam was recorded in T_1 (7.45), which decreased to 4.86 at the end of the storage period during both the years and over pooled data mean. The maximum reduction in organoleptic score for the overall acceptability was noted in T_1 (2.59) followed by T_2 (2.27),

while the minimum reduction (1.08) in T_5 after 5 months of storage during both the years and over pooled data mean.

It is evident from the result obtained that there was a sharp decrease in organoleptic score for the overall acceptability of different treatments of strawberry jam with increase in storage period. It might be due to the browning reaction between reducing sugars and amino acids, accelerated by high temperature and oxidation of phenolic compounds. These results were in close agreement with the findings of Khan *et al.* (2012), Khan *et al.* (2014), Sharma (2014), Priyanka *et al.* (2015), Bishnoi *et al.* (2016), Parihar *et. al.* (2018) *etc*. in different processed products.

CONCLUSION

Based on the results of the present investigation, it can be concluded that the recipe for preparation of strawberry jam treatment T_5 (50% pulp with 65% TSS) was found best regarding all the aspects of nutritive values, sensory parameters, storability and benefit: cost ratio.

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Table 1: Changes in Organoleptic Score for Colour of Strawberry Jam during storage.

Treatments	Organoleptic Score for Colour of Strawberry Jam																		Reduction in score during storage		
	0 DAP			30 DAP			60 DAP			90 DAP			120 DAP			150 DAP					
	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled
Pulp (%)																					
P_1 : 45% Pulp	8.18	8.02	8.10	7.71	7.54	7.63	7.19	7.02	7.10	6.62	6.45	6.53	6.04	5.87	5.95	5.42	5.26	5.34	2.76	2.76	2.76
P_2 : 50% Pulp	8.47	8.30	8.38	8.16	7.99	8.07	7.82	7.65	7.73	7.45	7.28	7.36	7.07	6.90	6.99	6.67	6.50	6.59	1.8	1.8	1.79
P_3 : 55% Pulp	8.31	8.14	8.22	7.98	7.81	7.89	7.61	7.45	7.53	7.21	7.05	7.13	6.81	6.64	6.73	6.38	6.22	6.30	1.93	1.92	1.92
SEm ±	**0.04**	**0.03**	**0.03**	**0.01**	**0.01**	**0.01**	**0.02**	**0.03**	**0.02**	**0.02**	**0.01**	**0.02**	**0.04**	**0.03**	**0.03**	**0.01**	**0.01**	**0.01**			
CD (P = 0.05)	**0.12**	**0.09**	**0.10**	**0.04**	**0.03**	**0.03**	**0.06**	**0.10**	**0.07**	**0.05**	**0.03**	**0.05**	**0.12**	**0.09**	**0.10**	**0.04**	**0.03**	**0.03**			
TSS (%)																					
TSS_1 : 60% TSS	7.78	7.62	7.70	7.32	7.17	7.25	6.83	6.67	6.75	6.28	6.13	6.21	5.73	5.58	5.66	5.15	4.99	5.07	2.63	2.63	2.63
TSS_2 : 65% TSS	9.17	8.99	9.08	8.85	8.66	8.75	8.48	8.30	8.39	8.09	7.91	8.00	7.69	7.51	7.60	7.27	7.09	7.18	1.91	1.89	1.90
TSS_3 : 70% TSS	8.01	7.85	7.93	7.67	7.51	7.59	7.30	7.14	7.22	6.90	6.74	6.82	6.49	6.33	6.41	6.06	5.90	5.98	1.95	1.95	1.95
SEm ±	**0.03**	**0.02**	**0.02**	**0.01**	**0.01**	**0.01**	**0.02**	**0.03**	**0.03**	**0.02**	**0.02**	**0.02**	**0.03**	**0.02**	**0.02**	**0.01**	**0.01**	**0.01**			
CD (P = 0.05)	**0.09**	**0.06**	**0.07**	**0.03**	**0.03**	**0.03**	**0.06**	**0.09**	**0.09**	**0.06**	**0.05**	**0.06**	**0.09**	**0.06**	**0.07**	**0.03**	**0.03**	**0.03**			
Interaction																					
T_1	7.67	7.52	7.59	7.13	6.97	7.05	6.53	6.38	6.45	5.88	5.73	5.80	5.22	5.07	5.14	4.52	4.37	4.44	3.15	3.15	3.15
T_2	8.98	8.80	8.89	8.50	8.32	8.41	7.98	7.80	7.89	7.41	7.23	7.32	6.83	6.65	6.74	6.22	6.04	6.13	2.76	2.76	2.76
T_3	7.90	7.74	7.82	7.49	7.33	7.41	7.04	6.89	6.97	6.56	6.40	6.48	6.06	5.90	5.98	5.54	5.38	5.46	2.36	2.36	2.36
T_4	7.85	7.69	7.77	7.41	7.25	7.33	6.92	6.77	6.85	6.40	6.24	6.32	5.86	5.70	5.78	5.29	5.13	5.21	2.56	2.56	2.56
T_5	9.45	9.26	9.35	9.22	9.03	9.13	8.97	8.78	8.88	8.70	8.51	8.61	8.42	8.24	8.33	8.13	7.94	8.04	1.32	1.32	1.31
T_6	8.11	7.95	8.03	7.85	7.69	7.77	7.56	7.40	7.48	7.25	7.09	7.17	6.93	6.77	6.85	6.60	6.44	6.52	1.51	1.51	1.51
T_7	7.81	7.65	7.73	7.44	7.28	7.36	7.03	6.87	6.95	6.58	6.42	6.50	6.12	5.97	6.05	5.64	5.49	5.56	2.17	2.16	2.17
T_8	9.10	8.91	9.01	8.81	8.63	8.72	8.50	8.32	8.41	8.16	7.98	8.07	7.82	7.64	7.73	7.46	7.27	7.36	1.64	1.64	1.65
T_9	8.02	7.86	7.94	7.68	7.52	7.60	7.31	7.15	7.23	6.90	6.74	6.82	6.49	6.33	6.41	6.05	5.89	5.97	1.97	1.97	1.97
SEm ±	**0.05**	**0.03**	**0.04**	**0.02**	**0.02**	**0.02**	**0.04**	**0.04**	**0.04**	**0.03**	**0.03**	**0.03**	**0.05**	**0.03**	**0.04**	**0.02**	**0.02**	**0.02**			
CD (P = 0.05)	**0.15**	**0.08**	**0.12**	**0.05**	**0.06**	**0.06**	**0.12**	**0.11**	**0.12**	**0.09**	**0.08**	**0.09**	**0.15**	**0.08**	**0.12**	**0.05**	**0.06**	**0.06**			

*DAP – Days after processing

Table 2: Changes in Organoleptic Score for Appearance of Strawberry Jam during storage.

Treatments	Organoleptic Score for Appearance of Strawberry Jam																		Reduction in score during storage		
	0 DAP			30 DAP			60 DAP			90 DAP			120 DAP			150 DAP					
	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled
Pulp (%)																					
P_1 : 45% Pulp	8.35	8.26	8.30	7.89	7.83	7.86	7.40	7.36	7.38	6.86	6.85	6.85	6.31	6.33	6.32	5.73	5.77	5.75	2.62	2.49	2.55
P_2 : 50% Pulp	8.64	8.55	8.59	8.34	8.27	8.31	8.02	7.97	7.99	7.67	7.63	7.65	7.31	7.29	7.30	6.93	6.93	6.93	1.71	1.62	1.66
P_3 : 55% Pulp	8.47	8.39	8.43	8.16	8.09	8.12	7.81	7.76	7.79	7.43	7.40	7.42	7.05	7.04	7.04	6.64	6.65	6.65	1.83	1.74	1.78
SEm ±	**0.06**	**0.02**	**0.04**	**0.01**	**0.01**	**0.01**	**0.04**	**0.01**	**0.02**	**0.06**	**0.02**	**0.04**	**0.01**	**0.01**	**0.01**	**0.04**	**0.01**	**0.02**			
CD (P = 0.05)	**0.18**	**0.05**	**0.13**	**0.02**	**0.02**	**0.02**	**0.13**	**0.03**	**0.05**	**0.19**	**0.05**	**0.13**	**0.02**	**0.02**	**0.02**	**0.13**	**0.03**	**0.05**			
TSS (%)																					
TSS_1 : 60% TSS	7.93	7.85	7.89	7.50	7.44	7.47	7.03	7.00	7.01	6.51	6.51	6.51	5.99	6.01	6.00	5.44	5.48	5.46	2.49	2.37	2.43
TSS_2 : 65% TSS	9.36	9.26	9.31	9.05	8.97	9.01	8.70	8.64	8.67	8.33	8.29	8.31	7.95	7.93	7.94	7.55	7.54	7.55	1.81	1.72	1.76
TSS_3 : 70% TSS	8.17	8.09	8.13	7.85	7.78	7.82	7.50	7.45	7.48	7.12	7.09	7.10	6.73	6.72	6.72	6.32	6.33	6.32	1.85	1.76	1.81
SEm ±	**0.03**	**0.04**	**0.03**	**0.01**	**0.01**	**0.01**	**0.04**	**0.01**	**0.03**	**0.05**	**0.04**	**0.05**	**0.01**	**0.01**	**0.01**	**0.04**	**0.01**	**0.03**			
CD (P = 0.05)	**0.09**	**0.13**	**0.10**	**0.02**	**0.03**	**0.03**	**0.12**	**0.03**	**0.09**	**0.16**	**0.13**	**0.14**	**0.02**	**0.03**	**0.03**	**0.12**	**0.03**	**0.09**			
Interaction																					
T_1	7.82	7.75	7.78	7.31	7.26	7.28	6.74	6.72	6.73	6.12	6.13	6.13	5.49	5.53	5.51	4.83	4.90	4.87	2.99	2.85	2.91
T_2	9.16	9.06	9.11	8.70	8.64	8.67	8.21	8.16	8.19	7.67	7.65	7.66	7.12	7.13	7.12	6.54	6.58	6.56	2.62	2.48	2.55
T_3	8.06	7.98	8.02	7.67	7.61	7.64	7.25	7.21	7.23	6.78	6.77	6.77	6.31	6.32	6.31	5.81	5.84	5.83	2.25	2.14	2.19
T_4	8.01	7.93	7.97	7.59	7.53	7.56	7.13	7.09	7.11	6.63	6.61	6.62	6.11	6.13	6.12	5.57	5.62	5.60	2.44	2.31	2.37
T_5	9.64	9.54	9.59	9.42	9.33	9.38	9.18	9.11	9.15	8.93	8.87	8.90	8.66	8.62	8.64	8.39	8.35	8.37	1.25	1.19	1.22
T_6	8.27	8.19	8.23	8.02	7.95	7.99	7.75	7.69	7.72	7.46	7.41	7.43	7.15	7.13	7.14	6.84	6.82	6.83	1.43	1.37	1.4
T_7	7.96	7.89	7.92	7.61	7.55	7.58	7.22	7.18	7.20	6.80	6.77	6.79	6.36	6.36	6.36	5.91	5.93	5.92	2.05	1.96	2
T_8	9.28	9.19	9.23	9.01	8.93	8.97	8.72	8.65	8.68	8.39	8.34	8.37	8.07	8.03	8.05	7.72	7.70	7.71	1.56	1.49	1.52
T_9	8.18	8.10	8.14	7.86	7.79	7.82	7.50	7.45	7.48	7.12	7.09	7.10	6.72	6.71	6.72	6.31	6.32	6.31	1.87	1.78	1.83
SEm ±	**0.08**	**0.05**	**0.07**	**0.01**	**0.02**	**0.02**	**0.07**	**0.02**	**0.04**	**0.11**	**0.05**	**0.07**	**0.01**	**0.02**	**0.02**	**0.07**	**0.02**	**0.04**			
CD (P = 0.05)	**0.24**	**0.16**	**0.21**	**0.03**	**0.03**	**0.03**	**0.21**	**0.06**	**0.12**	**0.33**	**0.16**	**0.21**	**0.03**	**0.03**	**0.03**	**0.21**	**0.06**	**0.12**			

*DAP – Days after processing

Table 3: Changes in Organoleptic Score for Flavour and Aroma of Strawberry Jam during storage.

	Organoleptic Score for Flavour and Aroma of Strawberry Jam																		Reduction in score during storage		
	0 DAP			30 DAP			60 DAP			90 DAP			120 DAP			150 DAP					
Treatments	**2020**	**2021**	**Pooled Mean**	**2020**	**2021**	**Pooled Mean**	**2020**	**2021**	**Pooled Mean**	**2020**	**2021**	**Pooled Mean**	**2020**	**2021**	**Pooled Mean**	**2020**	**2021**	**Pooled Mean**	**2020**	**2021**	**Pooled**
Pulp (%)																					
P_1 : 45% Pulp	7.45	7.30	7.37	7.02	6.89	6.95	6.55	6.44	6.49	6.03	5.95	5.99	5.51	5.46	5.48	4.96	4.93	4.94	2.49	2.37	2.43
P_2 : 50% Pulp	7.71	7.55	7.63	7.43	7.29	7.36	7.12	7.00	7.06	6.79	6.68	6.73	6.45	6.35	6.40	6.09	6.01	6.05	1.62	1.54	1.58
P_3 : 55% Pulp	7.56	7.41	7.48	7.26	7.12	7.19	6.93	6.81	6.87	6.57	6.47	6.52	6.21	6.12	6.17	5.82	5.76	5.79	1.74	1.65	1.69
SEm ±	**0.04**	**0.03**	**0.04**	**0.03**	**0.04**	**0.03**	**0.07**	**0.02**	**0.04**	**0.04**	**0.03**	**0.04**	**0.03**	**0.04**	**0.03**	**0.07**	**0.02**	**0.04**			
CD (P = 0.05)	**0.13**	**0.10**	**0.12**	**0.11**	**0.12**	**0.11**	**0.22**	**0.06**	**0.13**	**0.13**	**0.10**	**0.12**	**0.11**	**0.12**	**0.11**	**0.22**	**0.06**	**0.13**			
TSS (%)																					
TSS_1 : 60% TSS	7.08	6.93	7.01	6.67	6.55	6.61	6.22	6.12	6.17	5.73	5.66	5.69	5.23	5.18	5.21	4.71	4.68	4.69	2.37	2.25	2.32
TSS_2 : 65% TSS	8.35	8.18	8.26	8.05	7.90	7.98	7.73	7.59	7.66	7.37	7.25	7.31	7.01	6.91	6.96	6.63	6.55	6.59	1.72	1.63	1.67
TSS_3 : 70% TSS	7.29	7.14	7.21	6.99	6.85	6.92	6.65	6.54	6.60	6.29	6.19	6.24	5.92	5.84	5.88	5.53	5.47	5.50	1.76	1.67	1.71
SEm ±	**0.03**	**0.04**	**0.03**	**0.04**	**0.03**	**0.04**	**0.05**	**0.03**	**0.03**	**0.03**	**0.04**	**0.03**	**0.04**	**0.03**	**0.04**	**0.05**	**0.03**	**0.03**			
CD (P = 0.05)	**0.10**	**0.13**	**0.11**	**0.13**	**0.10**	**0.12**	**0.17**	**0.08**	**0.10**	**0.10**	**0.13**	**0.11**	**0.13**	**0.10**	**0.12**	**0.17**	**0.08**	**0.10**			
Interaction																					
T_1	6.98	6.84	6.91	6.49	6.38	6.43	5.95	5.86	5.91	5.36	5.31	5.34	4.77	4.74	4.75	4.14	4.14	4.14	2.84	2.7	2.77
T_2	8.17	8.00	8.09	7.74	7.60	7.67	7.27	7.15	7.21	6.75	6.66	6.71	6.23	6.17	6.20	5.68	5.64	5.66	2.49	2.36	2.43
T_3	7.19	7.04	7.12	6.82	6.70	6.76	6.42	6.31	6.36	5.98	5.89	5.94	5.53	5.47	5.50	5.06	5.02	5.04	2.13	2.02	2.08
T_4	7.14	7.00	7.07	6.75	6.62	6.68	6.31	6.21	6.26	5.83	5.75	5.79	5.35	5.29	5.32	4.83	4.81	4.82	2.31	2.19	2.25
T_5	8.60	8.42	8.51	8.39	8.23	8.31	8.17	8.02	8.09	7.92	7.78	7.85	7.67	7.55	7.61	7.41	7.30	7.35	1.19	1.12	1.16
T_6	7.38	7.23	7.30	7.14	7.01	7.08	6.89	6.76	6.82	6.60	6.50	6.55	6.32	6.22	6.27	6.02	5.94	5.98	1.36	1.29	1.32
T_7	7.11	6.96	7.03	6.77	6.64	6.71	6.40	6.29	6.35	6.00	5.91	5.95	5.58	5.52	5.55	5.15	5.11	5.13	1.96	1.85	1.9
T_8	8.28	8.11	8.20	8.02	7.87	7.95	7.74	7.60	7.67	7.44	7.31	7.37	7.13	7.02	7.07	6.80	6.71	6.75	1.48	1.4	1.45
T_9	7.30	7.15	7.22	6.99	6.86	6.93	6.65	6.54	6.60	6.29	6.19	6.24	5.91	5.84	5.88	5.52	5.46	5.49	1.78	1.69	1.73
SEm ±	**0.05**	**0.06**	**0.05**	**0.06**	**0.05**	**0.06**	**0.10**	**0.04**	**0.05**	**0.05**	**0.06**	**0.05**	**0.06**	**0.05**	**0.06**	**0.10**	**0.04**	**0.05**			
CD (P = 0.05)	**0.15**	**0.18**	**0.16**	**0.19**	**0.15**	**0.18**	**0.30**	**0.13**	**0.15**	**0.15**	**0.18**	**0.16**	**0.19**	**0.15**	**0.18**	**0.30**	**0.13**	**0.15**			

*DAP – Days after processing

Table 4: Changes in Organoleptic Score for Taste of Strawberry Jam during storage.

Treatments	Organoleptic Score for Taste of Strawberry Jam																		Reduction in score during storage		
	0 DAP			30 DAP			60 DAP			90 DAP			120 DAP			150 DAP					
	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled
Pulp (%)																					
P_1 : 45% Pulp	8.26	8.02	8.14	7.98	7.72	7.85	7.68	7.39	7.53	7.34	7.03	7.19	7.00	6.67	6.83	6.64	6.28	6.46	1.62	1.74	1.68
P_2 : 50% Pulp	8.55	8.30	8.42	8.37	8.10	8.24	8.17	7.89	8.03	7.95	7.65	7.80	7.73	7.42	7.57	7.50	7.17	7.33	1.05	1.13	1.09
P_3 : 55% Pulp	8.39	8.14	8.27	8.20	7.93	8.06	7.98	7.70	7.84	7.75	7.45	7.60	7.51	7.20	7.35	7.26	6.93	7.09	1.13	1.21	1.18
SEm ±	**0.05**	**0.04**	**0.05**	**0.04**	**0.03**	**0.04**	**0.06**	**0.07**	**0.06**	**0.03**	**0.04**	**0.04**	**0.05**	**0.04**	**0.05**	**0.04**	**0.03**	**0.04**			
CD (P = 0.05)	**0.16**	**0.13**	**0.15**	**0.13**	**0.10**	**0.12**	**0.18**	**0.21**	**0.19**	**0.10**	**0.13**	**0.12**	**0.16**	**0.13**	**0.15**	**0.13**	**0.10**	**0.12**			
TSS (%)																					
TSS_1 : 60% TSS	7.85	7.62	7.74	7.59	7.33	7.46	7.30	7.02	7.16	6.98	6.68	6.83	6.65	6.33	6.49	6.31	5.97	6.14	1.54	1.65	1.60
TSS_2 : 65% TSS	9.26	8.99	9.13	9.07	8.78	8.93	8.86	8.55	8.71	8.63	8.31	8.47	8.39	8.05	8.22	8.14	7.79	7.97	1.12	1.2	1.16
TSS_3 : 70% TSS	8.09	7.85	7.97	7.89	7.63	7.76	7.67	7.40	7.54	7.44	7.15	7.29	7.20	6.89	7.04	6.94	6.62	6.78	1.15	1.23	1.19
SEm ±	**0.05**	**0.05**	**0.05**	**0.04**	**0.04**	**0.04**	**0.06**	**0.05**	**0.05**	**0.06**	**0.05**	**0.06**	**0.05**	**0.05**	**0.05**	**0.04**	**0.04**	**0.04**			
CD (P = 0.05)	**0.17**	**0.16**	**0.16**	**0.12**	**0.13**	**0.13**	**0.19**	**0.15**	**0.16**	**0.18**	**0.16**	**0.18**	**0.17**	**0.16**	**0.16**	**0.12**	**0.13**	**0.13**			
Interaction																					
T_1	7.75	7.51	7.63	7.43	7.17	7.30	7.08	6.80	6.94	6.69	6.39	6.54	6.31	5.97	6.14	5.89	5.53	5.71	1.86	1.98	1.92
T_2	9.07	8.79	8.93	8.79	8.49	8.64	8.48	8.17	8.32	8.14	7.81	7.98	7.80	7.44	7.62	7.44	7.06	7.25	1.63	1.73	1.68
T_3	7.98	7.74	7.86	7.74	7.48	7.61	7.48	7.20	7.34	7.19	6.89	7.04	6.90	6.58	6.74	6.59	6.25	6.42	1.39	1.49	1.44
T_4	7.93	7.69	7.81	7.67	7.41	7.54	7.38	7.11	7.25	7.07	6.77	6.92	6.76	6.44	6.60	6.42	6.08	6.25	1.51	1.61	1.56
T_5	9.54	9.25	9.40	9.41	9.11	9.26	9.26	8.96	9.11	9.10	8.79	8.94	8.94	8.61	8.78	8.77	8.43	8.60	0.77	0.82	0.80
T_6	8.19	7.94	8.07	8.04	7.78	7.91	7.87	7.60	7.73	7.68	7.40	7.54	7.50	7.20	7.35	7.30	6.99	7.15	0.89	0.95	0.92
T_7	7.89	7.65	7.77	7.67	7.42	7.54	7.43	7.16	7.29	7.16	6.88	7.02	6.90	6.59	6.74	6.61	6.29	6.45	1.28	1.36	1.32
T_8	9.19	8.91	9.05	9.02	8.73	8.88	8.84	8.54	8.69	8.64	8.33	8.48	8.44	8.11	8.27	8.22	7.88	8.05	0.97	1.03	1.00
T_9	8.10	7.86	7.98	7.90	7.64	7.77	7.68	7.41	7.54	7.44	7.15	7.30	7.20	6.89	7.04	6.94	6.62	6.78	1.16	1.24	1.2
SEm ±	**0.07**	**0.08**	**0.07**	**0.06**	**0.05**	**0.06**	**0.10**	**0.11**	**0.10**	**0.09**	**0.08**	**0.09**	**0.07**	**0.08**	**0.07**	**0.06**	**0.05**	**0.06**			
CD (P = 0.05)	**0.20**	**0.23**	**0.21**	**0.18**	**0.16**	**0.17**	**0.28**	**0.32**	**0.30**	**0.27**	**0.25**	**0.26**	**0.20**	**0.23**	**0.21**	**0.18**	**0.16**	**0.17**			

*DAP – Days after processing

Table 5: Changes in Organoleptic Score for Texture/Grittiness of Strawberry Jam during storage.

Organoleptic Score for Grittiness of Strawberry Jam																		Reduction in score during storage		
	0 DAP			30 DAP			60 DAP			90 DAP			120 DAP			150 DAP					
Treatments	**2020**	**2021**	**Pooled Mean**	**2020**	**2021**	**Pooled Mean**	**2020**	**2021**	**Pooled Mean**	**2020**	**2021**	**Pooled Mean**	**2020**	**2021**	**Pooled Mean**	**2020**	**2021**	**Pooled Mean**	**2020**	**2021**	**Pooled**
Pulp (%)																				
P_1 : 45% Pulp	7.97	7.65	7.81	7.65	7.31	7.48	7.30	6.93	7.11	6.91	6.52	6.72	6.52	6.10	6.31	6.11	5.66	5.89	1.86	1.99	1.92
P_2 : 50% Pulp	8.25	7.92	8.08	8.04	7.69	7.87	7.81	7.45	7.63	7.56	7.18	7.37	7.31	6.91	7.11	7.04	6.62	6.83	1.21	1.3	1.25
P_3 : 55% Pulp	8.09	7.77	7.93	7.87	7.53	7.70	7.62	7.26	7.44	7.35	6.98	7.17	7.08	6.69	6.88	6.79	6.38	6.59	1.3	1.39	1.34
SEm ±	**0.02**	**0.02**	**0.02**	**0.01**	**0.02**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.02**	**0.02**	**0.01**	**0.02**	**0.01**			
CD (P = 0.05)	**0.07**	**0.06**	**0.07**	**0.03**	**0.05**	**0.04**	**0.03**	**0.03**	**0.03**	**0.03**	**0.02**	**0.02**	**0.07**	**0.06**	**0.07**	**0.03**	**0.05**	**0.04**			
TSS (%)																				
TSS_1 : 60% TSS	7.57	7.27	7.42	7.27	6.94	7.11	6.93	6.58	6.76	6.57	6.19	6.38	6.20	5.80	6.00	5.80	5.38	5.59	1.77	1.89	1.83
TSS_2 : 65% TSS	8.93	8.57	8.75	8.71	8.34	8.52	8.47	8.08	8.27	8.20	7.80	8.00	7.93	7.51	7.72	7.65	7.20	7.43	1.28	1.37	1.32
TSS_3 : 70% TSS	7.80	7.49	7.64	7.57	7.24	7.41	7.32	6.98	7.15	7.05	6.69	6.87	6.78	6.39	6.59	6.49	6.08	6.28	1.31	1.41	1.36
SEm ±	**0.03**	**0.02**	**0.03**	**0.02**	**0.02**	**0.02**	**0.01**	**0.02**	**0.02**	**0.02**	**0.01**	**0.01**	**0.03**	**0.02**	**0.03**	**0.02**	**0.02**	**0.02**			
CD (P = 0.05)	**0.09**	**0.07**	**0.08**	**0.06**	**0.05**	**0.06**	**0.04**	**0.07**	**0.06**	**0.05**	**0.03**	**0.04**	**0.09**	**0.07**	**0.08**	**0.06**	**0.05**	**0.06**			
Interaction																				
T_1	7.47	7.17	7.32	7.10	6.78	6.94	6.70	6.35	6.53	6.26	5.88	6.07	5.82	5.40	5.61	5.35	4.90	5.12	2.12	2.27	2.20
T_2	8.74	8.39	8.56	8.42	8.05	8.23	8.07	7.67	7.87	7.69	7.26	7.47	7.30	6.84	7.07	6.88	6.40	6.64	1.86	1.99	1.92
T_3	7.69	7.38	7.54	7.42	7.09	7.25	7.12	6.77	6.94	6.79	6.42	6.60	6.45	6.06	6.26	6.10	5.68	5.89	1.59	1.7	1.65
T_4	7.64	7.34	7.49	7.35	7.02	7.18	7.02	6.67	6.85	6.66	6.29	6.48	6.30	5.90	6.10	5.92	5.49	5.71	1.72	1.85	1.78
T_5	9.20	8.83	9.01	9.05	8.67	8.86	8.88	8.49	8.68	8.70	8.29	8.49	8.51	8.09	8.30	8.31	7.88	8.10	0.89	0.95	0.91
T_6	7.89	7.58	7.74	7.72	7.39	7.56	7.53	7.19	7.36	7.32	6.96	7.14	7.10	6.73	6.92	6.88	6.49	6.68	1.01	1.09	1.06
T_7	7.60	7.30	7.45	7.35	7.03	7.19	7.08	6.73	6.91	6.77	6.41	6.59	6.47	6.08	6.28	6.14	5.74	5.94	1.46	1.56	1.51
T_8	8.86	8.50	8.68	8.67	8.30	8.48	8.46	8.08	8.27	8.23	7.83	8.03	8.00	7.58	7.79	7.75	7.32	7.54	1.11	1.18	1.14
T_9	7.81	7.50	7.65	7.58	7.25	7.41	7.33	6.98	7.16	7.05	6.69	6.87	6.78	6.39	6.58	6.48	6.08	6.28	1.33	1.42	1.37
SEm ±	**0.04**	**0.03**	**0.04**	**0.03**	**0.03**	**0.03**	**0.02**	**0.03**	**0.03**	**0.02**	**0.02**	**0.02**	**0.04**	**0.03**	**0.04**	**0.03**	**0.03**	**0.03**			
CD (P = 0.05)	**0.11**	**0.08**	**0.12**	**0.10**	**0.09**	**0.09**	**0.05**	**0.08**	**0.07**	**0.05**	**0.04**	**0.05**	**0.11**	**0.08**	**0.12**	**0.10**	**0.09**	**0.09**			

*DAP – Days after processing

Table 6: Changes in Organoleptic Score for Overall Acceptability of Strawberry Jam during storage.

Treatments	Organoleptic Score for Overall Acceptability of Strawberry Jam																		Reduction in score during storage		
	0 DAP			30 DAP			60 DAP			90 DAP			120 DAP			150 DAP					
	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled Mean	2020	2021	Pooled
Pulp (%)																					
P_1 : 45% Pulp	8.04	7.85	7.94	7.65	7.46	7.55	7.22	7.03	7.12	6.75	6.56	6.66	6.28	6.08	6.18	5.77	5.58	5.68	2.27	2.27	2.26
P_2 : 50% Pulp	8.32	8.12	8.22	8.07	7.87	7.97	7.79	7.59	7.69	7.48	7.28	7.38	7.17	6.98	7.07	6.85	6.65	6.75	1.47	1.47	1.47
P_3 : 55% Pulp	8.16	7.97	8.07	7.89	7.70	7.79	7.59	7.40	7.49	7.26	7.07	7.17	6.93	6.74	6.83	6.58	6.39	6.48	1.58	1.58	1.59
SEm ±	**0.01**	**0.01**	**0.01**	**0.01**	**0.03**	**0.02**	**0.01**	**0.02**	**0.01**	**0.02**	**0.01**	**0.02**	**0.01**	**0.01**	**0.01**	**0.01**	**0.03**	**0.02**			
CD (P = 0.05)	**0.03**	**0.02**	**0.03**	**0.03**	**0.08**	**0.06**	**0.02**	**0.05**	**0.03**	**0.06**	**0.03**	**0.05**	**0.03**	**0.02**	**0.03**	**0.03**	**0.08**	**0.06**			
TSS (%)																					
TSS_1 : 60% TSS	7.64	7.46	7.55	7.27	7.09	7.18	6.86	6.68	6.77	6.41	6.23	6.32	5.96	5.78	5.87	5.48	5.30	5.39	2.16	2.16	2.16
TSS_2 : 65% TSS	9.01	8.80	8.91	8.75	8.53	8.64	8.45	8.23	8.34	8.12	7.91	8.02	7.80	7.58	7.69	7.45	7.23	7.34	1.56	1.57	1.57
TSS_3 : 70% TSS	7.87	7.68	7.78	7.59	7.41	7.50	7.29	7.10	7.20	6.96	6.77	6.87	6.62	6.44	6.53	6.27	6.08	6.17	1.6	1.6	1.61
SEm ±	**0.01**	**0.01**	**0.01**	**0.02**	**0.01**	**0.02**	**0.02**	**0.01**	**0.02**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.01**	**0.02**			
CD (P = 0.05)	**0.04**	**0.03**	**0.03**	**0.05**	**0.04**	**0.05**	**0.05**	**0.03**	**0.06**	**0.03**	**0.04**	**0.03**	**0.04**	**0.03**	**0.03**	**0.05**	**0.04**	**0.05**			
Interaction																					
T_1	7.54	7.36	7.45	7.09	6.91	7.00	6.60	6.42	6.51	6.07	5.89	5.98	5.52	5.34	5.43	4.95	4.77	4.86	2.59	2.59	2.59
T_2	8.82	8.61	8.72	8.43	8.22	8.32	8.00	7.79	7.90	7.53	7.32	7.43	7.06	6.85	6.95	6.55	6.34	6.45	2.27	2.27	2.27
T_3	7.76	7.58	7.67	7.43	7.24	7.34	7.06	6.87	6.97	6.66	6.47	6.57	6.25	6.07	6.16	5.82	5.63	5.73	1.94	1.95	1.94
T_4	7.71	7.53	7.62	7.35	7.17	7.26	6.95	6.77	6.86	6.52	6.33	6.43	6.08	5.89	5.98	5.61	5.42	5.52	2.1	2.11	2.10
T_5	9.28	9.06	9.17	9.10	8.88	8.99	8.89	8.67	8.78	8.67	8.45	8.56	8.44	8.22	8.33	8.20	7.98	8.09	1.08	1.08	1.08
T_6	7.97	7.78	7.87	7.75	7.56	7.66	7.52	7.33	7.42	7.26	7.07	7.17	7.00	6.81	6.91	6.73	6.54	6.63	1.24	1.24	1.24
T_7	7.67	7.49	7.58	7.37	7.18	7.28	7.03	6.85	6.94	6.66	6.48	6.57	6.29	6.10	6.20	5.89	5.71	5.80	1.78	1.78	1.78
T_8	8.94	8.73	8.83	8.71	8.49	8.60	8.45	8.24	8.34	8.17	7.96	8.07	7.89	7.68	7.78	7.59	7.38	7.48	1.35	1.35	1.35
T_9	7.88	7.69	7.79	7.60	7.41	7.51	7.29	7.11	7.20	6.96	6.77	6.87	6.62	6.43	6.53	6.26	6.07	6.17	1.62	1.62	1.62
SEm ±	**0.02**	**0.02**	**0.02**	**0.02**	**0.03**	**0.02**	**0.02**	**0.03**	**0.03**	**0.03**	**0.02**	**0.03**	**0.02**	**0.02**	**0.02**	**0.02**	**0.03**	**0.02**			
CD (P = 0.05)	**0.06**	**0.04**	**0.05**	**0.05**	**0.07**	**0.06**	**0.06**	**0.08**	**0.09**	**0.09**	**0.06**	**0.09**	**0.06**	**0.04**	**0.05**	**0.05**	**0.07**	**0.06**			

*DAP – Days after processing