

# Maize Beyond the Grain:

## Specialty Corns & Value-Added Products



**ICAR- Indian Institute of Maize Research**  
**Ludhiana (Punjab) 141004**





# **Maize Beyond the Grain: Specialty Corns and Value-Added Products**

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## **PREFACE**

Welcome to the world of "Value-added Maize Products." In the dynamic landscape of agriculture and food processing, maize (*Zea mays* L.), stands as a beacon of versatility and opportunity. This technical bulletin delves into the realm of maize, its diverse applications, and the transformative potential it offers through value-added products.

However, what makes maize truly fascinating is its ability to transform into "specialty corn." These specialized maize types possess unique characteristics that set them apart from standard field corn. They have garnered global attention and are becoming increasingly sought after by farmers and consumers alike. Specialty corn offers not only economic benefits but also opportunities for crop diversification and enhanced nutrition.

In this bulletin, we explore four intriguing categories of specialty corn: Baby Corn, Sweet Corn, Popcorn, and Quality Protein Maize (QPM). Each of these brings its own set of qualities and advantages, ranging from delectable taste and tender texture to enhanced nutritional profiles. These specialty corns have the power to boost farmer incomes, support livestock industries, mitigate migration trends, and generate employment opportunities.

The Agri-Business Incubator (ABI) plays a pivotal role in catalyzing the transformation of maize into value-added products. ABI provides the necessary support, including agricultural technology, business consultancy, networking, venture capital funding, infrastructure, and training to entrepreneurs. This support is instrumental in nurturing innovative agribusiness ventures that add value to farm produce and contribute to the growth of the agricultural sector.

The final section of this bulletin delves into the exciting realm of value-added maize products. From muffins and cookies to pasta and cakes, these products are a testament to the boundless possibilities that maize offers. By adding value to maize, we not only enhance its economic potential but also create a diverse range of delicious and nutritious options for consumers.

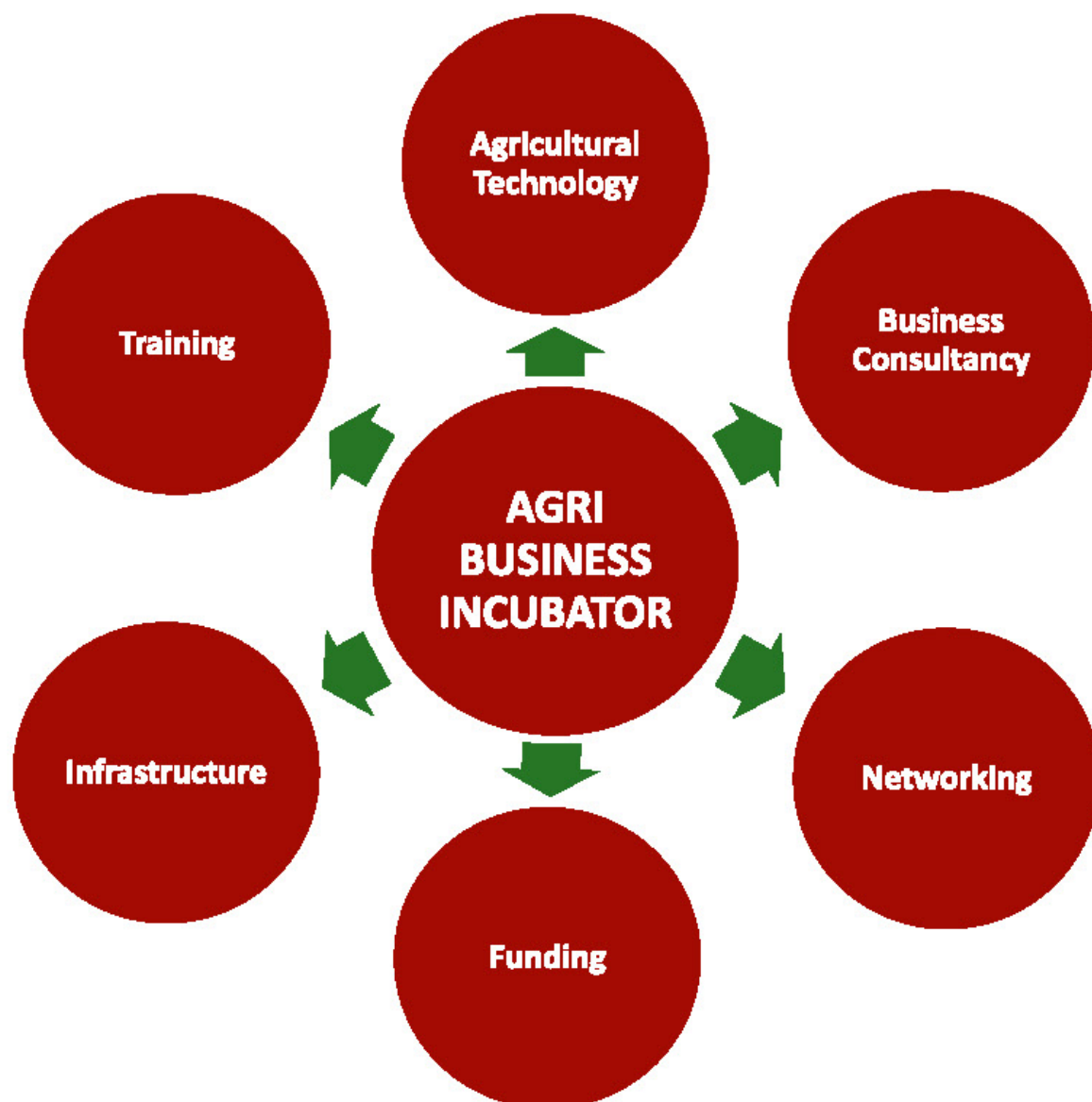
As we begin this exciting adventure into the world of maize and all the amazing things it can offer, we want to motivate entrepreneurs, farmers, researchers, and policymakers to uncover the untapped possibilities of this extraordinary crop. Maize is more than just a cereal; it represents innovation, nourishment, and prosperity. We warmly invite you to explore the captivating content of this bulletin, where you'll uncover the diverse range of opportunities that maize brings to the ever-changing field of agriculture and agribusiness.

**Happy Reading!**

## AGRI-BUSINESS INCUBATOR

The Agri-Business Incubator (ABI) is a place where the process of starting Agri-business venture is catalyzed by supporting the entrepreneurs with Agricultural Technology, Business Consultancy, Networking with Management Experts, Venture Capital Funding, Infrastructure, and Training to develop technology-based business ideas and establish sustainable enterprises.

Agribusiness incubation is defined as a process that focuses on nurturing innovative, early-stage enterprises that have high potential for growth and to become competitive agribusinesses by serving, adding value to or linking to farm producers.





## **OVERVIEW**

The ICAR- Indian Institute of Maize Research (ICAR-IIMR) is a premier national institute under the aegis of the Crop Science Division of the Indian Council of Agricultural Research, New Delhi. IIMR is mandated to plan, coordinate and execute the research programs to augment the production and productivity of maize including fodder and specialty corn in India. It is an ISO 9001:2015 compliant institute.

## **MISSION**

Enhancing the productivity, profitability and competitiveness of maize and maize-based farming systems with economic and environmental sustainability.

## **VISION**

Rapid growth in the food, feed and industrial application of maize and maize-based products, for generation of wealth and employment in farming and industrial sectors, and for all those who are directly or indirectly associated with maize cultivation and utilization.

## **MANDATE**

- ✓ Basic and strategic research aimed at enhancement of productivity and production of maize, including specialty corn.
- ✓ Coordination of multi-disciplinary and multi-location research to identify appropriate technologies for varied agro-climatic conditions.
- ✓ Dissemination of improved technologies, capacity building and developing linkages.
- ✓ Coordination of the All India Coordinated Research Project (AICRP) on Maize and to carry out extension and outreach programs.



## **OBJECTIVES**

- ✓ To carry out basic, strategic and applied research aimed at enhancement of production and productivity of maize in the country.
- ✓ To conduct and coordinate multidisciplinary and multi-location research to identify appropriate technologies for varied agro-climatic conditions in different parts of India.
- ✓ Germplasm collection, evaluation, maintenance and its enhancement.
- ✓ To develop specialty corn cultivars such as quality protein maize, baby corn, sweet corn, bio-fuel etc. towards its diversified uses.
- ✓ To conduct training, frontline demonstrations and on-farm research to maximize and accelerate adoption of research findings and innovative technologies.
- ✓ To serve as core center for the supply of maize research material and information.
- ✓ To develop linkages with the national, international and private sector for the collaborative research program.
- ✓ To provide consultancy services and undertake contractual research.
- ✓ Postharvest studies for value addition, quality control and storage.
- ✓ To evaluate technologies and transfer it as per IP policies of ICAR.



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## INTRODUCTION

Maize (*Zea mays* L.) is one of the most important cereal crop globally, with a substantial production volume of 1137 million metric tons, representing 39% of the total cereal production. Its adaptability and extensive cultivation on 197 million hectares make it a versatile and stable contributor to food security, serving diverse purposes from food and feed to industrial applications. In the agricultural year 2021-22, the crop being cultivated on 10.0 million hectares of land in India. This resulted in a production of 33.6 million metric tons and a productivity rate of 3.4 metric tons per hectare. Maize is often referred to as the 'Queen of cereals' due to its exceptional yield potential compared to other cereal crops. In India, approximately 60% of maize consumption is attributed to animal feed production; with poultry feed alone accounting for 47% of the total maize usage. Maize also contributes significantly to the human food supply, representing 20% of its total production. This includes direct consumption (13%) and the use of maize in processed food products (7%) (FICCI Vision 2022).

In recent years, there has been a growing interest in cultivating maize for various specialized and value-added purposes, collectively referred to as specialty corn. Unlike standard field corn varieties, specialty corns possess unique and distinctive characteristics. Their increasing global demand and ability to command premium prices have made them an appealing option for farmers in many countries, including India. Specialty corns offer flexibility in terms of harvest timing and can be used to produce a wide range of economically valuable products.

Additionally, specialty corns offer numerous health benefits and a delicious taste that is all their own. Varieties like Quality Protein Maize (QPM), sweet corn, popcorn, and baby corn are particularly rich in essential nutrients.

The cultivation of specialty corn brings forth several advantages:

- ✓ Increased income for farmers
- ✓ Enhanced crop intensity
- ✓ Additional fodder production
- ✓ Support for the livestock industry
- ✓ Mitigation of migration trends
- ✓ Value addition and improved nutrition
- ✓ Generation of employment opportunities

### Types of Specialty Corn:

**Baby Corn:** Baby corn, harvested young from maize plants before or just after silk emergence, is gaining popularity as a versatile vegetable.



These de-husked ears are crisp, sweet, succulent, and delicious, making them a great addition to salads. Notably, baby corn is pesticide-free and nutritionally comparable to other vegetables. Additionally, the by-products of the plant, including tassels, young husks, silk, and green stalks, can serve as nutritious cattle feed, providing opportunities for rural employment and crop diversification.

Baby corn is recognized by its young, finger-like, unfertilized cob, typically harvested within 1-3 days of silk emergence, with the ideal size ranging from 6 to 11 cm in length and 1.0 to 1.5 cm in diameter. Baby corn is highly nutritive, containing proteins, vitamins A & C and an abundant supply of iron. It's also a rich source of fiber, which makes it easily digestible. Baby corn is on par with, or even superior to, many seasonal vegetables.





**Sweet corn:** Sweet corn is a special type of maize characterized by its tender and delicious seeds, which are consumed as a vegetable. Sweet corn varieties are typically harvested when their corn ears have reached the milk stage. Standard sweet corn at this immature, milky stage contains approximately 10 percent sucrose. Sweet corn kernels often exhibit a wrinkled and glassy appearance due to a sugary gene that inhibits the normal conversion of sugar to starch during endosperm development. The major modifier genes responsible for sweetness are shrunken-2 (*sh2*) and sugary enhancer (*se*). Sweet corn is gaining popularity in urban areas, making it a lucrative crop for peri-urban farmers. In addition to the edible green cobs, farmers can also use the green fodder for their cattle.





**Boiled Sweet Corn**

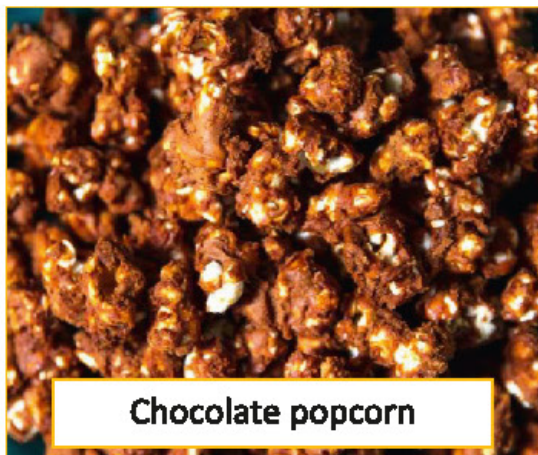
Sweet corn is typically ready for harvest in 70-75 days during the Kharif season. This vegetable is not only delicious but also a rich source of energy, vitamin C, and vitamin A. It can be enjoyed raw, boiled, or steamed, and is also used in the preparation of various dishes such as soups, salads, pizzas, and other recipes.



**Popcorn:** Popcorn, a distinct type of maize, is characterized by its exceptionally hard and corneous endosperm, which contains only a small portion of soft starch. Popcorn kernels are generally small-seeded and belong to the flint type, resulting in lower test weight compared to other maize varieties. When heated, the moisture trapped within the soft starch at the center of the kernel turns into explosive steam, causing the kernel to burst and turn inside out. The quality of popcorn is often judged by the extent of this expansion, with greater expansion indicating higher quality.



Caramel popcorn



Chocolate popcorn

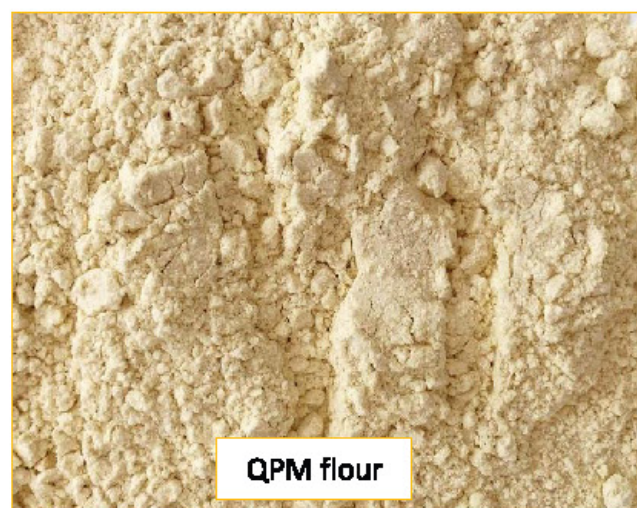
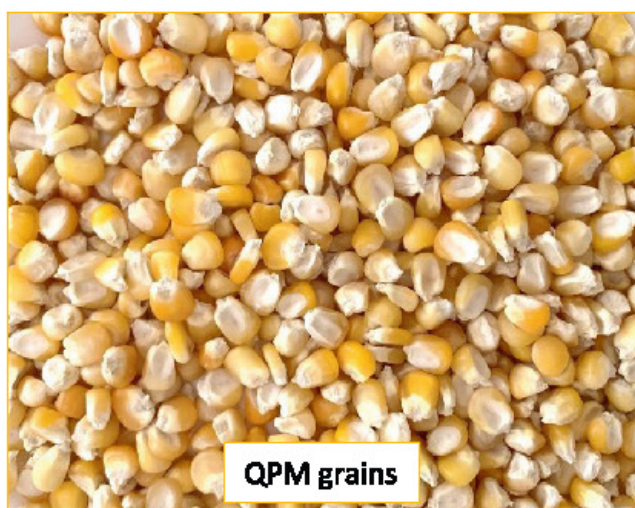


For optimal results, popcorn should have a moisture content of around 13.5 to 14 percent. Two crucial factors that influence popcorn's popping quality are the pericarp (outer shell) of the popcorn kernel and the quality of starch used in packaging. Popcorn is primarily consumed as a snack, especially in metropolitan areas, and its flour can be used in various culinary dishes. Popcorn is a fiber-rich snack that is naturally high in polyphenol antioxidants and provides essential nutrients including Vitamin B1, B3, B6, Iron, Magnesium, Phosphorus, Potassium, Zinc, Copper, and Manganese.

**Quality Protein Maize (QPM):** Quality Protein Maize (QPM) is a biofortified non-transgenic crop that offers enhanced protein quality for consumers. It contains a naturally occurring mutant maize gene. QPM varieties are characterized by 2-3 times higher levels of two essential amino acids: lysine and tryptophan. This protein alteration is governed by a single recessive gene known as Opaque-2, which was discovered in 1964. The Opaque-2 mutation leads to reduced zein synthesis in the endosperm, resulting in elevated lysine and tryptophan content.

The balanced combination of amino acids in the endosperm results in a higher biological value, ensuring greater protein availability for both humans and animals compared to regular maize. QPM maize boasts a biological value double that of regular maize and surpasses wheat and rice, rivaling milk in terms of true protein digestibility.

In a country like India, QPM offers an affordable solution for high quality protein diet. Its high biological value reduces food and feed costs, making it a valuable resource in combating malnutrition among children, pregnant and lactating women, adolescents, and the elderly population. Additionally, QPM holds the potential to benefit poultry, livestock, pig, and fish sectors. It emerges as the most cost-effective source of protein for the less privileged, addressing both food and nutritional security concerns. Moreover, various value-added products based on QPM have been developed to further extend its benefits.



# COOKIES



## Ingredients:

- ✓ Maize Flour (250 g)
- ✓ Butter (180 g)
- ✓ Sugar (180 g)
- ✓ Baking Soda (5 g)
- ✓ Boiling Water (30 ml)
- ✓ Vanilla essence
- ✓ Choco chips (10 g)

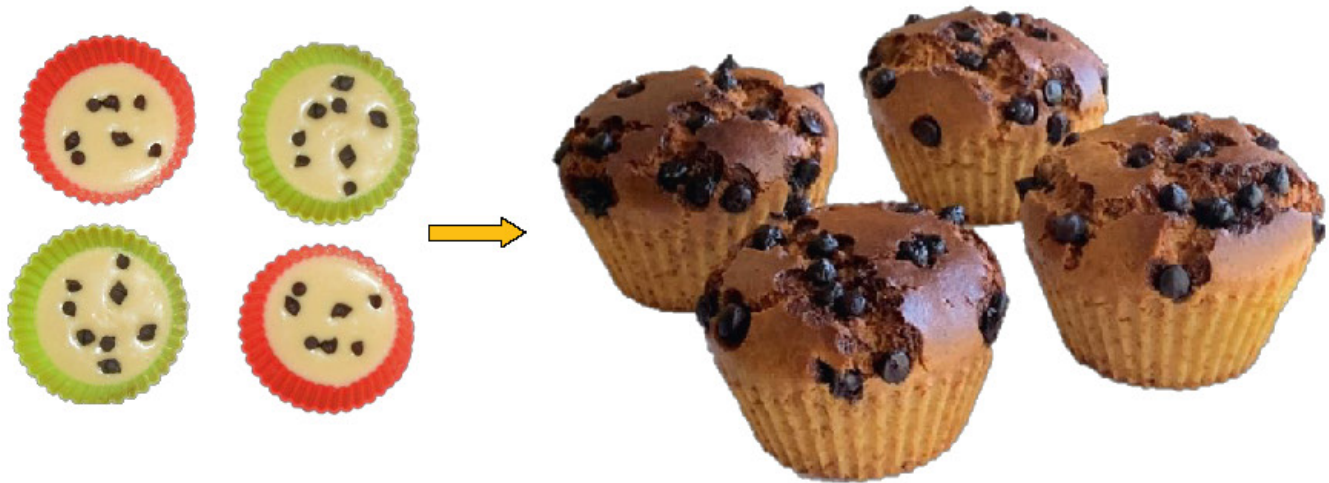
## Requirements:

Baking Oven, Weighing balance,  
Mixing bowls, Sifter Cup, Refrigerator

## Recipe:

- ✓ Cream Sugar and butter together and add a few drops of vanilla essence
- ✓ Sift and add Maize flour to the creamed batter
- ✓ Add baking soda to the boiling water
- ✓ Mix the dry and wet ingredients until combined
- ✓ Make small balls of the cookie dough and refrigerate it for 30 minutes
- ✓ Transfer the balls to the baking tray and bake at 160°C for 20-25 minutes in a preheated oven

# MUFFINS



## Ingredients:

- ✓ Maize Flour (100 g)
- ✓ Sugar (70 g)
- ✓ Milk Powder (30 g)
- ✓ Oil (50 ml)
- ✓ Baking Powder (3.4 g)
- ✓ Baking Soda (3.4 g)
- ✓ Water (100 ml)
- ✓ Vanilla essence
- ✓ Choco chips (10 g)

## Requirements:

Muffin Cups, Baking Oven, Weighing balance, Mixing bowls, Sifter Cup

## Recipe:

- ✓ Over a bowl, add maize flour, milk powder, baking soda, and baking powder to the sifter cup
- ✓ Cream oil and sugar in a separate bowl
- ✓ Mix the dry and wet ingredients and add water and a few drops of vanilla essence
- ✓ Pour the batter in the muffin cups till they are half full. Sprinkle some choco chips on top
- ✓ Bake in a preheated oven at 170°C for 20-25 minutes



# PANCAKES



## Ingredients:

- ✓ Maize Flour (80 g)
- ✓ Sugar (20 g)
- ✓ Milk (150 ml)
- ✓ Oil (2 tbsp)
- ✓ Baking Powder (1 tsp)
- ✓ Baking Soda ( $\frac{1}{2}$  tsp)
- ✓ Salt

## Requirements:

Nonstick frying pan,  
Whisk, Sifter Cup, Ladle,  
Saucepan, Mixing bowls,  
Spatula

## Recipe:

- ✓ Sift all the dry ingredients and use a whisk to mix them together
- ✓ Add milk to the saucepan and heat it over low heat and add oil to the hot milk
- ✓ Add a few drops of vanilla essence and mix the dry and wet ingredients with a whisk until combined
- ✓ Heat the pan on medium heat and spread some oil over it and use a ladle to pour a scoop of batter onto the frying pan
- ✓ Cook the pancakes on medium heat until they become golden

# BURFI



## Ingredients:

- ✓ Maize Flour (160 g)
- ✓ Sugar (100 g)
- ✓ Ghee (80 g)
- ✓ Coconut Powder
- ✓ Dry Fruits (5 g)

## Requirements:

Stove, Indian wok,  
Spatula, Parchment Paper,  
Knife, Refrigerator

## Recipe:

- ✓ Dry roast the maize flour in a wok on a medium-low heat and stir it continuously so that there is even roasting and browning
- ✓ Roast till the color changes to a darker shade and aroma gets nutty
- ✓ Add ghee to the flour and keep on stirring and roasting this mixture for 5 more minutes
- ✓ Switch off the heat and add the sugar and dry fruits and mix them well with a spatula
- ✓ Pour the mixture on a parchment paper and make the surface plain
- ✓ Keep it in the refrigerator and let it cool for 60 minutes
- ✓ After the burfi has been cooled, take it out of the refrigerator and cut it into small pieces using a knife

# HALWA



## Ingredients:

- ✓ Maize Flour (80 g)
- ✓ Sugar (60 g)
- ✓ Ghee (50 g)
- ✓ Dry Fruits (10 g)
- ✓ Water (150 ml)
- ✓ Cardamom Powder (3 g)

## Requirements:

Stove, Indian wok,  
Pan, Spatula

## Recipe

- ✓ Dry roast the maize flour in a wok on a medium-low heat and stir it continuously so that there is even roasting and browning
- ✓ Roast till the color changes to a darker shade and aroma gets nutty
- ✓ To a pan, add ghee and heat it. Add dry fruits and fry them on a medium heat
- ✓ Add the roasted maize flour to the hot ghee. Mix them well and turn off the heat
- ✓ Add water, sugar and cardamom powder and garnish with the fried dry fruits
- ✓ Serve halwa as a dessert or with puri



# LADOO



## Ingredients:

- ✓ Maize Flour (100 g)
- ✓ Sugar (60 g)
- ✓ Ghee (40 g)
- ✓ Dry Fruits (5 g)

## Requirements:

Stove, Indian wok, Spatula

## Recipe:

- ✓ Dry roast the maize flour in a wok on a medium-low heat and stir it continuously so that there is even roasting and browning
- ✓ Roast till the color changes to a darker shade and aroma gets nutty
- ✓ Add ghee to the flour and and roast this mixture for 5 more minutes
- ✓ Switch off the heat and add the sugar and dry fruits and mix them well with a spatula
- ✓ When the mixture is still hot and the heat is tolerable, take a heaped portion of it in a spoon and use this portion to shape into a small to medium sized round ball

# PANJEERI

## Ingredients:

- ✓ Maize Flour (80 g)
- ✓ Sugar (50 g)
- ✓ Ghee (30 g)
- ✓ Dry Fruits (5 g)

## Requirements:

- ✓ Stove, Indian wok, Spatula

## Recipe

- ✓ Dry roast the maize flour in a wok on a medium-low heat and stir it continuously so that there is even roasting and browning
- ✓ Roast till the color changes to a darker shade and aroma gets nutty
- ✓ Add ghee to the flour and and roast this mixture for 5 more minutes
- ✓ Switch off the heat and add the sugar and dry fruits and mix them well with a spatula



# SWEET BISCUITS



## Ingredients:

- ✓ Maize Flour (100 g)
- ✓ Butter (50 g)
- ✓ Sugar (50 g)
- ✓ Vanilla essence

## Requirements:

- ✓ Baking Oven, Weighing balance, Sifter Cup, Mixing bowls, Rolling Pin, Cutters

## Recipe

- ✓ Cream Sugar and butter together and add a few drops of vanilla essence
- ✓ Sift and add Maize flour to the creamed batter
- ✓ Prepare dough and sheet it to 0.5 cm thickness and cut it into desired shapes and transfer the cut pieces to the baking tray
- ✓ Bake at 160°C for 20-25 minutes in a preheated oven
- ✓ Cool it and evaluate



# JEERA BISCUITS



## Ingredients:

- ✓ Maize Flour (100 g)
- ✓ Butter (50 g)
- ✓ Sugar (40 g)
- ✓ Jeera (3 g)
- ✓ Salt (2 g)

## Requirements:

- ✓ Baking Oven, Weighing balance, Sifter Cup, Mixing bowls, Rolling Pin

## Recipe

- ✓ Cream Sugar and butter together
- ✓ Sift and add Maize flour to the creamed batter
- ✓ Add a pinch of salt and some Jeera to the batter
- ✓ Prepare dough and sheet it to 0.5 cm thickness and cut it into desired shapes and transfer the cut pieces to the baking tray
- ✓ Bake at 160°C for 20-25 minutes in a preheated oven
- ✓ Cool it and evaluate

# GHACHAK



## Ingredients:

- ✓ Jaggery (150 g)
- ✓ Popcorn (20 g)
- ✓ Peanuts (20 g)
- ✓ Dry Fruits (20 g)
- ✓ Saunf (10 g)
- ✓ Water (40 ml)

## Requirements:

- ✓ Frying Pan, Ladle, Grinder, Mixing bowls

## Recipe

- ✓ Take water in a frying pan
- ✓ Add jaggery and allow cooking to thick consistency
- ✓ Heat it until the jaggery leaves the pansides
- ✓ Add ground popcorn to jaggery and mix it properly
- ✓ Add almonds and cashew nuts and mix
- ✓ Pour the mixture on a plain surface and cut it into desirable pieces



# CRACKERS



## Ingredients:

- ✓ Maize Flour (100 g)
- ✓ Sugar (1 tbsp)
- ✓ Salt (1tsp)
- ✓ Oil (2 tbsp)
- ✓ Cumin
- ✓ Black Pepper
- ✓ Poppy Seeds
- ✓ Sesame Seeds

## Requirements:

- ✓ Baking Oven, Weighing balance, Sifter Cup, Mixing bowls, Rolling Pin, Cutters

## Recipe

- ✓ Sift the Maize Flour and add oil, sugar, salt, cumin, black pepper, poppy seeds and sesame seeds to it
- ✓ Prepare dough and sheet it to 0.3 cm thickness and cut it into long rectangular pieces
- ✓ Sprinkle some salt and black pepper on top
- ✓ Transfer the cut pieces to the baking tray
- ✓ Bake at 170°C for 15-20 minutes in a preheated oven

# PASTA



## Ingredients

- ✓ Maize Flour (500g)
- ✓ Water (220 ml)

## Requirements:

- ✓ Extruder, Hot air oven, Sifter Cup, Bowls

## Recipe

- ✓ Maize flour was sieved to remove any extraneous matter
- ✓ Sieved maize flour was then mixed with optimum amount of water in the mixing chamber of pasta extruder (La Monferrina Masoero Arturo and C.S.N.C., Italy) for 10 minutes to distribute water uniformly throughout the flour particles
- ✓ The moist flour aggregates were placed in a metal extruder attachment of the pasta machine fitted with an adjustable die
- ✓ The Extruded dough was cut to a desirable shape
- ✓ The resulting pasta was dried in a hot air oven at 50°C for 4 hours so as to attain moisture content of about 6-7%



Extruder

# NACHOS



## Ingredients:

- ✓ Maize Flour (100 g)
- ✓ Sugar (1 tbsp)
- ✓ Salt (1tsp)
- ✓ Oil (2 tbsp)
- ✓ Chilli Powder
- ✓ Oregano Seasoning
- ✓ Cumin
- ✓ Black Pepper

## Requirements:

- ✓ Baking Oven, Weighing balance, Sifter Cup, Mixing Bowls, Rolling Pin, Cutters

## Ingredients:

- ✓ Sift the Maize Flour and add oil, sugar, salt, chilli powder, oregano seasoning , cumin, and black pepper to it
- ✓ Prepare dough and sheet it to 0.3 cm thickness and cut it into a triangular shape
- ✓ Sprinkle some chilli powder, salt and black pepper on top
- ✓ Transfer the cut pieces to the baking tray
- ✓ Bake at 170°C for 15-20 minutes in a preheated oven

# POPCORN LADOO



Kernels



Popcorn



Popcorn Powder



Popcorn Ladoo

## Ingredients:

- ✓ Popcorn Kernels (100g)
- ✓ Sugar (70 g)
- ✓ Ghee (2 tbsp)
- ✓ Milk Powder (2 tbsp)
- ✓ Elaichi Powder (3 g)
- ✓ Dry fruits

## Requirements:

- ✓ Grinder, Stove, Indian wok, Spatula

## Recipe:

- ✓ Combine ghee and popcorn kernels in an Indian wok over medium heat. Cover the wok and wait for kernels to pop
- ✓ Grind the popcorns to a fine powder in a grinder
- ✓ Make a sugar syrup and add ghee and milk powder to it
- ✓ Add the popcorn powder to the syrup and add elaichi powder and dry fruits to it
- ✓ When the mixture is still hot and the heat is tolerable, take a heaped portion of it in a spoon and use this portion to shape into a small to medium sized round ball

# CAKE



## Ingredients:

- ✓ Maize Flour (100 g)
- ✓ Sugar (100 g)
- ✓ Yoghurt (90 g)
- ✓ Oil (50 ml)
- ✓ Cocoa Powder (20 g)
- ✓ Baking Powder (1 tsp)
- ✓ Baking Soda (1/2 tsp)
- ✓ Instant Coffee (1g)
- ✓ Salt

## Recipe:

- ✓ Sieve the Maize flour to remove any foreign matter
- ✓ Add Baking Powder, Baking Soda and a pinch of salt to the sieved maize flour
- ✓ In a separate bowl, mix Sugar, Yoghurt and Oil. To this concoction add Cocoa Powder and Instant Coffee
- ✓ Mix everything together till no lumps are visible
- ✓ Grease the cake mould with oil and pour in the batter
- ✓ Bake the cake at 180°C in a preheated oven

## Requirements:

- ✓ Baking Oven, Mixing bowls, Weighing Balance, Sifter Cup, Cake Mould



Activities at Kissan Mela



### Training Program



**ਆਈ. ਸੀ. ਏ. ਆਰ. ਭਾਰਤੀ ਮੱਕੀ ਖੋਜ ਸੰਸਥਾ ਲੁਧਿਆਣਾ ਨੇ ਪਿੰਡ ਮਹਿੰਦਲੀ 'ਚ ਲਗਾਇਆ ਜਾਗਰੂਕਤਾ ਸੈਮੀਨਾਰ**

ਸੋਮਵਾਰ 18 ਮਾਰਚ 2024 ਨੂੰ ਆਈ. ਸੀ. ਏ. ਆਰ. ਭਾਰਤੀ ਮੱਕੀ ਖੋਜ ਸੰਸਥਾ ਲੁਧਿਆਣਾ ਨੇ ਪਿੰਡ ਮਹਿੰਦਲੀ ਵਿੱਚ ਇੱਕ ਸ਼ਿਕਾਇਤੀ ਮੀਟਿੰਗ ਕੀਤੀ। ਇਸ ਮੌਕੇ ਉੱਚ ਅਧਿਕਾਰੀਆਂ ਦੀ ਸ਼ਿਫਟ ਗਰਾਮੀਨ ਮਹਿੰਦਲੀ ਦੇ ਆਈ. ਸੀ. ਏ. ਆਰ. ਮੌਜੂਦਗ ਵਿੱਚ ਵੈਲਫੇਅਰ ਯੋਜਨਾ ਦੀ ਸਮੀਖਿਆ ਕੀਤੀ ਗਈ। ਮੌਜੂਦਗ ਵਿੱਚ ਪੌਦੇ ਪੜ੍ਹਾਉਣ ਲਈ ਖੋਜ ਸੰਸਥਾ ਦੀ ਸੇਵਾ ਖੋਲ੍ਹਣ ਦੇ ਉਦੇਸ਼ ਨਾਲ ਇਹ ਮੀਟਿੰਗ ਕੀਤੀ ਗਈ। ਆਈ. ਸੀ. ਏ. ਆਰ. ਮੁੱਖ ਮੰਤਵਾਂ ਵਿੱਚ ਸ਼ਾਮਲ ਹੈ: 1. ਨਵੇਂ ਖੋਜੀਆਂ ਨੂੰ ਆਈ. ਸੀ. ਏ. ਆਰ. ਵਿੱਚ ਸ਼ਾਮਲ ਕਰਨਾ। 2. ਆਈ. ਸੀ. ਏ. ਆਰ. ਵਿੱਚ ਸੇਵਾ ਖੋਲ੍ਹਣ ਦੇ ਉਦੇਸ਼ ਨਾਲ ਮੌਜੂਦਗ ਵਿੱਚ ਪੌਦੇ ਪੜ੍ਹਾਉਣ ਲਈ ਖੋਜ ਸੰਸਥਾ ਦੀ ਸੇਵਾ ਖੋਲ੍ਹਣ। 3. ਆਈ. ਸੀ. ਏ. ਆਰ. ਵਿੱਚ ਸੇਵਾ ਖੋਲ੍ਹਣ ਦੇ ਉਦੇਸ਼ ਨਾਲ ਮੌਜੂਦਗ ਵਿੱਚ ਪੌਦੇ ਪੜ੍ਹਾਉਣ ਲਈ ਖੋਜ ਸੰਸਥਾ ਦੀ ਸੇਵਾ ਖੋਲ੍ਹਣ। 4. ਆਈ. ਸੀ. ਏ. ਆਰ. ਵਿੱਚ ਸੇਵਾ ਖੋਲ੍ਹਣ ਦੇ ਉਦੇਸ਼ ਨਾਲ ਮੌਜੂਦਗ ਵਿੱਚ ਪੌਦੇ ਪੜ੍ਹਾਉਣ ਲਈ ਖੋਜ ਸੰਸਥਾ ਦੀ ਸੇਵਾ ਖੋਲ੍ਹਣ।

ਸੰਸਥਾ ਦੇ ਆਈ. ਸੀ. ਏ. ਆਰ. ਮੌਜੂਦਗ ਵਿੱਚ ਪੌਦੇ ਪੜ੍ਹਾਉਣ ਲਈ ਖੋਜ ਸੰਸਥਾ ਦੀ ਸੇਵਾ ਖੋਲ੍ਹਣ ਦੇ ਉਦੇਸ਼ ਨਾਲ ਇਹ ਮੀਟਿੰਗ ਕੀਤੀ ਗਈ। ਆਈ. ਸੀ. ਏ. ਆਰ. ਮੁੱਖ ਮੰਤਵਾਂ ਵਿੱਚ ਸ਼ਾਮਲ ਹੈ: 1. ਨਵੇਂ ਖੋਜੀਆਂ ਨੂੰ ਆਈ. ਸੀ. ਏ. ਆਰ. ਵਿੱਚ ਸ਼ਾਮਲ ਕਰਨਾ। 2. ਆਈ. ਸੀ. ਏ. ਆਰ. ਵਿੱਚ ਸੇਵਾ ਖੋਲ੍ਹਣ ਦੇ ਉਦੇਸ਼ ਨਾਲ ਮੌਜੂਦਗ ਵਿੱਚ ਪੌਦੇ ਪੜ੍ਹਾਉਣ ਲਈ ਖੋਜ ਸੰਸਥਾ ਦੀ ਸੇਵਾ ਖੋਲ੍ਹਣ। 3. ਆਈ. ਸੀ. ਏ. ਆਰ. ਵਿੱਚ ਸੇਵਾ ਖੋਲ੍ਹਣ ਦੇ ਉਦੇਸ਼ ਨਾਲ ਮੌਜੂਦਗ ਵਿੱਚ ਪੌਦੇ ਪੜ੍ਹਾਉਣ ਲਈ ਖੋਜ ਸੰਸਥਾ ਦੀ ਸੇਵਾ ਖੋਲ੍ਹਣ। 4. ਆਈ. ਸੀ. ਏ. ਆਰ. ਵਿੱਚ ਸੇਵਾ ਖੋਲ੍ਹਣ ਦੇ ਉਦੇਸ਼ ਨਾਲ ਮੌਜੂਦਗ ਵਿੱਚ ਪੌਦੇ ਪੜ੍ਹਾਉਣ ਲਈ ਖੋਜ ਸੰਸਥਾ ਦੀ ਸੇਵਾ ਖੋਲ੍ਹਣ।



**NOTES**

Lined area for taking notes, consisting of approximately 25 horizontal lines.





**NOTES**

A series of horizontal lines within a rounded rectangular border, designed for taking notes.



**Nurturing diversity, resilience,  
livelihood & industrial inputs**



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