

## ASSESSMENT OF SENSORY QUALITIES, PROXIMATE COMPOSITION AND ACCEPTABILITY OF PUFF-PUFF PREPARED WITH DIFFERENT HERBS AND SPICES

OLAWALE OGUNYEMI

Department of Hospitality Management (HMT), The Federal Polytechnic, Ilaro, Ogun State

Email: [ogunyemiolawale2014@gmail.com](mailto:ogunyemiolawale2014@gmail.com) 08036386587

### **ABSTRACT**

*The research study was carried out to assess the sensory qualities, proximate composition and acceptability of puff-puff prepared with different herbs and spices. In order to achieve this, a nine (9) point hedonic scale rating was used through sensory evaluation form which was administered to the twenty five (25) taste panelist, who are mainly staff and student of the federal polytechnic Ilaro. The number of panelists was determined by Taro Yamane formula. The data collected was subjected to descriptive and inferential statistics using SPSS 20.0 version. Proximate composition of the sample was determined using AOAC (2000). The result shows that there is little significant difference in the appearance, taste, flavor, and overall acceptability but there is significant difference in the texture and colour of the samples. The proximate composition of the samples shows significant difference. The study concluded that puff puff should be prepared herbs and spices In order to improve the sensory qualities and proximate composition. The recommendations made from the study are: herbs and spices should be used in the preparation of other snacks and dishes apart puff puff, because they are chockful of healthy compounds and flavourful, they can be used to replace or reduce sugar and salt in food and they should be used in cooking because of their medicinal values.*

**Keyword:** Acceptability, Assessment, Conventional, Herbs, Puff Puff, Spices.

### **INTRODUCTION**

Puff-puff as it is called in Sierra Leone, and in Anglophone (English), Cameroon and in Nigeria. The name of this traditional snack is popular throughout the country Nigeria and other countries across the continent of Africa. Its name varies across nations for instance, it is called Bofrot in Ghana, Mikate in Congo, Beinye in Francophone (French) Kala in Liberia. The prominence of this delicacy stretches even to the eastern and southern parts of the motherland, where it is mostly known as mandazi.

Puff puff are made of dough containing Flour, yeast, sugar, butter, salt, water and eggs, butter and eggs are optional and deep fried in vegetable oil to an irresistible golden brown colour. Puff-puff is usually eaten for breakfast, as a snack or as a side dish. Puff-puff can be taken to the next level by increasing spices to the production which will improve the flavor and other nutritional content of puff-puff.

Furthermore, like the French beignet and the Italian zeppole, puff-puffs can be rolled in any spices/flavoring such as cinnamon, vanilla and nutmeg and for a fusion style of cooking.

In botany, the term herbs refers to a herbaceous plant, defined as a small, seed bearing plant without a woody stem in which all aerial parts (i.e. above ground) die back to the ground at the end of the each growing season(Allaby 2012). In culinary, Herbs are plants with a savoury or aromatic properties that are used for flavouring and garnishing food, medicinal purposes, or fragrances. Culinary use typically distinguished herbs from vegetables (Jonathan 2019). Herbs generally refer to the leafy green or flowering parts of a plant (either fresh or dried) for example Coriander and parsley roots, garlic etc. Herbs have a variety of uses including Culinary, medicinal, and in some cases spiritual. Herbs can be perennials such as thyme or lavender, biennials such as parsley or annuals like basil(Stuart 2009). Perennial herbs can be shrubs such as Rosemary (*Rosmarinus Officinalis*) or trees such as Bay Laurel (*Laurus nobilis*).

Spices is usually only dried part of plant such as dried bark, root, berries, seed twigs or anything else that is not green or leafy. For example, cloves are flower buds, cinnamon is bark, ginger is a root, peppercorns are berries, nigella is seed, cumin is a fruit, saffron is stigmas, cardamom is pods and seed. Spices are usually used in small amounts, are best used dry (the drying process often enhances the flavor), and most grow in subtropical or tropical climates. Spices are generally used for seasoning and flavoring, but not usually the main ingredient. The properties and characteristics of spices have been summarized as the ability to give flavour to the flavourless food, to impact a different character to a basic product or food. Some plants are used as both herbs and spices, such as dill weed and dill seeds.

Spices were among the most demanded and expensive products available in Europe in the middle ages, the most common being black pepper, cinnamon (and the cheaper alternative cassia), cumin, nutmeg, ginger and cloves (Panda 2015). Given medieval medicine's main theory of humorism, spices and herbs were indispensable to balance "humors" in food, a daily basis for food health at a time of recurrent pandemic in addition to being desired by those using medieval medicine, the European elite also craved spices in the Middle Ages. An example of the European aristocracy's demand for spices comes from the king of Aragon, who invested substantial resources into bringing back spices to Spain in the 12<sup>th</sup> century. He was specifically looking for spices to put in wine, and was not alone among European monarchs at the time to have such a desire for spice.

Although spices and herbs have been used since ancient times, they are playing a new and important role in modern food preparation. They did not only add unique flavour to our food but contribute to the colour and variety as well. Most herbs and spices have substantial antioxidant activity. A study found cumin and fresh ginger to be highest in antioxidant activity. These antioxidants can also act as natural preservatives, preventing or slowing the spoilage of food, leading to a higher nutritional content in stored food.

Spices and herbs are used in many different ways of cooking; they are essential cook's companion. Different cultures for different countries use different types and sets of spices to give their dishes different distinguishing taste and flavour.

“A meal no matter how ordinary can be made extraordinary by adding fresh herbs and spices”

Herbs and spices make food tastier while boosting your health says, Moreno, an adjunct professor of nutrition at the University of Miami and a dietitian for the Miami Marlins. You should be cooking with herbs and spices regularly and if possible using several at a time. Herbs and spices are used to flavour food, but research shows they are chock full of healthy compounds and may have health benefits “Herbs and spices fight inflammation and reduces damage to your body's cell. That's because it is rich in phytochemicals, which are healthful plant chemical.

Adding herbs and spices to your diet has another benefit. “Because they are so flavourful they make it easier to cut back on less healthy ingredients like salt, sugar and added fat,” says Adrienne Youdim, MD, an associate clinical professor of medicine at the UCLA David Geffen School of Medicine (Neha 2019).

Early Egyptians also used spices and herbs in medicine, as cosmetics and perfumes, for embalming, in cooking, and to kill and repel pests.

### **Objective of the Study**

The objectives of the study are to:

Determine the sensory quality of puff puff prepared with different herbs and spices,

Identify the acceptability of puff-puff produced with different herbs and spices.

Compare the conventional or regular way of making puff-puff with the one produced with herbs and spices.

And determined the proximate composition of various puff puff prepared with different herbs and spices.

### **Statement of Problem**

Many caterers and other food production practitioners use the regular and the conventional way of making Puff Puff but little or no research has been carried out on various way to improve the texture, flavor and taste of Puff Puff. The research study will be carried out to show that various herbs and spices can be used in producing Puff Puff to improve the flavour, texture, taste, and other sensory qualities and proximate composition of the snacks.

## **LITERATURE REVIEW**

Since ancient times, herbs and spices have been used for culinary, medicinal, cosmetic and spiritual purposes. Many traditional foods around the world are cooked with spices and herbs to enhance their flavour, colour and to improve conservation. Spices are derived from any part of a plant that is not a leaf, such as the root, part, bulb, bark or seeds; instead, herbs come from the green, leafy part of the plant in some cases, herbs and spices may come from the same plant. The America Spice Trade Association uses the term spice as an all-inclusive term that encompasses three categories: spice, herb and aromatic seeds. Both spices and herb are rich sources of phytochemicals, many of which are biologically active with antioxidant and anti-inflammatory effects; moreover, they may contain essential oils, antioxidants, minerals and vitamin that are important for overall wellness. As a result, some herb and spices may be classified as a functional food, with a range of health benefits beyond basic nutrition, such as reduction of the risks of heart diseases, diabetes obesity cancer, and Alzheimer's disease.

Although spices and herbs have been used since ancient times. They are playing a new and important role in modern food preparation. They not only add unique flavours to our variety as well. Certain spices and herb used alone, or in blends, can replace or reduce salt and sugar in foods(freedman 2015).

### **List of Common Culinary Herbs**

**Basil:** There are more than 50 species of basil, but almost all basil used in the United State is one species that come from California, Egypt or France. Basil has a better flavor when dried, as oppose to fresh. Dried basil has anise pepper and minty undertones and it somehow sweet yet savory at the same time.

**Bay leaves:** Bay leaves are in the whole dried leaves of a tree in the laurel family. Bay leaves have a much more pleasant flavor when dried, which has higher volatile oil content. Bay leaves are used in their whole form in soups and stews and are removed before serving. Ground bay leaves are added to seasoning blends and dishes to give an earthy flavor with undertones of nutmeg and cloves.

**Celery Flakes:** Celery flakes add a great authentic celery taste, though rehydrate them do not accurately mimic the texture of fresh celery.

**Cilantro Leaves:** Many people know cilantro as the herb that people love or hate, saying it either has a delicious flavor or tastes like soap cilantro is a key ingredient in authentic Mexican, Caribbean and Asian dishes. In the United States, cilantro is used in beans, salsas, soups and dips.

**Curry Leaves:** Curry leaves are an essential part of Southern Indian and Sri Lankan cuisines. They are used in a similar way to bay leaves but unlike bay leaves they do not need to be removed before serving because they are much softer. Curry leaves are used in curry fish, lamb and vegetable dishes.

**Garlic:** Garlic has been eaten by humans from the time pyramids were built and continues to be a great addition to almost every savory food around. It tastes wonderful in combination with most spices and herbs

**Lemon Grass:** Lemon grass is part of the grass family and is popular in Thai and Southeast Asian cuisine. It is best when used fresh, but if using dried it should be soaked before used when the dish does not have a large liquid component. Lemon grass provided a light fresh citrus and floral flavor to foods and can even be used to make tea.

**Mint Leaf:** Spear mint is the most called for of the two mints has a refreshing and mellow pure flavor and provide that ‘cold’ sensation on your tongue. It is popular in baking, chocolates sauces and liquors.

**Oregano:** Oregano is commonly associated with Italy and Pizza, but they are two types of Oregano, Mediterranean Oregano and Mexican Oregano.

**Parsley:** Parsley is a popular garnish because of its bright green color but it can be eaten too. Parsley has a vegetable aroma and flavor that is prominent in Middle Eastern recipes. Parsley also works well in grain based dishes with fish and in pastas and soups.

**Rosemary:** Rosemary has a very distinct, strong flavor that is minty, cooling and somewhat balsamic. The aroma is just as strong as hints of eucalyptus. Rosemary works well with meats of all kinds, especially lamb, pork, veal and wild games. It also works well with dairy based foods such as cream cheese, butters and cream sauce.

**Sage:** In the United State, Sage is an herb that stays in its comfort zone, being an ingredient in poultry seasoning, sausages and cheese, but we robust and savory flavor sage can be added to any dish that is rich in fat or has a savory component. It can be added to dark iced teas for a deliciously new flavor.

**Thyme:** Thyme is the subject of many spice pun, is popular in a plethora of European cuisines for its strong, fresh, lemony flavor. It is used to give flavor to sauces, vinegars, soups and stew. In the United States thyme is most recognized for its use incurable cooking to add flavor to blackened meat and fish. It is used in turkey, stuffing, sausages and hew England clam chowder.

## **Spices**

Spice is a culinary term, not a botanical category (Farrell 2014). A spice is a dried fruit, seed, root, bark or vegetative substances, primarily used for flavoring, coloring or preserving food. Sometime a spice is used hide other flavors. Spices can also be a sort of substances. (E.g. ginger, nutmeg, cinnamon etc). The universal use of spices to flavor food implies its attributes to impact as well as improve unappetizing and unpalatable food. Though such food may be attractive to look at or balance nutritionally, without good aroma and taste the essential reflexes require and digestive process may not be activated. Many spices have antimicrobial properties, this may explain why spices are more commonly used in warmer climates, which have more infectious diseases, and why the use of spices is prominent in meat, which is particularly susceptible to spoiling. (Thomas, Daoust & Raymond2012).

Spices are being used in the preparation of soups, barbecue sauces, pickling and as a main ingredient. Spices along with some seasonal herbs are being used to enhance the flavor and taste of vegetable chicken, fish and meat dishes. Some healthy spices like cloves are also been used in flavor drinks.

### **List of Spices**

**Allspice:** This individual spice is commonly confused as a spice mixture. It has flavors of cloves, nutmeg, cinnamon and a little pepper, but it is in fact a single spice. It is a notable flavor in Jamaican Jerk seasoning and does well when mixed with other, similar spices.

**Almond Meal:** Almond Meal is made from ground almonds that have not been blanched. The consistency and application is more similar to corn meal than flour, and is not the same as almond flour. Our Almond Meal is made from almonds grown in California.

**Anise Seed:** Not to be confused with Star Anise, Anise seeds are small and look similar to Dill and Fennel seeds. Their aroma is sweet and licorice like while their flavor is a bit fruity and warm. They are most notably used in Italian pizza, Australian humbugs and Peruvian picarones.

**Celery Seed:** Our conventional Celery product is cultivated in India. Celery seeds and Ground Celery Seeds have more “earthy” taste that is still fresh and light. Depending on the season of the latest harvest, our organic Celery Seeds and Ground Celery is sourced from Egypt, India, the Netherlands and the US.

**Cinnamon:** Cinnamon is the oldest known spice, being referenced in written text in the 5<sup>th</sup> century. There are 4 distinct types. It actually comes from pieces of tree bark that have been sun dried. After drying, the bark is cut into strips or ground into a powder. There are a variety of cinnamon types, and each has a slightly different volatile oil content that determines its intensity. Cinnamon is used in baking and can also be found in an assortment of savory dishes.

**Cloves:** Cloves are probably the only spice that can be used by stabbing it into the food you’re cooking and just letting it sit. This popular way to flavor a holiday pork roast or ham is truly unique and also provides an aesthetic appeal. They can also be used whole when cooking liquids, such as cider, but they should be removed before serving. Ground cloves are used in spice blends such as Pumpkin Pie Spice, Chinese Five Spire and Masala.

**Cocoa Powder:** Cocoa powder is the processed, sweeter version of the natural cacao. Cocoa Powder had an extremely smooth flavor and gives color to one of America’s most iconic cookies, the Oreo. The sweet flavor works well with desserts, smoothies and even as a secret ingredient in steak rubs.

**Coriander:** The plant that produces coriander seed is one of three plants that produce both an herb and spice. The herb produced by this plant is Cilantro. Coriander is popular in Indian and Mexican dishes and provides a warm earthiness to dishes along with citrusy undertones. It is a popular ingredient with beer brewers.

**Cumin:** Cumin has long been an essential ingredient in cuisines around the world and has only relatively recently become mainstream as a spice in the US. Cumin has a very distinct earthy, nutty and spicy flavor with a warm aroma with hints of lemon. It is an ingredient in many spice blends and is used in bean, couscous, curry, rice and vegetable dishes.

**Dill Seed:** The plant that produces dill seed is a plant that produces both a spice and an herb, with the herb being dill weed. In the United States, dill is probably most associated with the flavor of dill pickles. In German, Russian and Scandinavian cuisines it is a popular spice used in cooking cabbage, onion, potatoes and pumpkin. The flavor is clean and pungent with anise undertones.

**Ginger:** The ginger plant is a rhizome, producing a plant above the dirt's surface and a horizontal stem below. These stems are what we consider 'ginger'. The flavor is fierce and peppery with lemony undertones. Ginger can be used fresh and its juice is promoted as a super food, being featured in probiotic drinks across the US. Ginger is also extremely popular in desserts like gingerbread and pumpkin pie spice.

**Mustard:** Mustard seeds come in a variety of colors including yellow (also called white), brown and black. The darker the mustard seed, the more intense the flavor is when ground. Ground mustard is used to make mustard sauces and whole mustard seeds are used for pickling applications.

**Nutmeg:** Nutmeg is the seed of a yellow brownish edible fruit that grows on an evergreen tree. When picked, the nutmeg seed is covered in mace which is scraped off and sold as a separate spice. Nutmeg is typically solid all the way through and is most commonly used in its ground form. Nutmeg works well with hearty dishes such as lamb and mutton recipes, tomato sauces and vegetable stews. Nutmeg is always a popular flavor in baking and cold weather beverages.

**Onion:** The onion is also known as the onion bulb or common onion. When used fresh onion is considered a vegetable and in its dried, ground form is considered a spice. Onion is very popular inside of the United States, but also outside of this country with Libyans eating an average of 68.8 pounds of onion per capita.

**Sesame Seed:** Sesame seeds come in a variety of colors including white, yellow, black and red. They are popular in Chinese stir fry and Middle Eastern spice blends. Sesame Seeds can also be used on baked goods such as breads, hamburger buns and pastries.

**Turmeric:** Most likely known for its health benefits, turmeric is a powder ground from the plants rhizome. Turmeric is a main ingredient in masalas, Ras el Hanout and curry powders and pastes. Turmeric can also be used as

a natural coloring for foods or even clothing; as the powder's intense color will stain cooking ingredients, your clothes and even your hands.

### **Nutritive Value of Herbs and Spices**

Because they tend to have strong flavors and are used in small quantities, spices tend to add few calories to food, even though many spices, especially those made from seeds, contain high portions of fat, protein and carbohydrate by weight. However, when used in large quantity, spices can also contribute a substantial amount of minerals and other micronutrients, including iron, magnesium, calcium, and many others, to the diet. For example, a teaspoon of paprika contain about 1133 IU of Vitamin A, which is over 20% of the recommended daily allowance specified by the US FDA(USDA 2012).

Most herbs and spices have substantial antioxidant activity, owing primarily to phenolic compounds, especially flavonoids, which influence nutrition through man pathways, including affecting the absorption of other nutrients. One study found cumin and fresh ginger to be highest in antioxidant activity (Ninfali et al. 2017). These antioxidants can also act as natural preservatives, preventing or slowing the spoilage of food, leading to a higher nutritional content is stored food.

Herbs and spices add very little if any nutritive value to foods they are used only for flavoring or coloring foods. In general, they are low in calories, sodium, fat and have no cholesterol, although some of the oil-rich seeds, such as poppy and sesame, contain a moderate amount of calories. Also, some seasonings, such as celery or parsley flakes, contain enough sodium to be counted. However, these ingredients are used in such small quantities that they are not a problem unless a recipe calls for an unusually large amount, or unless the diet restriction is severe.

Herbs and Spices are said to be therapeutically useful in the management of convulsion, leprosy, stomachache, inflammation and/or rheumatoid pains, cough and loss of appetite (Valko & Leibfritz 2017). The components in the spices have been found to have anti-clotting action (prevent clogging of platelets in the blood vessels) and thus help easing blood flows, preventing stroke and coronary artery disease.

## **METHODOLOGY**

### **Study Area**

The Federal Polytechnic, Ilaro was established by Decree No. 33 of July 25, 1979. It was opened to students on November 15, 1979 on a temporary site provided by its host community, the ancient town of Ilaro, Ogun State. The first site of the Polytechnic was the premises of the Anglican Grammar School, Ilaro about half a kilometer from the Ilaro township junction. The Polytechnic was on this temporary site till 1983 when it moved to its permanent site along Ilaro/Oja-Odan Road, about three kilometers from Ilaro township. It is also about 60 kilometers from Idiroko, a Nigerian Border town with Benin Republic. Ilaro town itself is an ancient town, land locked between Lagos and



Abeokuta, the capital of Ogun State. The Polytechnic occupies a total of 898.116 hectares land area on its permanent site.

### **Source of Material**

The material used was bought from Lagos Island. While the ingredient used was brought from Shoprite, ota Ogun State.

### **Materials**

The materials used for the research includes frying pan, mixing bowls, plastics, stirring spoon, napkins, sieve, dinner plates, toothpick, cooking gas.

### **Method**

The method used for the research study on the preparation of puff puff is the frying method of cooking. The recipes and method of preparation are stated below:

### **Preparation of Conventional Puff Puff**

#### **Recipe:**

Plain flour (250g), Yeast (2 teaspoon), Salt (3 pinches), Lukewarm water (20ml), Vegetable oil (1litre)

#### **Method of Preparation**

Put the flour in a bowl, add sugar, salt and mix together.

Add water in small quantities and mix together by hand till you have a good blend of all the ingredients.

Add the yeast to lukewarm water.

Keep mixing till the batter is smooth but not watery.

Cover the bowl for about 45 minutes and allow to rise.

Pour some oil in a deep pot and allow to heat up.

Test that the oil is hot enough by putting a drop of batter into the hot oil.

When the oil is hot enough, scoop some batter into the oil with your hand by pressing the batter to come out from your thumb and index finger.

Once the underside of the puff puff has turned golden brown, flip the ball so that the topside will be fried as well.

When the both side are golden brown, take out the puff puff balls and place in a sieve.

### **Ginger Puff Puff**

#### **Recipe:**

Fresh ginger (1tablespoon), Plain flour (250g), Yeast (2 teaspoons), Salt (3 pinches), Lukewarm water (20ml), Vegetable oil (1 litre)

#### **Method of Preparation**

Wash and Peel the fresh ginger, then blend in a blender.

Put the flour in a bowl and sieve.

Add the sugar, salt and the blended ginger and mix together.

Add the yeast to lukewarm water and mix together by hand till you have a good blend of all the ingredients.

Keep mixing till the batter is smooth but not watery.

Cover the bowl for about 45 minutes and allow to rise.

Pour some oil in a deep pot and allow to heat up.

Test that the oil is hot enough by putting a drop of batter into the hot oil.

When the oil is hot enough, scoop some batter into the oil with your hand by pressing the batter to come out from your thumb and index finger.

Once the underside of the puff puff has turned golden brown, flip the ball so that the topside will be fried as well.

When the both side are golden brown, take out the puff puff balls and place in a sieve.

### **Garlic Puff Puff**

#### **Recipe:**

Fresh garlic (1 tablespoon), Plain flour (250g), Yeast(2 teaspoons), Salt (3 pinches), Lukewarm water (20ml), Vegetable oil (1 litre)

### **Method of Preparation**

Put the flour in a bowl and sieve.

Add the sugar, salt and the ginger powder and mix together.

Add the yeast to lukewarm water and mix together by hand till you have a good blend of all the ingredients.

Keep mixing till the batter is smooth but not watery.

Cover the bowl for about 45 minutes and allow to rise.

Pour some oil in a deep pot and allow to heat up.

Test that the oil is hot enough by putting a drop of batter into the hot oil.

When the oil is hot enough, scoop some batter into the oil with your hand by pressing the batter to come out from your thumb and index finger.

Once the underside of the puff puff has turned golden brown, flip the ball so that the topside will be fried as well.

When the both side are golden brown, take out the puff puff balls and place in a sieve.

### **Turmeric Puff Puff**

#### **Recipe:**

Fresh tumeric (1tablespoon), Plain flour (250g), Yeast (2 teaspoons), Salt (3 pinches), Lukewarm water (20ml), Vegetable oil (1 litre)

### **Method of Preparation**

Put the flour in a bowl and sieve.

Add the sugar, salt and the grounded tumeric and mix together.

Add the yeast to lukewarm water and mix together by hand till you have a good blend of all the ingredients.

Keep mixing till the batter is smooth but not watery.

Cover the bowl for about 45 minutes and allow to rise.

Pour some oil in a deep pot and allow to heat up.

Test that the oil is hot enough by putting a drop of batter into the hot oil.

When the oil is hot enough, scoop some batter into the oil with your hand by pressing the batter to come out from your thumb and index finger.

Once the underside of the puff puff has turned golden brown, flip the ball so that the topside will be fried as well.

When the both side are golden brown, take out the puff puff balls and place in a sieve

### **Nutmeg Puff Puff**

#### **Recipe:**

Nutmeg (1tablespoon), Plain flour (250g), Yeast (2 teaspoons), Salt (3 pinches), Lukewarm water (20ml), Vegetable oil (1 litre)

#### **Method of Preparation**

Put the flour in a bowl, and sieve.

Add the sugar, salt and the grounded nutmeg and mix together.

Add the yeast to lukewarm water and mix together by hand till you have a good blend of all the ingredients.

Keep mixing till the batter is smooth but not watery.

Cover the bowl for about 45 minutes and allow to rise.

Pour some oil in a deep pot and allow to heat up.

Test that the oil is hot enough by putting a drop of batter into the hot oil.

When the oil is hot enough, scoop some batter into the oil with your hand by pressing the batter to come out from your thumb and index finger.

Once the underside of the puff puff has turned golden brown, flip the ball so that the topside will be fried as well.

When the both side are golden brown, take out the puff puff balls and place in a sieve.

### **Mintleaves Puff Puff**

#### **Recipe:**

Mintleaves (50g), Plain flour (250g), Yeast (2 teaspoons), Salt (3 pinches), Lukewarm water (20ml), Vegetable oil (1 litre).

### **Method of Preparation**

Wash and soak mint leaves in warm water in a bowl

Put the flour in a bowl and sieve.

Add the sugar, salt and mix together.

Sieve the mint leaves from the bowl and dispose leaving the water remaining.

Add the yeast to luke warm water containing the mint leaves and mix together by hand till you have good blend of all the ingredients.

Keep mixing till the batter is smooth but not watery.

Cover the bowl for about 45 minutes and allow to rise.

Pour some oil in a deep pot and allow to heat up.

Test that the oil is hot enough by putting a drop of batter in to the hot oil.

When the oil is hot enough, scoop some batter into the oil with your hand by pressing the batter to come out from your thumb and index finger.

Once the underside of the puff puff has turned golden brown, flip the ball so that the top side will be fried as well.

When the both side are golden brown, take out the puff puff balls and place in a sieve.

### **Lemon Grass Puff Puff**

#### **Recipe:**

Lemongrass (50g), Plain flour (250g), Yeast (2 teaspoons), Salt (3 pinches), Lukewarm water (20ml), Vegetable oil (1 litre)

#### **Method of Preparation**

Wash and soak lemon grass in warm water in a bowl

Put the flour in a bowl and sieve.

Add the sugar, salt and the grounded nutmeg and mix together.

Sieve the lemongrass from the bowl and dispose leaving the water remaining.

Add the yeast to lukewarm water containing the lemongrass and mix together by hand till you have good blend of all the ingredients.

Keep mixing till the batter is smooth but not watery.

Cover the bowl for about 45 minutes and allow to rise.

Pour some oil in a deep pot and allow to heat up.

Test that the oil is hot enough by putting a drop of batter into the hot oil.

When the oil is hot enough, scoop some batter into the oil with your hand by pressing the batter to come out from your thumb and index finger.

Once the underside of the puff puff has turned golden brown, flip the ball so that the topside will be fried as well.

When the bothside are golden brown, take out the puff puff balls and place in a sieve.

### **Thyme Puff Puff**

#### **Recipe:**

Thyme (1tablespoon), Plain flour (250g), Yeast (2 teaspoons), Salt (3pinches), Lukewarm water (20ml), Vegetable oil (1 litre)

#### **Method of Preparation**

Put the flour in a bowl and sieve.

Add the sugar, salt and thyme and mix together.

Add the yeast to lukewarm water and mix together by hand till you have a good blend of all the ingredients.

Keep mixing till the batter is smooth but not watery.

Cover the bowl for about 45 minutes and allow to rise.

Pour some oil in a deep pot and allow to heat up.

Test that the oil is hot enough by putting a drop of batter into the hot oil.

When the oil is hot enough, scoop some batter into the oil with your hand by pressing the batter to come out from your thumb and index finger.

Once the underside of the puff puff has turned golden brown, flip the ball so that the topside will be fried as well.

When the both side are golden brown, take out the puff puff balls and place in a sieve.

### Research Population

The selected population of the study was the general public within the institution which comprises the students and staff within Federal Polytechnic Ilaro. 25 Panelist was allowed to taste the puff-puff prepared in the conventional way and the puff-puff prepared with herbs and spices.

### Sampling size and techniques

In this study, The sample size was determined using Taro Yamen Formula i.e

Taro Yamen

$$n = \frac{N}{1+N(e)^2}$$

n = Sample size

N = Population

l= Constant

e = correction factor level (level of significance of error assumed to be 5% i.e. 0.05 by Shawms 1994)

$$n = \frac{25}{1 + 25(0.05)^2}$$

$$n = \frac{25}{1 + 25(0.0025)}$$

$$n = \frac{25}{1 + 0.0625}$$

$$n = \frac{25}{1.0625}$$

$$n = 23$$

n= 23 Sample Size

### Instrument for Data Collection

All data was collected through sensory evaluation sheet which was given to the taste panelists. An hedonic scale ranging in a descending order was used i.e. (9,8,7,6,5,4,3,2,1) by the taste panelists to evaluate some of the sensory

attributes of the puff puff prepared in conventional way and the puff prepared with herbs and spices. The attributes include appearance, color, taste, texture, flavor and overall acceptability with the 9 point hedonic rating scale.

### Data Collection Process

Data was sourced primarily through the sensory evaluation forms administered to the taste panelists while secondary source of data was through the use of internet, journal, magazines, textbooks, newspapers and others.

### Data Analysis Techniques

The data collected was analyzed using one way analysis of Variance ANOVA with the aids of statistical package for social science called SPSS version 20.0 Analysis of variances was employed in order to determine the significant differences in treatment means and least significant differences (LSD)analysis ( $P < 0.05$ ) to separate means.

### Chemical Analysis (Proximate Composition)

Proximate composition of the coded samples (i.e. A, B, C, D, E, F, G and H) were determined using the analytical procedures as described by Association of Official Analytical Chemists (AOAC, 2000).

## RESULTS AND DISCUSSION

**Table 1 Showing the result from the sensory evaluation form**

Samples	Appearance	Colour	Texture	Taste	Flavour	Overall acceptability
A	7.87 <sup>a</sup> ±1.42	7.91 <sup>b</sup> ±0.94	6.87 <sup>ab</sup> ±2.07	6.83 <sup>a</sup> ±2.22	7.30 <sup>a</sup> ±1.71	7.52 <sup>a</sup> ±1.56
B	7.17 <sup>a</sup> ±1.30	7.04 <sup>ab</sup> ±1.43	6.48 <sup>a</sup> ±2.08	6.74 <sup>a</sup> ±2.24	6.91 <sup>a</sup> ±2.10	6.87 <sup>a</sup> ±2.16
C	7.74 <sup>a</sup> ±1.17	7.35 <sup>b</sup> ±0.98	7.13 <sup>ab</sup> ±1.54	7.43 <sup>a</sup> ±1.77	7.22 <sup>a</sup> ±1.53	7.22 <sup>a</sup> ±1.90
D	7.74 <sup>a</sup> ±1.38	7.65 <sup>b</sup> ±1.26	7.30 <sup>ab</sup> ±1.14	7.35 <sup>a</sup> ±1.46	7.09 <sup>a</sup> ±1.53	7.70 <sup>a</sup> ±1.14
E	7.74 <sup>a</sup> ±1.21	7.65 <sup>b</sup> ±1.07	7.74 <sup>b</sup> ±0.96	7.43 <sup>a</sup> ±1.77	7.39 <sup>a</sup> ±1.75	7.83 <sup>a</sup> ±1.52
F	7.30 <sup>a</sup> ±1.49	7.26 <sup>b</sup> ±1.45	7.13 <sup>ab</sup> ±1.48	7.39 <sup>a</sup> ±1.46	7.13 <sup>a</sup> ±1.42	7.39 <sup>a</sup> ±1.50
G	7.52 <sup>a</sup> ±1.12	7.30 <sup>b</sup> ±1.10	7.09 <sup>ab</sup> ±1.04	7.30 <sup>a</sup> ±1.10	7.04 <sup>a</sup> ±1.43	7.17 <sup>a</sup> ±1.69
H	6.96 <sup>a</sup> ±2.12	6.39 <sup>a</sup> ±1.87	6.70 <sup>ab</sup> ±1.94	6.43 <sup>a</sup> ±1.97	6.26 <sup>a</sup> ±2.13	6.78 <sup>a</sup> ±2.31

Values are means of triplicates± standard deviation.

Mean values in the same column with different superscripts are significantly different for each other at  $p \leq 0.05$



**Table 2 Showing the proximate composition of different samples of puff puff**

Samples	Crude protein (%)	Crude fat (%)	Ash (%)	CHO (%)	Moisture content	Crude fibre (%)
A	1.80 <sup>b</sup>	6.73 <sup>b</sup>	2.32 <sup>c</sup>	20.31 <sup>c</sup>	3.32 <sup>c</sup>	1.06 <sup>b</sup>
B	1.78 <sup>a</sup>	6.68 <sup>c</sup>	2.48 <sup>c</sup>	19.67 <sup>b</sup>	3.21 <sup>d</sup>	1.23 <sup>c</sup>
C	1.79 <sup>a</sup>	5.59 <sup>c</sup>	2.46 <sup>b</sup>	19.58 <sup>b</sup>	3.14 <sup>a</sup>	1.19 <sup>e</sup>
D	1.75 <sup>b</sup>	6.58 <sup>c</sup>	2.43 <sup>c</sup>	20.01 <sup>e</sup>	3.11 <sup>c</sup>	1.15 <sup>b</sup>
E	1.68 <sup>d</sup>	6.43 <sup>b</sup>	2.44 <sup>b</sup>	19.98 <sup>c</sup>	3.17 <sup>c</sup>	1.18 <sup>a</sup>
F	1.78 <sup>c</sup>	6.57 <sup>c</sup>	2.45 <sup>b</sup>	19.77 <sup>a</sup>	3.28 <sup>c</sup>	1.25 <sup>e</sup>
G	1.74 <sup>b</sup>	6.21 <sup>b</sup>	2.52 <sup>c</sup>	19.83 <sup>c</sup>	3.30 <sup>a</sup>	1.14 <sup>d</sup>
H	1.73 <sup>a</sup>	6.46 <sup>c</sup>	2.47 <sup>b</sup>	19.92 <sup>b</sup>	3.22 <sup>c</sup>	1.20 <sup>ab</sup>

Means with different letters across the same column are significantly (P<0.05) difference

Source: Field survey 2019

**A: Conventional Puff Puff (Control Variable)**

**B: Ginger Puff Puff**

**C: Garlic Puff Puff**

**D: Tumeric Puff Puff**

**E: Nutmeg Puff Puff**

**F: Mintleaves Puff Puff**

**G: Lemon Grass Puff Puff**

**H: Thyme Puff Puff**

The table 1 above shows the difference scores obtained from different samples. The list of panelist that was used for the research study. The score ranges from 9-1. In term of appearance, Sample A which is the control variable has the highest with mean (7.87) followed by Sample C, D and E with mean (7.74), then Sample G with mean (7.52), then Sample F with mean (7.30), then Sample B with mean (7.17) and Sample H with the lowest mean (6.96). Sample A, B, C, D, E, F and G are like moderately and Sample H is like slightly. There is no significant difference in the appearance of the samples.

In terms of colour Sample A which is the control variable has the highest value with mean (7.91) follow by Sample D and E with mean (7.65) the Sample C with (7.35) then follow by Sample D (7.30) then Sample F (7.26) and

Sample B (7.06) which are like moderately and Sample H (6.39) which is like slightly. There is significance difference in the colour of the samples.

In terms of texture Sample E with mean (7.74) has the highest value then Sample D with mean (7.30) then Sample C and F with (7.13) then Sample G with (7.09) are like moderately while sample A which is the control variable with mean (6.87), followed by Sample H with mean (6.70) and Sample B with the lowest value with mean (6.48) are like slightly. There is significance difference in the texture of the Samples.

In terms of taste, Sample C and E has the highest value with mean (7.43) then Sample F with mean (7.39) then Sample D with mean (7.35) then Sample G with mean (7.30) are like moderately while Sample A which is the control variable with mean (6.83) with Sample B with mean (6.74) and Sample H with mean (6.43) are like slightly. There is no significance difference in the taste of the samples.

In terms of flavor, Sample E has the highest value with mean (7.39) then Sample A which is the control variable with mean (7.30) then Sample C with mean (7.22) then Sample F with mean (7.13) then Sample D with mean (7.09) then Sample G with mean (7.04) are like moderately while Sample B with mean (6.91) and Sample H with the lowest value with mean (6.26) are like slightly. There is no significance difference in the flavor of the samples.

In terms of Overall Acceptability, Sample E with the highest value with mean (7.83) follow by Sample D with mean (7.70) then Sample A which is the control variable with mean (7.52) then Sample F (7.39) then Sample C (7.22) then Sample G with mean (7.17) are like moderately, while Sample B with mean (6.87) and Sample H with the lowest value are like slightly. There is slight difference in the overall acceptability of the samples.

The table 2 above shows the proximate composition of various samples of puff-puff prepared with different herbs and spices. The crude protein of samples A, B, C, D, E, F, G and H varies from 1.68 to 1.80, sample A has the highest crude protein value of 1.68 among the various samples. The differences in crude protein of the samples are slightly significant  $p < 0.05$ . the values of crude fat of the samples vary from 5.59 (lowest) to 6.73 (highest) sample A has the t value 8.74 while sample c has the lowest value value of 5.59 which means that sample C has less fat content than other samples while A has highest crude fat among the samples. Ash content values vary from 2.32 to 2.52; sample A has the least value of ash content. Carbohydrate value. Sample C has the least carbohydrate value while sample A has the highest value (20.31) among the samples, the moisture content values vary from 3.11 (lowest value) has by sample D to 3.32 (highest value) by sample A. The differences in moisture content of various samples are less significant.

Crude fibre % values vary from 1.06 (the lowest value) recorded by sample A to 1.25 (the highest moisture content value) as shown by sample F. Wright (2017) reported that some herbs and spices have some medicinal substance that can neutralize sugar and also dissolve fat which can reduces the risk of diabetes and obesity in consumer of snacks like puff-puff and others.

Yakubu (2013) in his findings said that onions when consumed with some fatty foods reduce or dissolve the fat thus reducing risk of obesity. According to Yewande (2016), she opined and recommended in her research work that herbs and spices should be used always in cooking because of their medicinal values, piquancy and pleasant aroma.

## **DISCUSSION**

From the results obtained, it was observed that there was significant difference within the samples. The appearance and colour of the samples ranges between 7.87 to 6.96 with sample A having the highest value (7.87) , samples C,D and E having the same appearance (7.74) while sample H had the lowest(6.92 and 6.39 ) in terms of both the appearance and colour. Appearance is the first characteristics perceived by human senses and play an important role in the identification and final selection of foods. The appearance of a meal shows an impact on appetite stimulation; crave ability and acceptance (Mian,Moshood, Rizwan & Muhammed 2017). Also the texture of the samples shows that sample E had the highest value (7.74) while sample B has the lowest (6.48). This could result from the inclusion of nut Meg, as it is known to have a characteristic fine and fluffy texture. The result further revealed that samples C and E had the highest taste value (7.43 and 7.43) while sample H has the lowest (6.43) respectively. Also there was a significant increase (7.39 and 7.83) in the flavour and overall acceptability of sample E compare to other samples. This is similar to the findings of Ayanwu *et al.*, (2016) which reported that sausages treated with nut-meg have an increasing trend of overall liking. The result also shows that there was no significant difference in appearance, taste, flavor and overall acceptability of all the samples while sample B and H were significantly different from all the samples in terms of colour, and sample B and E in terms of texture respectively.

## **CONCLUSION**

The findings of this research study as clearly seen above is concluded that puff puff should be prepared with different herbs and spices apart from the normal conventional method in order, to improve the sensory and proximate qualities, the nutritional values and the overall acceptability. The study also concluded that herbs and spices can be used in cooking other dishes because they are flavorful and chockfull of healthy compounds.

## **RECOMMENDATIONS**

Based on the findings and conclusion of the research work, the following recommendations will go a long way in the food industry:

- i. Apart from using herbs and spices in puff-puff, it can also be used in other dishes, in order to create a different taste in food.
- ii. Since it is rich in nutrition, their inclusion in food should be encouraged.
- iii. Certain spices and herb used alone, or in blends, can replace or reduce salt and sugar in foods.
- iv. Herbs and spices are also medicinal which can be recommended by the nutritionist to people with health related problem e.g.obesity, diabetes etc.

## REFERENCES

- Allaby M. (2012). *A Dictionary of Plant Sciences*. Oxford University Press. ISBN 9780191079030.
- Alton B. (October 2009). Good Eats. *The Early Years*. New York. P.396. ISBN 978-1-5479-795-1.
- Anyanwu, C.N, Egbuche, C.T., Osuigwe, O.I, Nwaihu, E.C., & Anyachi, N.J. (2016). *Organoleptic Assesment of Clarias Gariepinus*.
- Burkill I.H. (2010). *A Dictionary of the Economic Products of Malay Peninsula*. Dorling Kindersley, pp.404-679. ISBN 9781405303538.
- Freedman P. ( 2015 June 5). Health wellness and the allure of Spices in the Middle ages. *Journal of Ethno pharmacology. Potent Substances on the Boundaries of food and substances, 167, 47-53.*
- Freeman M.B. (2011). Herbs for the Medieval Household for Cooking, Healing other uses. Newyork. *The Metropolitan Museum, Pp ix-x.*
- Gill M., & John W.(2010). *Encyclopedia of Jewish Food*. P 453. ISBN 973-0-470-39130 ISBN 9780199571123.
- Mian K., Mashood S., Rizwan Sherriff & Muhammed N. (2017). *Sensory Evaluation and Consumer acceptability*.
- Murdock L. (2009). A Busy Cook's Guide to Spices; *How to introduce New Flavors to Everyday Meals Bell wether Books, P. 14.*
- Ninfali, P., Mea, G., Gorgini, S., Rocchi, M., & Bachhiocca, M. (2007). Antioxidant Capacity of Vegetables; Spices and dressings relevant to nutrition. *British Journal of Nutrition, 93 (2), p257-66.*
- Oconell J. (2016). The Book of Spice from Anise to Zeodary. *Pegasus Book. ISBN 978-1-6817-152-6.*
- Otunola G.A., & Afolayan A.J. (2013). Evaluation of polyphenolic content and some anti oxidant of aqueous extracts of Garlic, Ginger, Cayenne Pepper. *Journal of applied Botany and Food Quality.*
- Oxford Dictionary of English (3<sup>rd</sup> ed.). Oxford University Press.2010.p.819.
- Paul W., & Jennifer B. (2015 June1). Darwinian Gastronomy. Why we use Spices; spices taste good because they are good for us. *Bio Science, 49(6), 453-463.*
- Stuart M. (2009). *The Encyclopedia of herbs and herbalism*. Crescent Books,p.7. ISBN 978-0517-353264
- The Royal Horticultural Society Encyclopedia of Gardening(2<sup>nd</sup> ed.). dolling kindersley,pp, 404-679. ISBN 9781405303538

Thomas, F., Daoust, S.P., & Raymond, M., (2012) Can we understand modern humans without considering pathogens? *Evolutionary Application*, 5(4), 368-379.

USDA National Nutrient Database: Nutrient data for 02028, Spices, paprika; Retrieved August 26, 2012.

Valko M., & Leibfritz D. (2017). Free radicals and antioxidants in normal physiological functions and human diseases. *International Journal of Biochemical cell Biology*, 39(1), 44-48.

Wright, B.F. (2017). Curative uses of Herbs and spices in West Africa. *A Journal on Alternative Medicine*. Pp 2-10.

Yakubu, A.M. (2013). Efficacies of Herbs and Spices in Cooking. *A Journal of Home Economics* Pp. 6-11.

Yewande, A.S., (2016) Medicinal Uses of Herbs in Tropical Africa, *A Paper on Alternative Therapy*. Pp.11-17

[www.fooducate.com](http://www.fooducate.com)

[www.nigerianpuffrecipe:how](http://www.nigerianpuffrecipe:how) to make puff. Retrieved.2016-01-11.