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Studies on flavour coating in cashew kernel

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Abstract

The experiment, was carried out in completely randomized design (CRD) with ten treatments of flavour coatings, C₁ (Chat masala), C₂ (Black pepper), C₃ (Spicy), C₄ (Salt), C₅ (Honey), C₆ (Chilli oleoresin), C₇ (Fruit juice), C₈ (Chocolate), C₉ (Cheese), C₁₀ (Control) and 3 replications. Flavour coated cashew kernels were prepared and physical parameters, chemical composition, sensory evaluation and microbial count was studied. In case of initial weight, the known quantity (100 g) of cashew kernels were taken before starting experiment. In case of weight of cashew kernels after coating, the maximum weight was recorded by the C₈ (Chocolate). Treatment C₉ (Cheese) was found to be best with respect to chemical parameters. In case of sensory quality treatment C₉ was found to be best followed by C₈ (Chocolate), C₅ (Honey) and C₁ (Chat masala). Among the ten flavour coating treatments, fungal and bacterial growth was not detected. On the basis of sensory evaluation it is concluded that, treatment C₉ (Cheese) was found to be best followed by C₈ (Chocolate), C₅ (Honey) and C₁ (Chat masala).

Keywords: cashew kernels, flavours, coating

Introduction

Cashew is one of the important plantation crop of India belonging to the genus *Anacardium* of the family Anacardiaceae. The cashew tree (*Anacardium occidentale* L.) is cultivated in 32 countries around the world with Brazil, India, Vietnam and Nigeria as the main cultivation countries. (Honorato and Rodrigues, 2010) [10]. It is indigenous to the Brazil and introduced in India by Portuguese in 16th century. In the commence, cashew was mainly considered as a crop for afforestation and soil binding to check soil erosions and has now become one of the major dollar earning crop of India.

Maharashtra, Kerala, Andhra Pradesh, Orissa, Karnataka, Tamil Nadu, Goa and West Bengal are the major cashew nut producing states in India. In India area under cashew is 1125 thousand ha and total production 703 thousand MT (Anonymous, 2019) [7]. India is largest producer of raw cashew nut contributing 20 per cent of total global production. The production and productivity of cashew is highest in Maharashtra. Maharashtra state comprises 191.50 thousand ha area under cashew and production is about 181.10 thousand MT. (Anonymous, 2019) [7]. The average productivity of cashew in the Maharashtra is 1.5 t/ha. Konkan region on west coast of Maharashtra is one of the largest cashew growing belt occupying 1,73,601 ha area under cashew cultivation. The Konkan region of Maharashtra including Thane (10783 ha), Raigad (19088 ha), Ratnagiri (89999 ha) and Sindhudurg (53731 ha) districts is the major territory of cashew cultivation in the state (Haldankar *et al.*, 2007) [9].

Cashew kernel has better medicinal value. It is store house of protein, carbohydrates, fat. The cashew kernel is rich source of protein 21 per cent, fat 47 per cent, carbohydrate 22 per cent, fibre 1.3 per cent and mineral matter 2.4 per cent. Present dietary fibre in cashew kernel helps to lowers serum cholesterol and risk of coronary heart disease. It helps to lowers blood glucose due to the presence of high mono unsaturated fatty acids. It is rich in phosphorus and potassium. It contains selenium which helps in protection against cancer. It is the absolute supplement in the diet of children, pregnant women and lactating mothers. Cashew contains Vitamin E which improves immunity and could function as a naturally occurring antioxidant. Due to the high nutritive value of cashew kernel and its uses in as snacks, food preparation and confectionary, it has got great international demand. At present the value-added products like cashew kernel powder, cashew laddu, cashew chikki, cashew ice cream, cashew burfi, cashew pedha are prepared from cashew kernels. However, till limited research work has been done on flavour coating of cashew kernels. There is great demand for flavour coated cashew kernels in the market. If proper technology for flavour coating of cashew kernel is developed, the processors and farmers will get higher returns.

Material and Methods

The experiment was carried out at Post Harvest Technology Laboratory, College of Horticulture, Dapoli, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, District- Ratnagiri during the year 2020-2021. The experiment was conducted in completely randomized design with ten treatments and three replications. Product was prepared and analysed for different physical, chemical and sensory attributes and also microbial count was taken.

Weight of cashew kernels before and after coating was taken by using physical balance. The moisture content of flavour coated cashew kernel was determined by method described by A.O.A.C. (1975) [1]. The protein (%) and fat (%) was determined by method described in A.O.A.C. (1990) [2]. The Carbohydrate (%) was determined by difference i.e. subtracting from 100 (Ranganna, 1986) [15]. The fibre content was determined by method described in Anonymous, (1977) [6]. Phosphorous was determined by colorimetric method (Jackson, 1973) [11]. Potassium was estimated with the help of flame photometer (Ranganna, 1986) [15]. The magnesium content of flavour coated cashew kernel was determined in the di-acid digest of plant tissues using EDTA titration method by Cheng and Bray (1951) [8]. The sensory qualities in terms of colour, flavour and texture were assessed by panel of 10 judges with 9 point Hedonic scale score (Amerine *et al.*, 1965) [5]. Fungal and bacterial count was taken by using serial dilution and plate technique method.

Result and Discussion

The data regarding weight of cashew kernels before and after coating is presented in Table 1. For conducting experiment, 100 g cashew kernels were taken per treatment per replication and recorded as initial weight. Hence, results were non-significant. The data pertaining to the weight after coating was found to be significant. The maximum weight (185.47 g) was recorded by the C₈ (Chocolate) may be due to the thick coating of chocolate. The minimum weight (100.37 g) was recorded by C₁₀ (control).

The data regarding chemical composition of flavour coated cashew kernels is presented in Table 2. In case of moisture, the results were found to be significant. The maximum (2.67%) moisture percentage was recorded by C₅ (Honey) and C₇ (Fruit juice). The minimum (2%) moisture percentage was recorded by C₁ (Chat masala), C₂ (Black pepper), C₄ (Salt), C₆ (Chilli oleoresin), C₉ (Cheese) and C₁₀ (Control). With respect to protein, the results were found to be significant. The highest (24.38%) protein content recorded by C₉ (Cheese) and it was at par with C₁ (24.03%), C₂ (23.22%), C₃ (23.33%) and C₇ (23.68%). The highest protein content recorded by C₉ (Cheese) may be the impact of cheese coating as cheese powder used for coating contains 25.38 per cent protein. Mohamed *et al.* (2013) [14] recorded maximum (25.38%) protein in cheese. The fat content of flavour coated cashew kernels differs significantly with respect to different treatments of flavour coating. The highest (47.33%) fat content was recorded by C₉ (Cheese) and it was at par with treatments C₂ (44.10%), C₃ (44.40%), C₆ (44.15%), C₈ (47.25%) and C₁₀ (44.08%). The highest fat content recorded by C₉ may be the impact of cheese coating, as cheese powder used for coating contains 34.70 per cent fat. Mohamed *et al.* (2013) [14] recorded maximum (34.70%) fat in cheese. With respect to carbohydrate content, the results were found to be significant. The highest (28.68%) carbohydrate content was recorded by C₈ (Chocolate) and it was at par with C₁

(26.17%), C₂ (26.82%), C₅ (28.23%), C₆ (26.65%) and C₇ (27.93%). The highest carbohydrate content recorded by C₈ might be the effect of chocolate coating. Melo *et al.* (2019) [13] recorded average 46 per cent carbohydrate in different chocolates. In case of fibre content, the results were found to be significant. The maximum (1.72%) fibre content was recorded by C₂ (Black pepper) and it was superior over other treatments. AI-Jasass and AI-Jasser (2012) [4] recorded maximum (23.6%) fibre in black pepper. The phosphorus content of flavour coated cashew kernels differs significantly with respect to different treatments of flavour coating. The highest (0.60%) phosphorus content was recorded by C₃ (Spicy) and it was at par with C₁ (0.59%). The highest phosphorus content recorded by C₃ may be due to extra phosphorus provided by the red chilli powder (spicy) coating. Kosoko *et al.* (2014) [12] recorded 319.12 mg/100 g phosphorus in oven roasted cashew kernel. With respect to potassium content of flavour coated cashew kernels, results were found to be significant. The highest (0.36%) potassium content was recorded by C₇ (Fruit juice) and it was at par with treatments C₁ (0.34%), C₂ (0.34%), C₃ (0.35%), C₆ (0.35%) and C₈ (0.34%). The highest potassium recorded by C₇ (fruit juice) may be due to extra potassium provided by fruit juice coating. Abubakar *et al.* (2018) [3] recorded 25.60 mg/100 g potassium in roasted cashew kernels. In case of magnesium content of flavour coated cashew kernels, results were found to be significant. The maximum (0.33%) magnesium percentage was recorded by C₂ (Black pepper) and it was at par with C₁ (0.30%), C₃ (0.27%), C₄ (0.29%), C₅ (0.29%), C₆ (0.32%) and C₇ (0.30%). The maximum magnesium recorded by the C₂ (Black pepper) may be the impact of extra magnesium provided by the coating as the black pepper powder used for coating contains 52 mg/100 g magnesium. AI-Jasass and AI-Jasser (2012) [4] recorded maximum (52 mg/100g) magnesium in black pepper.

The data regarding the sensory evaluation of flavour coated cashew kernels is presented in Table 3. With respect to colour score of flavour coated cashew kernels, the results were found to be significant. The highest (8.07) colour score recorded by C₉ (Cheese) and it was at par with C₃ (7.39), C₄ (7.31), C₅ (7.35), C₆ (7.69), C₈ (7.71) and C₁₀ (7.34). The highest colour score recorded by C₉ (Cheese) may be due to attractive colour provided by coating material. In case of flavour score of flavour coated cashew kernels, the results were found to be significant. The maximum (8.09) flavour score was recorded by C₈ (Chocolate) and it was at par with C₁ (7.76), C₅ (7.72) and C₉ (7.98). The chocolate flavour is liked by most of the people. Hence, in present study maximum flavour score was recorded by chocolate coating. With respect to texture score of flavour coated cashew kernels, the results were found to be significant. The highest (7.93) texture score was recorded by C₉ (Cheese) and it was at par with C₁ (7.53), C₅ (7.59) and C₈ (7.76). The cheese coating provided crispy texture to the cashew kernels and hence maximum score for texture was obtained. The overall acceptability score of flavour coated cashew kernels differs significantly with respect to different treatments of flavour coating. The highest (7.99) overall acceptability score was recorded by C₉ (Cheese) and it was at par with C₅ (7.55), C₈ (7.85) and significantly superior over others. The highest overall acceptability score recorded by C₉ may be the combined effect of colour, flavour and texture. Fungal and bacterial growth in flavour coated cashew kernel was not detected.

Conclusion

From experiment it can be concluded that treatment C₉ (Cheese) was found to be best followed by C₈ (Chocolate), C₅

(Honey) and C₁ (Chat masala) on the basis of sensory evaluation.

Table 1: Weight of cashew kernels (g) before and after coating

Coating treatments	Initial Weight (g) (Before Coating)	Weight after coating (g) (After Drying)
C ₁ : Chat masala	100.50	104.47
C ₂ : Black pepper	100.67	104.20
C ₃ : Spicy	100.67	103.93
C ₄ : Salt	100.50	102.53
C ₅ : Honey	100.60	110.77
C ₆ : Chilli oleoresin	100.33	102.20
C ₇ : Fruit juice	100.43	107.73
C ₈ : Chocolate	100.53	185.47
C ₉ : Cheese	100.83	107.23
C ₁₀ : Control	100.37	100.37
Mean	100.54	112.89
SE±	0.247	0.681
CD at 1%	NS	2.739

Table 2: Chemical composition of flavour coated cashew kernels

Coating treatments	Moisture (%)	Protein (%)	Fat (%)	Carbohydrate (%)	Fibre (%)	Phosphorus (%)	Potassium (%)	Magnesium (%)
C ₁ : Chat masala	2.00	24.03	43.37	26.17	1.37	0.59	0.34	0.30
C ₂ : Black pepper	2.00	23.22	44.10	26.82	1.72	0.56	0.34	0.33
C ₃ : Spicy	2.64	23.33	44.40	25.37	1.38	0.60	0.35	0.27
C ₄ : Salt	2.00	21.12	43.20	25.85	1.27	0.56	0.31	0.29
C ₅ : Honey	2.67	22.28	43.28	28.23	1.30	0.47	0.31	0.29
C ₆ : Chilli oleoresin	2.00	21.00	44.15	26.65	1.30	0.53	0.35	0.32
C ₇ : Fruit juice	2.67	23.68	41.12	27.93	1.30	0.50	0.36	0.30
C ₈ : Chocolate	2.33	21.12	47.25	28.68	1.35	0.44	0.34	0.25
C ₉ : Cheese	2.00	24.38	47.33	23.98	1.13	0.51	0.31	0.25
C ₁₀ : Control	2.00	21.12	44.08	25.95	1.30	0.55	0.31	0.25
Mean	2.23	22.53	44.23	26.56	1.34	0.53	0.33	0.29
SE±	0.018	0.511	0.982	0.677	0.027	0.008	0.007	0.014
CD at 1%	0.072	2.057	3.953	2.725	0.110	0.032	0.027	0.056

Table 3: Sensory evaluation of flavour coated cashew kernels

Coating treatments	Colour	Flavour	Texture	Overall acceptability
C ₁ : Chat masala	7.05	7.76	7.53	7.45
C ₂ : Black pepper	6.76	7.16	7.27	7.06
C ₃ : Spicy	7.39	7.37	7.47	7.41
C ₄ : Salt	7.31	7.18	7.38	7.29
C ₅ : Honey	7.35	7.72	7.59	7.55
C ₆ : Chilli oleoresin	7.69	6.98	7.40	7.36
C ₇ : Fruit juice	7.11	7.03	7.28	7.14
C ₈ : Chocolate	7.71	8.09	7.76	7.85
C ₉ : Cheese	8.07	7.98	7.93	7.99
C ₁₀ : Control	7.34	7.12	7.34	7.27
Mean	7.38	7.44	7.49	7.44
SE±	0.200	0.138	0.113	0.127
CD at 1%	0.804	0.555	0.455	0.509

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