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Study on the Development of Avocado (*Persea Americana*) Stirred Yoghurt

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Abstract

This study was aimed in the month and year on December, 2021 to develop avocado (*Persea Americana*) pulp incorporated stirred yoghurt and determine the sensorial properties. Fresh cow milk was procured from the Dairy farm. Cow milk was standardized up to 3% fat level and pasteurized at 85°C/30 min. Then the milk was cooled and starter cultures inoculate at 45°C (2% addition per kg milk) and incubate for about 4 hrs until acidity 0.7–0.8% lactic acid for the preparation of yoghurt. Fresh ripened avocado were purchased from local market. The ripen flesh was extracted, well blended until turn in to a smooth cream and pasteurized. The avocado pulp and yoghurt were blended properly. Avocado stirred yoghurt was prepared using different inclusion rates; 0%, 5%, 10% and 15% of avocado pulp, 18% sugar syrup of 50% concentration and compared with control. Sensory attributes such as Colour and Appearance, Body and Texture, Flavour and Overall acceptability were analyzed by using hedonic scale in all samples. All samples were evaluated by trained and untrained judges. 10% avocado pulp collusion rate was preferred significantly. The sensory scores of overall acceptability of control (0% avocado pulp), 5%, 10% and 15% avocado stirred yoghurt are 6.64, 6.72, 7.68 and 7.42 respectively. This study revealed that 10% inclusion of avocado pulp in stirred yoghurt make consumer preferred dairy product which can be improved in future studies.

Keywords: Avocado, sensory analysis, stirred yoghurt, yoghurt

1. Introduction

Yoghurt represents the most popular fermented milk product worldwide. Yoghurt originates from countries around the Balkan and the Eastern Mediterranean sea (Walstra et al., 1999). According to the Code of Federal Regulations of the United States Food & Drug Administration (FDA), yogurt can be defined as a food produced by culturing one or more of the optional dairy ingredients namely, cream, milk, partially skimmed milk, and skim milk, used alone or in combination with a characteristic bacterial culture that contains lactic acid producing bacteria, Lactobacillus bulgaricus and Streptococcus thermophilus [3].Yogurt should contain at least 3.25% of milk fat and 8.25% of Milk Solids Non Fat (MSNF) with a titratable acidity of not less than 0.9 percent, expressed as lactic acid (FDA. 2013a)

Yoghurt is a nutritiously balanced food containing almost all the nutrients present in milk but in a more assailable form (Joseph and Joy, 2011). It is easily digested, has high nutritional value and is a rich source of carbohydrates, protein, fat, vitamins, calcium and phosphorus (El-Batawy et al., 2013). There are main two types of yoghurt in the market; set yoghurt and stirred yoghurt. Yoghurt drinks are categorized under stirred yoghurt. It contains low viscosity which obtains by high agitation after formation of fermented coagulum (Allgeyer et al., 2010). The Food and Drug Administration standard of identity for yoghurt drinks specifies >8.25% milk solids-not-fat and fat levels to satisfy nonfat yoghurt (<0.5%), low-fat yogurt (2%), or yogurt (>3.25%) before the addition of other ingredients (Chandan, et al., 2006).

Yoghurt drinks are generally flavored with natural or artificial fruit puree or juices and consumer preference vary from country to country. Fruit flavors which have been used in yoghurt drinks are strawberry, raspberry, carrot, apple concentrates, pineapple, lemon or orange concentrates or essences (Tamime and Robinson, 1999). Fruit additions have an increasing effect on yoghurt consumption (Erdogan and Zekai, 2003).

The name “avocado” also refers to the fruit of the tree, which is characterized by an oval or pear-shape, with a rough or leathery skin, and a large seed, it is sometimes known as the avocado pear or alligator pear. It is a highly caloric fruit rich in vitamins, minerals, folates, potassium, and fiber, with a unique lipid composition (Slater et al., 1975). Avocado has the highest level of β-sitosterol, which has been shown in clinical trials to reduce blood levels of low density cholesterol by blocking cholesterol absorption in the intestine (Heinemann et al., 1993). Fresh avocado is rich in moisture and fat is the second important constituent of the fruit so, avocado pulp is sensitive

to oxidative process during postharvest storage resulting in rancidity and subsequent production of undesirable flavors and reduction in quality (Shrestha, 2019). Avocado is rich in bioactive compounds as vitamin E and one to two times of protein than other fruits (Manal and Sahar, 2013).

The yoghurt with fruit juice/pulp combinations seems to hold good promises in the manufacture of value added nutritious beverages. Such beverages have been found to be highly acceptable as refreshing drink (Khedkar et al., 2015). Preparation and Quality Evaluation of Avocado (Persea Americana) Pulp Incorporated Yoghurt. The sensory evaluation revealed that the product containing 5% avocado pulp and 95% milk by volume was found to be best as per the score given by panelist (Dangal et al., 2021).

Today consumers are concerned about health and nutrition within food products at the reasonable price. When it comes to quenching a consumer's thirsty for healthy yoghurt drinks, natural products are more concerned. Thus keeping a view, this study was planned to determine the best avocado incorporation rate in stirred yoghurt and the optimizing the organoleptic characteristics of product.

2. Materials and Methods

2.1. Description of the study area

Product development was carried out at Department of Dairy Processing Technology laboratory, Holeta satellite campus, Ethiopian Technical University (ETU) in December, 2021. Holeta town is located 33 km west of Addis Ababa, on the way to Ambo town in Oromia Regional State. The elevation is around 2500 masl with minimum and maximum temperature of 5°C and 28°C respectively. The area receives an average rainfall of 1,085 mm per annum. The major crops in the farming system around Holeta town are barley, wheat and teff (Tadele and Paul Mansingh, 2015).

2.2. Preparation of stirred yoghurt

Fresh cow milk was procured from the dairy farm at Holeta. Cow milk was standardized up to 3% fat level and pasteurized at 85°C/30 min. Then the milk was cooled and starter cultures inoculate at 45°C (2% addition per kg milk) and incubate for about 4 hrs until Acidity 0.7–0.8 % lactic acid. Result yoghurt was stirred, packed and refrigerated at <4°C (Figure 1).

Figure 1: Ingredients for the prepartion of avocado stirred yoghurt

2.2.1. Flow diagram of preparation of stirred yoghurt

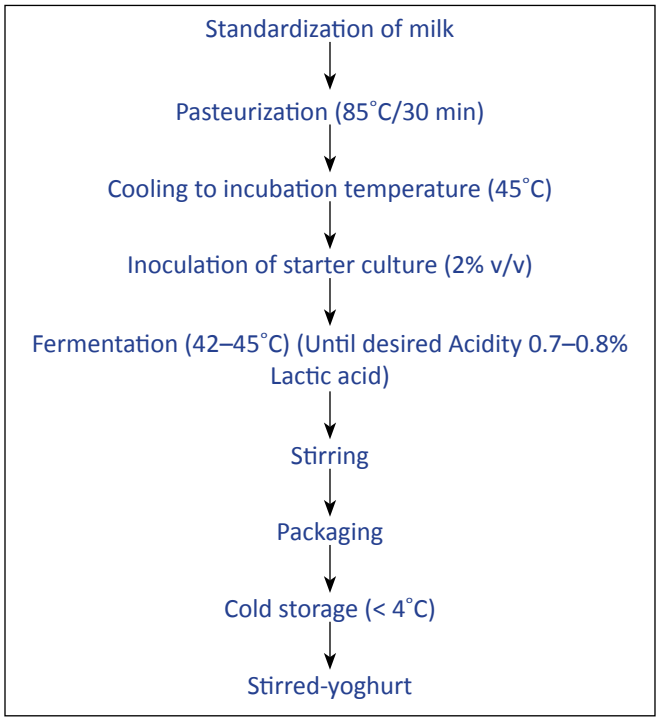

Figure 2: Preparation of stirred yoghurt (Lee and Lucey, 2010)

2.3. Preparation of avocado stirred yoghurt

Fresh cow milk was procured from the dairy farm at Holeta. Cow milk was standardized up to 3% fat level and pasteurized at 85°C/30 min. Then the milk was cooled and starter cultures inoculate at 45°C (2% addition per kg milk) and incubate for about 4 hrs until Acidity 0.7–0.8 % lactic Acid. Result yoghurt is refrigerated at 4°C. Fresh ripened avocado are purchased from local market, Holeta. The ripen flesh is extracted, well blended until turn in to a smooth cream and pasteurized. The avocado pulp and yoghurt were blended properly. Avocado stirred yoghurt was prepared using different inclusion rates; 0%, 5%, 10% and 15% of avocado pulp, 18% sugar syrup of 50% concentration. Product is packed properly and stored at refrigerated conditions. Several trials are conducted by using set yoghurt, sugar syrup and avocado pulp with different levels

Table 1: Formulation of Avocado stirred yoghurt

Treatments	Formulation
T_1: Control (0% Avocado pulp)	700 g of stirred yoghurt+126 g of Sugar syrup
T_2: 5% Avocado pulp	700 g of stirred yoghurt+126 g of Sugar syrup+35 g of Avocado pulp
T_3: 10% Avocado pulp	700 g of stirred yoghurt+126 g of Sugar syrup+70 gm of Avocado pulp
T_4: 15% Avocado pulp	700 g of stirred yoghurt+126 g of Sugar syrup+105 g of avocado pulp

2.3.1. Flow diagram of Preparation of Avocado stirred yoghurt

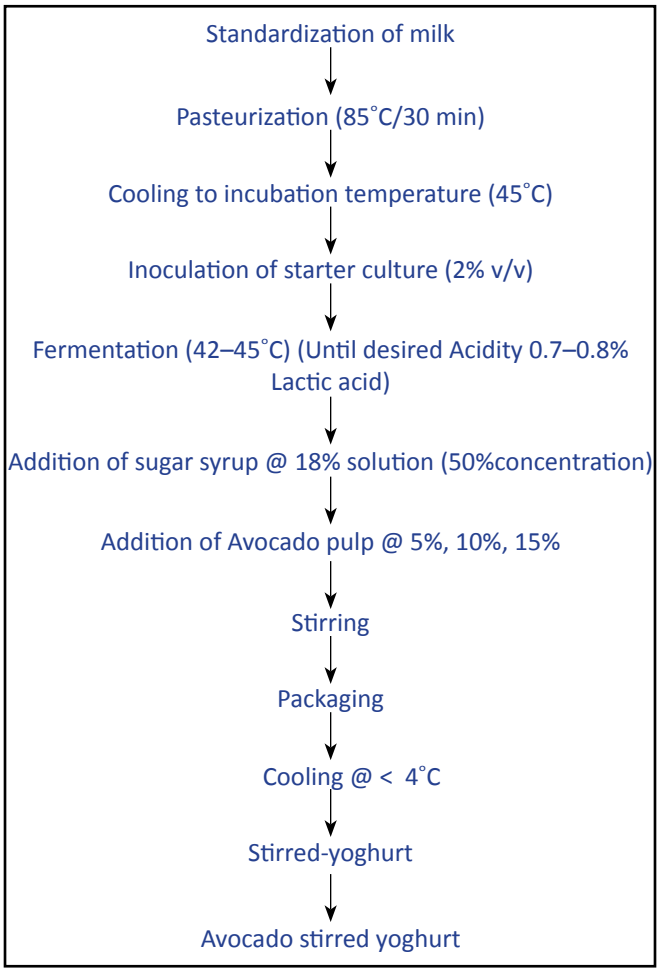

Figure 3: Preparation of avocado stirred yoghurt

2.4. Sensory analysis

Sensory evaluation of stirred yoghurt samples were carried out by a trained panel of ten judges and untrained panel of ten judges of the institute by using 9- point hedonic scale (Ranganna, 2007). Colour and appearance, flavor, body and texture and overall acceptability sensory parameters were included for study.

2.5. Statistical analysis

The data obtained during different phases of this study was analyzed using Randomized Block Design. The experiment was designed and responses were analyzed using software Design Expert Version 8.0.10.

3. Results and Discussion

3.1. Sensory Evalution of Avocado stirred yoghurt development

Avocado stirred yoghurt with different inclusion rates; 0%, 5%, 10% and 15% of avocado pulp, 18% sugar syrup of 50% concentration and compared with control. Sensory attributes such as Colour and Appearance, Body and Texture, Flavour and Overall acceptability were analyzed by a trained panel of ten judges and untrained panel of ten judges of the institute using 9- point hedonic scale.

Figure 4: Sensorly analysis

3.1.1. Colour and appearance

It is revealed from Table 2 that, the highest mean score for colour and appearance in avocado stirred yoghurt (8.2) was obtained from T_3 followed the treatment by T_4 (7.8), T2 (7.0). The minimum score (5.8) was obtained in T_1. There were significant differences found among the treatments. F Value was 8.72, indicating significant effect of treatment on colour and appearance.

3.1.2. Flavour

It is revealed from Table 2 that, the highest mean score for flavour in avocado stirred yoghurt (8.2) was obtained from the treatment T_3 followed by T_4 (6.8), T_2 (6.6). The score (6.2) was obtained in T_1. There were significant differences found among the treatments. F Value was 3.53, indicating significant effect of treatment on flavour.

Table 2: Sensory evalution of avocado stirred yoghurt

Attributes	Scores/ values based on mean value of different parameters of treatments					
	T_1	T_2	T_3	T_4	F value	CD
Color & appearance	5.8	7.0	8.2	7.8	8.72*	1.10
Flavor	6.2	6.6	8.2	6.8	3.53*	1.56
Body and texture	6.2	6.4	8.4	6.6	3.58*	1.81
Overall acceptability	6.64	6.72	7.68	7.42	3.50*	0.94

3.1.3. Body and texture

It is revealed from Table 2 that, the highest mean score for body and texture in avocado stirred yoghurt (8.4) was obtained from the treatment T_3 followed by T_4 (6.6), T2 (6.4). The minimum score (6.2) was obtained in T_1. There were significant differences found among the treatments. F Value was 3.58, indicating significant effect of treatment on body and texture.

3.1.4. Overall acceptability

It is revealed from Table 2 that, the highest mean score for overall acceptability in Avocado stirred yoghurt (7.68) was

obtained for the treatment T_3 followed by T_4 (7.42), T2 (6.72). The minimum score (6.64) was obtained in T1. There were significant differences found among the treatments. F Value was 3.50, indicating significant effect of treatment on overall acceptability. Dangal et al., 2021 reported that, the sensory evaluation of yoghurt containing 5% avocado pulp and 95% milk by volume was found to be best as per the score given by panelist.

4. Conclusion

Avocado addition in stirred yoghurt was effected for higher consumer acceptability than plain drinking yoghurt. Additionally avocado stirred yoghurt was more nutritional and therapeutic values than a plain set yoghurt. 10% of avocado addition in stirred yoghurt was resulted with good sensory quality attributes for consumers. Thus keeping a view of acceptability of the new product, more researches need to be conducted on its physico-chemical, microbiological properties and shelf life.

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