# Formulation and Standardization of Barnyard Millet Nimkin Incorporated with Amaranth Seed

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***Abstract-*** **Barnyard millet *(echinochloa species*) includes nutrient than other cereal grains and it is a great source of protein, carbohydrate, iron and fibre. This can be handed to 6 to 8- month babies as gruel or Kheer, and to kiddies above one time as dosa and idlis. It's honored as" Sanwa Rice" but when boiled, it makes it taste nearly like rice. Barnyard Millet is indeed a real natural blessing to the diurnal mess and inactivity, which can lead to multitudinous health issues. Amaranth (also called kiwicha or amaranthus) which has high nutrient content in both splint and in seed. It's also rich in fibre which reduces threat of developing cardiovascular complaint. Barnyard millet is a good source for maintaining healthy diet snack prepared by incorporating amaranth seed in 3 variants. It was estimated by a panel of judges using score card with five point hedonic scale. The packaging material decided for packing the Barnyard Nimkin is (PET) Poly Ethylene Terephthalate box vessel or burlesque zip cinch sacks. Shelf life analysis has experienced to examine the shelf life of a product and how they change with environmental conditions. The cost of barnyard millet nimkin incorporated with amaranth seed were anatomized by taking into account. The fixed and variable cost include during the course of processing. The sensitive outgrowth revealed that among the advanced products the overall mean score in 10 incorporated amaranth seed nimkin was largely respectable.**

**Key words- Amaranth seed, Amaranthus, Barnyard Millet nimkin, Healthy snack, Nimkin.**

## INTRODUCTION

Barnyard millet (echinochloa species) has been cultivated in demitasse for over 2000 times, it spread from central Asia to Europe and America. Sanva(Hindi), oodalu( Kannada), kavadapullu( Malayalam), Kuthiraivali( Tamil), Odalu( Telugu), Kira( Oriya) are the common names of barnyard millet. It's one amongst the toughest millet and it's come one in all the foremost important minor millet crops in Asia. Echinochloa esculenta may be a species of lawn within the Gramineae. It's generally grown as a rainfed crop. It's named by the common names called Japanese barnyard millet or Japanese barnyard millet that is cultivated on a tiny low scale in India, Japan, China and Korea, both as a food and for beast fodder. These grains will be used as food and might be cooked the same as rice. Barnyard millet grain could be a good source of protein, carbohydrate, fiber, and it contains further micronutrients (iron and zinc) than other major cereals. The carbohydrate that present in barnyard millet was veritably low and digestible. It's a multi-reason crop. Nutritionally, it's a good protein, which is profoundly absorbable and it's an inconceivable source of salutary fibre. It shows the high position of retrogradation of amylase, which inspires the event of upper measures of resistant bounce. Accordingly it's suggested for the cases with diabetes mellitus and cardiovascular conditions.

Amaranth (also called kiwicha or amaranthus) began in Central America. It's cultivat**ed** as minor crop within the Himalayan region. Grain amaranth belongs to the Caryophyllales, family Amaranthaceae sub-family Amarnathoideae, and rubric Amaranthus. Amaranths aren't considered as true cereals and it's contrary of the bulk of the cereal (e.g., wheat, rice, barley.) Amaranth seeds are small l( 1-1.5 mm periphery) they're lenticular in shape and weigh0.6-1.3 mg per seed. One factory can produce over 500 grams of seeds. These crops are largely nutritional and environmentally resistant. They'll be acclimated to, being cultivated in poor soils and high mound environmental conditions. Amaranth has implicit for functional and bio active constituents in food products for their high salutary fiber content and natural antioxidants. It's a awful

nutrient profilewith numerous pivotal nutrients, it helps in reducing health

OBJECTIVES

- ✓ To formulate the concept of barnyard millet nimkin incorporated with amaranth seed.
- ✓ To standardize the concept of barnyard millet nimkin incorporated with amaranth seed.
- ✓ To access the nutrient analysis of barnyard millet nimkin incorporated with amaranth seed.
- ✓ To design and label the developed barnyard millet nimkin incorporated with amaranth seed.

REVIEW OF LITERATURE

I. Barnyard Millet and Amaranth Seed: an over view
II. Nutrient composition of Barnyard Millet and Amaranth Seed
III. Health benefits of Barnyard Millet and Amaranth Seed
IV. Value added products in Barnyard Millet and Amaranth Seed

I.A. Over view of Barnyard Millet

- ➢ Barnyard millet (*Echinochloa* species) is an ancient millet crop grown in warm and temperate regions of the world and widely cultivated in Asia, particularly India, China, Japan, and Korea (VG renganathan *et.al.*,2020).
- ➢ Barnyard millet is primarily cultivated for human consumption, though it is also used as a livestock feed (Sood *et.al* 2015), (VG renganathan.2020 *et.al.,)*

I.B. Over view of Amaranth Seed

- ➢ A few decades ago *Amaranthus* was rediscovered as a most promising plant genus that may provide high-quality protein, unsaturated oil, and various other valuable constituents (Petras R Venskutonis[1] *et.al* 2013, paulius kraujalis[1] *et.al* 2013).
- ➢ The grain amaranths are native to the New World. Pre-Columbian civilizations grew thousands of hectares of this pseudo-cereal (SF Wekulo *et.al*, 2013).

II.A Table 1: Nutritional Composition of Barnyard Millet (per 100g)

| Compositions | Barnyard millet |
|---|---|
| Moisture | 8.74% |
| Protein | 14.59g |
| Fat | 3.9% |
| Carbohydrate | 59.68g |
| Dietary fibre | 12.5% |
| Energy | 1490 kcal |
| Calcium | 19 mg |
| Magnesium | 83 mg |
| Iron | 5 mg |

II.B Table 2: Nutritional Composition of Amaranth Seed (per 100g)

| Compositions | Amaranth seed |
|---|---|
| Moisture | 11.29 % |
| Protein | 13.56 % |
| Fat | 7.2% |
| Carbohydrate | 65.25 % |
| Dietary fibre | 6.7 % |
| Energy | 371 kcal |
| Calcium | 159 mg |
| Magnesium | 248 mg |
| Iron | 7.61 mg |

III.A Health benefits of barnyard Millet

Diabetes

Dehulled and heat-treated barnyard millet are beneficial for the Type II diabetes in which low glycemic index for dehulled millet (50.0±4.19) and heat rewarded was recorded (41.7±2.55) (Ugare *et al*., 2011),(H Kaur *et.al*., 2020)

Cardiovascular disease

A large portion of the world nations face high and expanding paces of disease related to cardiovascular. It has been exhibited that rodents feed with diet of native and treated starch from barnyard millet had the most minimal blood glucose, serum cholesterol and triglycerides as compared with and rice and other minor millets (Kumari and Thayumanavan 1997) (AJ Dairy *et.al*.,)

III.B Health benefits of Amaranth Seed

Chronic disease

The consumption of amaranth proteins can promote human health due to their potential to reduce the risk of suffering chronic diseases, (Silvia Leticia Rivero Meza *et.al*.,2022) (international journal of food science+ technology).

IV. Value added products in Barnyard Millet and Amaranth Seed

- Naik et al., (2013) developed value added PRODUCT IN barnyard millet cookies with the combination of sago flour, pulse flour and vegetable flour.
- Nazni and Karuna (2016) developed the muffin and rusk from the Barnyard millet bran. The wheat flour is combined with barnyard millet bran at different ratio for both muffin and rusk.
- A.sindhuja ( 2005) developed the composite flour cookies by incorporating amaranth seed flour

MATERIALS AND METHODS

A. COLLECTION OF RAW MATERIAL

The raw materials such as roasted gram flour, rice flour, barnyard millet, amaranth seed, salt, pepper, cumin, garlic, ghee, baking soda, asafetida, chilli powder, rava bought hygienically in local Market

B. CHEMICALS:

The chemicals and reagents used for the study where Laboratory reagent (LR), Analytical reagent (AR)

C. UTENSILS

Stainless steel vessels, spoon, plate, ladle, knife, tray and bowl where used for preparing and serving the developed products

D. ENERGY SOURCE:

Electric current and liquid petroleum gas were used as heating sources.

E. EQUIPMENTS USED

- ✓ Weighing balance
- ✓ Electronic balance
- ✓ Mixer
- ✓ Hot air oven
- ✓ Hot plate oven
- ✓ Infrared moisture analyzer
- ✓ Kel plus digestion apparatus
- ✓ Muffle furnace
- ✓ SOCS plus apparatus
- ✓ Fibro plus apparatus

PRELIMINARY PREPARATION OF SELECTED INGREDIENTS

- ✓ The preocured raw materials are weighed by electronic weigh balance
- ✓ Amaranth seed were roasted at a temperature of 50ºC for five minutes in order to reduce the pungent smell.
- ✓ Barnyard millet was roasted at a temperature of 50ºC for five minutes in order to reduce the pungent smell then it was ground and it is sieved to obtain fine powder. The prepared powder was used to make various products viz., cookies, dosa mix, flakes, muruku, etc.,

FORMULATION OF BARNYARD MILLET NIMKIN WITH AMARANTH SEED

Barnyard millet flour and Amaranth seed have high nutritive value and enormous health benefits. Amaranth seeds were incorporated in different products such as cutlets, ladoo, energy bars.

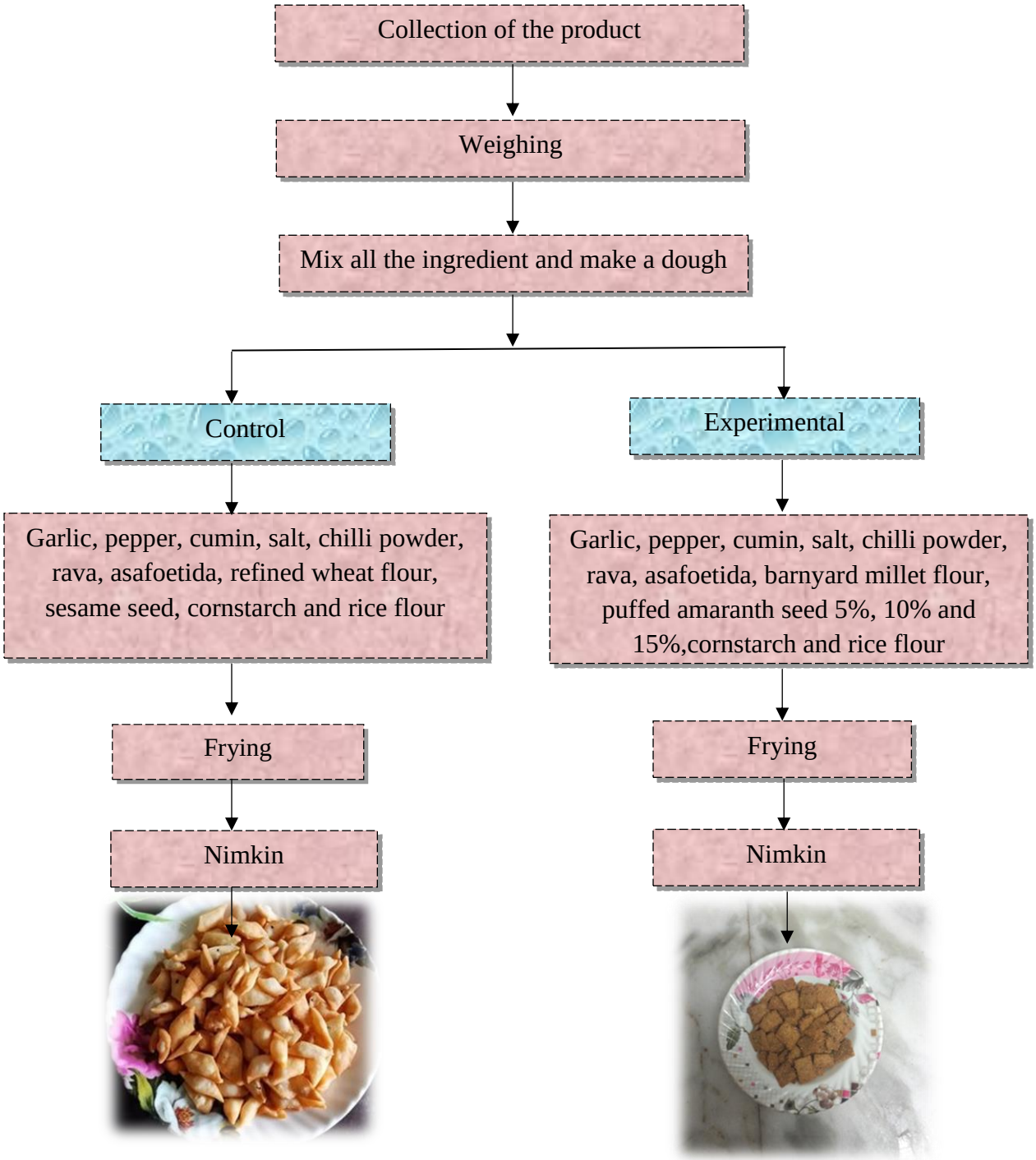
Amaranth seed was incorporated at the level of 5%, 10% and 15% in the formulated barnyard millet nimkin products respectively.


BMN 1- 5% Amaranth seed incorporated barnyard millet nimkin

BMN 2- 10% Amaranth seed incorporated barnyard millet nimkin

BMN 3- 15% Amaranth seed incorporated barnyard millet nimkin

**PREPARATION OF BARNYARD MILLET SEED NIMKIN INCORPORATED WITH AMARANTH**



ORGANOLEPTIC OR SENSORY EVALUATION:

When the quality of a food product is assessed by means of human sensory organs, the evaluation is said to be sensory or subjected or organoleptic evaluation (Himanshu Rajak *et al.*, 2015).

Sensory quality is a combination of different senses of perception coming and eating a food. Appearance, flavor and mouth feel decides the acceptance of the food (Sreeja *et al.*, 2009).

The sensory evaluation was conducted to assess the acceptability of the developed Barnyard Millet Nimkin. Panel members who were cooperative and willing to participate in the study were selected and trained for evaluating the developed food products judges using score card with five point hedonic scale rating

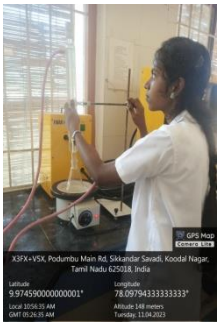

| Sensory attribute | Color | Flavour | Texture | Taste | Appearance | Overall mean |
|---|---|---|---|---|---|---|
| BMN 1 | 4.4 | 4.1 | 4.3 | 4.1 | 4.5 | 4.28 |
| BMN 2 | 4.6 | 4.6 | 4.6 | 4.8 | 4.6 | 4.64 |
| BMN 3 | 3.9 | 3.9 | 4.1 | 3.9 | 4.1 | 3.98 |

Table 4: Acceptability of BMN

NUTRIENT ANALYSIS

Nutritional quality can be assessed by chemical or instrumental analysis for specific nutrients (Norman *et al.*, 2005).

Nutrient analysis refers to the process of determining the nutrient content of the food and food products. The development and evaluation of control and 10% amaranth seed incorporated barnyard millet nimkin were subjected to nutrient analysis namely Energy, Protein, Fat, carbohydrate, fibre, Calcium, Iron, Moisture was shown in *table* 5 Barnyard millet nimkin were prepared by incorporating amaranth seed at the level of 5%, 10% and 15% respectively. It was evaluated by a panel of



| Nutrient | Barnyard Millet Nimkin (per100g) |
|---|---|
| Moisture | 10.10g |
| Protein | 8.9g |
| Fat | 20.03g |
| Crude fiber | 3.92g |
| carbohydrate | 60.75g |
| Energy | 459.1 kcal |

***Table* 5**

PACKAGING & LABELLING

Packaging is not only indispensable in the distribution chain but is designed to prevent the spoilage of food products throughout the supply chain. Diversity in food composition and product structure in fresh and processed food products demands unique packaging solution for each product category (Wani *et al*., 2014).

## SHELF LIFE STUDIES

Shelf life analysis predicts how the products change with and other environmental factors The evidence suggest that using Low-density polyethylene packaging gradually increase the shelf life at room temperature 25$^{O}$C for Barnyard Millet Nimkin.

## RECOMMENDATION

- Supplementation studies can be carried out by using other ingredients
- Shelf life of the standardized products can be assessed
- Storage studies can be carried out by using different packaging materials

## SUMMARY AND CONCLUSION

A brief summary of the results of the study carried out to analyze Barnyard Millet and Amaranth seed nimkin are dealt in their chapter. The data in sensory attributes, nutritive value, and of the standardized product have been summarized and concluded.

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