

# Production of ice cream using *Cissum populnea* as wet ingredient

Ogori A. F.<sup>1\*</sup>, Tanko S<sup>1</sup>, Joeguluba J, Danjuma<sup>1</sup> M and Alex Onyeocha O.U<sup>2</sup>

Accepted 18 February, 2015

<sup>1</sup>Federal College of Education School of Vocational Education P.M.B 39 Niger State, Nigeria.

<sup>2</sup>Department of Hospitality Management, Dorben Polytechnic, Bwari, Abuja, Nigeria.

## ABSTRACT

The study identified the use of *Cissum populnea* in the production of ice cream using control. The study adopted the percentage, research analysis design involving 40 respondent populations including students and lecturers for sensorial analysis. The result showed that, *C. populnea* can take the place of egg in the production of ice cream, and maybe due to its high food value compared to cholesterol in egg white. Sample A contains no egg mix and emulsifier, showed similar sensorial attribute like the control. This was followed closely by sample B and C which have varied proportional content of egg mix, cissum gum liquid and emulsifier.

**Key words:** Production, *Cissum* gum, ice cream, sensorial analysis.

\*Corresponding author. E-mail: [ogoriakamafriday@gmail.com](mailto:ogoriakamafriday@gmail.com).

## INTRODUCTION

Ice cream is a frozen desert usually made from dairy products such as milk and cream often combine with fruits or other ingredients to flavour. Most varieties are sugar based although some are made with other sweeteners. In some cases artificial flavorings and colourings are used in addition or natural ingredients. The ice cream mixture of chosen ingredient is stirred slowly while cooling in order to incorporate air and to prevent large crystals from forming. Ice cream comprises of a mixture of air water, milk fat or non dairy fats, milk solids non fat (MSNF), sweeteners, stabilizers, emulsifier and flavors. The composition of ice cream varies in different countries and in different localities and markets within each country. The best ice cream composition for a manufacturer to produce is often difficult to establish. The milk fat content of ice cream may vary from less than 1 to 20% depending upon such factors as regulations,

expected characteristics, price and competition. Within the ice cream category, usually at 78 to 100%, fat dynamics employs that as the fat content of ice cream is increased, the MSNF must be decreased so as to avoid high viscosity and the potential for sandiness or the crystallization of milk sugar in the finished ice cream.

Ice cream has a high concentration of MSNF, which is 34 to 36% milk protein when obtained from traditional source thus giving ice cream a protein content of 2.5 to 40% by weight. The milk protein contained in ice cream is of excellent biological value, because they contain all the essential amino acids. Milk proteins are important source of tryptophan and are especially rich in lysine. The fat content, milk fat consists mainly of triacylglycerides of fatty acids, 98.8% on a weight basis. Milk fat is highly complex, containing almost 400 fatty acids. It is unique among fats and oils in that it contains 11.8 and 4.6 mole

of butyric (4-carbon) and caproic (6-carbon) acids respectively, per 100 moles of total fatty acids carbohydrate including starch, dextrin, cellulose, pectin's, gums and related substance. They are broken down to simple sugar under the action of specific enzymes secreted into the digestive tract and the principal end product is glucose. Sugar of several kinds may be used in the manufacture of ice cream. The mineral content of ice cream is among the richest sources of calcium. The mineral content of ice cream derives almost entirely from the MSNF and is therefore found in proportion to the content of MSNF which can range from about 6 to 14%.

Like milk, ice cream is an important source of several vitamins, the content depending primarily on how much milk solid is contained and the weight of a serving. The high palatability of ice cream is an important factor in the choice of it as food. Chewing is not required with most flavours, and smooth velvety texture soothes the palates, its coldness makes it especially desirable during hot weather. Digestibility is generally high. The exception can be with the lactose malabsorbing individual. Thus, ice cream is an ideal food for times when other foods do not appeal however deprived from families in the tropics because of its simple technicalities and may be time consuming.

*C. Populnea* Guill and Perr has been described by Burkill (2002) as a strong woody liana, 8-10m long, 7.5 cm in diameter, distributed generally across west tropical Africa, from the coast to the sudanian and sahelian woodland. It is used for herbal remedies. Edeoga et al. (2005) reported that the medical values of these plants lie in some chemical substance which produce a definite physiological impact on the human body. *C. Populnea* has been studied using techniques to evaluate its nutritional, anti-nutritional and gum composition. Proximate composition analysis of *C. Populnea* showed that it is very rich in carbohydrate, protein with abundant levels of macro and micro minerals. Trypsin inhibitor and other anti-nutrients are below the tolerable limit in the vegetable. Some people are allergic to egg due to the high content of cholesterol forming substances in egg, while others are chemical phobia. Ice cream is loved not just by kids and teens but most adults too. Ice cream is very popular especially during summer when it is extremely hot. Because of the high demand, the art of making ice cream in the comfort of our homes is now fast becoming a trend and that is made possible because of our modern technology, but not always available in all homes.

Ice cream has been a source of joy to other kids, they feel loved when ever ice cream is brought to them by their parents. Some people use ice cream to establish a relationship, it gives room for people to be close and forget their sad movements. The researcher proposed a study of ice cream using *C. populnea* (cissus gum) as a wet ingredient in the production of ice cream.

## RESEARCH METHODOLOGY

### Population of the Study

The population for this study comprises of lecturers and students of the Federal College of Education Kontagora, Niger State. The sampling method adopted for this study is the random sampling technique. A total population of 40 respondents including lecturers and students were used.

### Materials and Methods

Batches of plant of *C. populnea* were collected between May and June 2014 from a nearby village called Salka. The plant was not popularly known by people. Other materials were bought from kontagora market such as the emulsifier, vanilla flavor, icing sugar, skimmed milk and salt. Questionnaire was designed using different sensorial characteristics on ice cream samples using four point hedonic scales such as taste, appearance, texture and flavor.

### Sample preparation

**Sample A1:** (control) in a medium pan, heat up the milk, sugar and salt. 6% egg yolks mixture, 70% skimmed milk, 9% icing sugar, 9% vanilla flavor, 6% liquid emulsifier and a pinch of salt to taste. Beat the 6% eggs for about 20 to 25 min. until it brings out foam. Pack the foam in a separate pan, do the same until all egg mixture were collected. After collecting the foam from the egg liquid, then add 9% of icing sugar, emulsifier, vanilla, pinch of salt and then heat milk and sugar mixture together. Mix for about 5 min. until desired texture is obtained then allow it to settle down and freeze.

**Sample A:** Extract your *C. populnea* gum using hot water extraction and add 6% *C. populnea* into a separate medium pan. Beat to reduce the thickness, add 9% icing sugar into the cissum gum, stir for about 5 min., then add 76% skimmed milk, 9% vanilla and a pinch of salt to taste. Mix all ingredients for about 5 to 10 min. then allow settling and freeze.

**Sample B:** In medium pan heat up together for 5 min. 6% egg mixture, 9% cissum gum, 70% skimmed milk, 3% vanilla, 3% emulsifier, a pinch of salt to taste and 9% icing sugar. Beat eggs for 15 to 20 min. until it foams. Pack the foam in a separate pan, do so all through until all is collected Beat cissum gum for 5 min. to reduce the thickness then add the two mixtures together, egg and the cissum gum mixture. Mix the two mixtures and add your icing sugar and then heat with milk, sugar and salt together again on stirring for 2 min. before adding your icing sugar, vanilla flavor, pinch of salt and emulsifier, stir to desire texture. Allow to settle and freeze.

Table 1. Sensory acceptability of ice cream made from varied proportional *Cissum populnea*

| Sample         | Mean Taste | %    | Mean appearance | %   | Mean texture | %   | Mean flavour | %   | Mean general acceptability | %    |
|----------------|------------|------|-----------------|-----|--------------|-----|--------------|-----|----------------------------|------|
| A <sup>1</sup> | 3.7        | 9.25 | 3.3             | 8.4 | 3.02         | 7.5 | 3.17         | 7.9 | 13                         | 32.5 |
| A              | 3.7        | 9.25 | 3.4             | 8.4 | 3.03         | 7.6 | 3.18         | 7.9 | 13                         | 32.5 |
| B              | 2.2        | 7.3  | 3.2             | 7.9 | 3.02         | 7.5 | 3.17         | 7.9 | 13                         | 32.5 |
| C              | 2.8        | 7.2  | 3.2             | 7.9 | 2.7          | 6.8 | 2.72         | 6.8 | 11.55                      | 28.8 |
| D              | 3          | 7.5  | 2.9             | 7.7 | 2.62         | 6.5 | 2.67         | 6.7 | 11.02                      | 27.6 |
| E              | 2.5        | 7.0  | 2.9             | 7.3 | 2.75         | 6.9 | 2.65         | 6.6 | 10.35                      | 25.8 |

Key: A<sup>1</sup> Control = 70%Milk,9% egg mixture,9% icing sugar,9% emulsifier, 9% vanilla and pinch of salt to taste. A =6%Cissus populnea, 9% icing sugar, 76% skimmed milk, 9% vanilla flavor and pinch of salt to taste. B=6% Egg liquid, 9% cissum populnea 70%skimmed milk, 3% vanillas , 3% emulsifier ,pinch of salt to taste and 9% icing sugar.C = 5% Egg liquid, 10% cissum populnea, 70% skimmed milk, 3% vanilla, 3% emulsifier pinch of salt to taste and 9% icing sugar. D =9% gum of Cissum populnea, 9 % icing sugar, 76% skimmed milk, 6% vanilla flavor and pinch of salt to taste.E = 9% Icing sugar, 9% cissum populnea, 6% emulsifier ,70% skimmed milk, 3% vanilla flavor and pinch of salt to taste.

**Sample C:** In a medium pan, heat up the skimmed milk, sugar and salt. Beat 5% egg yolk mixture, 10 % cissum gum. Then add your 9% of icing sugar, 70% of skimmed milk, 3% vanilla flavor, 3% of emulsifier and pinch of salt to taste. Mix up together for 5 min. allow the mix to settle down then freeze.

**Sample D:** Liquid Extract of *C.populnea* gum using hot water. Measure at least 9% of cissum gum in a separate medium pan, beat your *C. populnea* gum to reduce its thickness, measure 9% of icing sugar mix with the *C.populnea*, stir for about 5 min., then add 76% milk, 6% vanilla flavor and salt to taste. Mix up together until desire texture is obtained.

**Sample E:** Extract your *C. populnea* gum using hot water, add 9% of *C. populnea* gum and beat it to reduce its thickness. Add 9% of icing sugar, mix for about 5 to 10 min., then add 70% of milk, 6% of vanilla flavor, 6% of emulsifier and pinch of salt to taste. Mix together until desire texture is obtained.

### Sensory analysis

The questionnaire designed using different sensorial characteristics of the ice cream samples using four point hedonic likert scales such as taste, appearance, texture and flavor. Values obtained were subjected to mean and percentage values to ascertain the preferred samples.

## RESULTS

### DISCUSSION

The control A<sup>1</sup> has the highest percentage of acceptability, it contain all necessary ice cream ingredients.

Sample A showed that 32.5% of the respondents generally agreed that *C. populnea* can replace egg in the

production of ice cream. The acceptance of sample A by respondents which favourably compared to the control could be due to cissum chelating strength or may have emulsifying properties. According to Ogori and Gana (2014) and Alkali (2009) asserts that *C. populnea* as an admixture could be use as medicine for the treatment of general diseases , indigestion and as drug binder.

Sample B showed that the acceptability of sample B was high equaling with control for texture, appearance, flavor and on general acceptability. Percentage respondents strongly agreed that *C. populnea* and egg can be added together in the production of ice cream.

Sample C showed that the sample is also accepted by the respondents, 28.8% of the respondents strongly agreed with the sample. The sample was made up of small quantity of 5% egg and a large quantity of *C. populnea* (10%), 3% vanilla and 3% of emulsifier were mixed up together. Ibrahim et al (2011) strongly believe that *C. populnea* is a plant associated with a myriad of medicinal extracts having been credited with antibacterial properties as components of herbal anti sticking in Nigeria formular.

Sample D showed that, the acceptability of this sample is moderate. The acceptability of sample D is below sample A, B and C as seen in Table 1. The sample is made of 9% *C.populnea* slurry. This showed that when large quantity of *C. populnea* is used in the production of ice cream it can be of help to humanity because of its huge medical value in the body Iwe and Attah (1993).

Sample E is slightly accepted. The acceptability was only by 25.82% showing that the sample was not as good as other samples such as Samples A, B, C, and D. Base on the characteristics of this sample the taste and the texture were less. This implies that because of its high quantity it reduces the sweetness and the texture. This indicate that use of plenty *C. populnea* in the production of ice cream can reduce the sweetness of the ice cream and the texture will not be smooth as when only little quantity of it is added. Maybe because of its phyageting ability as depicted by iwe and Attah (1993) for treating snake bits.

## Conclusion

It is observed that *C. populnea* can replace egg in the production of ice cream on a given scale. The data collected based on the opinion of the respondents showed that samples of the ice cream presented before them were accepted except sample E which was not well accepted by the respondent. The research also showed the use of *C. populnea* in the production of ice cream in place of eggs and will help people especially adults who are allergic to egg. The use of *C. populnae* in the production of ice cream is of great importance because expenditures, timing and economics of scale in ice creams production, as well as machining would be reduced and would advance nutritional education.

## REFERENCES

- Alakali J (2009). Rheological characteristic of food gum (*Cissu populnea*) Afr. J. food Sci. (3)9: 237-242
- Burkill HM (2002). The useful plants of west tropical Africa, Royal botanic gardens, kew. Vol.5 families S-Z, pp.296-297.
- Edeoga HO, Okwu DE, Mbaebie BO (2005). Photochemical constituent of some Nigeria medicinal plants. Afr. J. Biotechnol., 4: 685-688.
- Ogori AF, Gana J (2014). Effect of Cassava Starch Flour Seeding On Functional Properties of Cissus Gum Stem and Root (*Cissum Populnea*) J. Environ.Sci., Toxicol.FoodTechnol. 2(7):2319-2399.
- Iwe MO, Attah MA (1993). Functional properties of the active gradient of *cussum populnea* grill and *Perriapeudacea* J. Agric. Sci. Technol., 1(3): 18-71.
- Ibrahim H (1991). Pharmacognostic and evaluative studies of the stem back of *Cissum populnea* guill and perri. A thesis submitted for the award of master of pharmacology, pp 7, 8. Abu. Zaira.