



Organoleptic Properties and Proximate Analysis of Soybeans Cheese Coagulated with Pawpaw Leaf Juice and Alum

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Abstract

The study was carried out at the Animal Health and Production Department, Oyo State College of Agriculture and Technology, Igboora, Oyo state. Pawpaw leave juice and alum were used as coagulants for Soybeans cheese. The experimental design was complete randomized design (CRD) and Duncan multiple range test was used to determine significant differences between the mean at ($P < 0.05$). The organoleptic properties results revealed that most parameters were not significantly ($p > 0.05$) different. The highest colour was recorded in T1 (8.00). The texture of the Soya beans cheese revealed that the T3 had the highest value in texture and is significant ($P < 0.05$) different from other treatments. The result from the proximate analysis revealed that the percentage of the ash content, ether extract and crude fibre were significantly different ($p < 0.05$) across all the treatments as well as the crude protein of T1, T2 and T3 with 14.37, 15.20 and 17.64 and carbohydrates with 7.42, 5.60 and 6.19 respectively. It could be concluded that the use of alum is good for coagulating soybeans cheese.

Keyword: Soybeans cheese, Coagulated, Pawpaw leave juice and Alum.

Introduction

Soybeans have been reported to be an ideal grain for meeting protein requirement for both man and animal. It is a source of good fat (unsaturated) unlike saturated fat from animal origin hence, good for heart health (Iwe, 2003; Samuel and George, 2009). It is also a cheap source of quality protein that balance the essential amino acid profile of cereal flour and it has a close protein content and amino acid (Belewu and Belewu, 2007). It is regarded as one of the best vegetarian food items as far protein is concerned. Soybeans contain 40% protein, 30% carbohydrate, 20% lipid and 10% mineral (Iwe, 2003; Samuel and George, 2009). Warankasi is a soft, white, unriened cheese that originated from Fulani cattle rearers in the northern part of the country. Warankasi is traditionally made from cow's milk and it a West African soft cheese regarded as meat analogue consumed in several parts of West African. It is often referred to as poor man's cheese and also known as 'tofu'beske' or 'wara' in Nigerian. To make or produce a good Warankasi, the milk clotting properties are of much importance with regards to both yield and organoleptic quality of the cheese produced. The shelf life, protein content, quality and quality of cheese produced is also a subject of coagulant used (Awolola *et al.*, 2010). The common coagulants used for Warankasi processing include the leaves and steam extract of pawpaw (*Carica papaya*), alum, lemon juice extract. Papain and

chymopapain, aluminium hydroxide and pectin are responsible for coagulation in pawpaw leaf juice, alum and lemon jice respectively. This study therefore sought to investigate the potential of pawpaw leave and alum extract as a coagulant for soya bean on it's organoleptic properties and proximate composition.

Materials and methods

Experimental site

The experiment was carried out at the Animal Health and Production Technology of the Oyo State College of Agriculture and Technology, Igboora. The area is located on latitude 7°26'12.57"N and longitude 3°17'18.77"E, at altitude of 1400m above the sea level. It has an average annual rainfall of 1,278mm with average annual temperature of 27°C to 32°C.

Experimental design

The experimental design was complete randomized design (CRD), T1 is cheese coagulated with Sodom apple, T2 is cheese coagulated with pawpaw leaves juice extract and T3 is cheese coagulated with alum.

Preparation of pawpaw leaf extract and Alum solution

30ml of pawpaw leaves extract was obtained by crushing fresh mature 100g leaves using a mortar and pestle. The crushed leaves were soaked in warm water for 10minutes and sieved



through muslin cloth to obtain the extract. 20g of alum was broken into small size and then dissolved in a 100ml of water.

Preparation of soya milk

Soybean seeds were washed, soaked in water for 6hrs. The soybeans were deshelled by rubbing between palms and the hulls was drained away in excess water by the process of water floatation. Water was added to the deshelled soybeans and blended in a blender until it become smooth. The slurry was drained using a muslin cloth.

Processing of cheese

The juice produced from soya seed was divided into two parts, heated in different pot, placed on two different charcoal pots. Alum water was added to one pot and pawpaw leave extract was added to the other pot. Heating was done for 20mins, coagulation of the first part was achieved in 7min and the second part was achieved in 25min. The curd so formed was poured into a muslin cloth, wrapped and pressed for 40min to drain away the whey. The curds were moulded into fine shapes.

Organoleptic evaluation

The product was assessed for aroma, taste, colour, flavour, texture and general acceptability on a nine-point hedonic scale and the attribute mean score was calculated.

Proximate analysis

The proximate analysis consists of the analytical determinations of the moisture content, ash, crude fibre, crude protein, ether extract and carbohydrate.

Results

Proximate analysis of cheese produced from cheese coagulated with pawpaw leaves juice and alum

Table 1 showed that proximate analysis of cheese prepared from soybeans cheese coagulated with pawpaw leaves extract and alum. Treatment 3 (Alum) had the highest value of Ash (3.35%) with treatment T1 had the lowest value (1.94%). Highest value of 17.64, 21.69, and 45.66 were recorded in T3 for crude protein, ether extract, and moisture content, respectively. T2 had the highest value of 13.55 and T1 had the highest value of 8.17 for crude fibre and carbohydrate respectively.

Organoleptic properties of soybeans cheese coagulated with pawpaw leaf extract and alum

Table 2 showed the organoleptic properties of cheese produced from soybeans cheese coagulated with pawpaw leave extract and alum. T1 had the highest value (8.00) for colour and T2 had the lowest value (2.00). The juiciness of T1 and T3 were the same (6.00) while T2 was (1.00), however, T3 had the highest value of (8.00) and T2 had the lowest value (3.00) for tenderness T1 had the highest value of (7.00) and T2 had the lowest value (3.00) for flavour T3 had the highest value of (7.00) and T2 had the lowest value (5.00) for texture. The overall acceptability of T1 was the highest (6.00).

Discussion

For the fact that there were no significant differences ($p > 0.05$) in the parameters taken, the various coagulants under consideration may not differ substantially in their coagulating abilities (Oboh and Omotosho, 2005). Any slight difference could arise from extraneous substances introduced by the coagulants. There was significant difference ($p < 0.05$) in ash contents of all the treatments with 1.94, 2.74, 3.35 for T1, T2 and T3 respectively. There was no significant difference ($p > 0.05$) in the crude fibre and crude protein of all the treatment. There were significant difference ($p < 0.05$) in ether extract of all the treatments. The moisture content of T1(37.46) and T3(45.66) were significantly different ($p < 0.05$) from each other. This result is consistent with the findings of Agboola *et al.*, (2020) and James *et al.*, (2016), who reported significant differences in the moisture content of cheeses made from cow milk, soy milk and coco nut milk using different coagulants. Carbohydrate of T1(8.17) and T2(6.19) were also significantly different ($p < 0.05$) from each other. For organoleptic properties there were significant differences ($p < 0.05$) in all the parameters taken with T1 having the highest values of 8.00, 7.00, 6.00, 6.33 and 6.00 for colour, flavour, juiciness, texture and overall acceptability respectively.

Conclusion and Recommendation

The study revealed that alum can be used in coagulating cheese on a commercial scale as it has appreciable amount of Crude protein, ash, carbohydrate, ether extract and moisture content.



From the results gotten from this study, it is recommended that alum can be used in coagulating cheese for commercial purpose.

Table 1: Proximate Analysis of Soybeans cheese coagulated with pawpaw leaves extract and alum

Parameters	%Ash	% Crude Protein	% Crude Fibre	% Ether extract	% Moisture content	% Carbohydrate
T1	2.57	14.87 ^b	3.74	33.04	37.46 ^b	8.17
T2	2.74	15.20 ^b	13.55	15.97	41.57 ^{ab}	5.60
T3	3.35	17.64 ^a	5.49	21.69	45.66 ^a	6.19
SEM	0.31	0.52	1.93	3.75	1.40	0.60

abc means in the same row with different superscripts differ significantly (p <0.05).

T1 – Fulani cheese

T2 – pawpaw leaves juice

T3 – alum

Table 2: Organoleptic properties of soybeans cheese coagulated with pawpaw leaves extract and alum

Sensory quality	T1	T2	T3	SEM	P-VALUE
Colour	8.00 ^a	2.00 ^b	3.00 ^b	0.97	0.00
Flavor	7.00	3.00	5.00	0.76	0.79
Tenderness	6.00 ^b	3.00 ^c	8.00 ^a	0.78	0.00
Juiciness	6.00 ^a	1.00 ^b	6.00 ^a	0.86	0.00
Texture	6.33	5.00	7.00	0.63	0.48
Overall acceptability	6.00	5.00	4.00	0.63	0.63

abc means in the same row with different superscripts differ significantly (p <0.05).

T1 – Fulani cheese

T2 – pawpaw leaves juice

T3 – alum

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