

# PROCESS AND STANDARDIZATION OF PULSE BASED READY-TO-COOK NUTRITIOUS MIXTURE

Arora M<sup>1</sup>, Sheikh. S<sup>2</sup>, Verma.A3, Yadav A<sup>4</sup>

<sup>1</sup>Research Scholar, Department of Foods & Nutrition,

<sup>2</sup>Prof. & Dean, Department of Foods & Nutrition,

<sup>3</sup>Assistant.Professor., Department of Foods & Nutrition,

Sam Higginbottom Institute of Agriculture, Technology & Sciences Allahabad,(U.P), India,

<sup>4</sup>Assistant Professor ,Department of &Nutrition & Dietetics ,SGT, University,

Gurgoan, Haryana.

[moni\\_arora@rediffmail.com](mailto:moni_arora@rediffmail.com)

**Abstract—** Chickpea (*Cicer arietinum*) flour added with oats, vegetables and seeds powders were used for the standardization of Ready-to-Cook (RTC) nutritious mixture. The acceptable level of seeds flour (niger and flax, incorporated 2.5% to 5%), vegetables powder (carrots and beans) and oats (1.25% to 20%) in chickpea flour mix was assessed and standardized for the sensory characteristics. The value added nutritious mixture was evaluated to find out the overall acceptability. RTC nutritious mixture provides high amount of nutrients and less time required for preparation than traditional besan cheela mixture. The prepared mixture could be stored for 165 days at room temperature in low density polyethylene.

**Key Words:** Ready-to-Cook, Chickpea flour, Low density Polyethylene, Sensory characteristics, Value added mixture.

## I. INTRODUCTION

Convenience has a huge impact on the food choices of today's consumers. It has been altering for many individuals that convenience food is a barrier to be achieved proper nutrition using adequate serving of vitamins & minerals. The ever-increasing market for convenience foods is it bugged, canned, chilled, frozen, pasteurized or preserved, presents a whole array of complex procedures in food processing (Roday, 2007 Banerjee., 2013).A natural, unprocessed food bound people to manage many things before cooking, raw ingredients purchasing, cleaning, chopping etc. And the large amount of time involved in pre-preparation and preparation time (Rachel, 2010).In many families, students and adults are staying away from home and therefore there is little time for the cooking of food based on raw ingredients. Processed food freed people from the time involved in preparing and cooking. The increase in free time allows people much more choice in lifestyle than previously allowed. Processing can also reduce the development of food borne disease. Fresh materials, such as fresh produce and raw meat and raw milk are more likely to harbour pathogenic micro-organisms (e.g. Salmonella and

*Clostridium*) capable of causing serious illnesses.

The product like cheela prepared from chick pea, is one of the traditional preparations all over India and is used throughout the year. The process for preparation of vegetable besan cheela is time consuming and also not providing all nutrients in a balanced ratios. There is a little work done to mechanize the process of pulses based balanced nutritious mixtures which can be use in the formations of many recipes like dhokla, idly, cheela, dosa , uttapam etc.

## A. Materials and methods

The study on optimization of process parameters for preparation of Ready-to-Cook (RTC) nutritious mixture was carried out in Ethelind School of Home Sciences, Department of Food and Nutrition, Sam Higginbottom Institute of Agriculture Technology & Sciences, Allahabad (Uttar Pradesh) of India. The study was divided into two parts, one as the preparation of RTC value added nutritious mixture by varying process parameters and second as to organoacceptability of the process variables through the qualitative and quantitative analysis. The biochemical analysis of the final product and its shelf life study was undertaken.

## B. Selection of Composition for making RTC nutritious mixture

Chickpea (Besan flour), oats, seeds (niger and flax seeds) and fresh vegetables (carrots ,beans tomatoes, onion, green chillies and coriander leaves) were procured from local market of Allahabad city, Uttar Pradesh India.

## C. Preparation of besan, oats and seeds ( niger and flax) flour

Besan, oats grains and seeds (Niger and flax) seeds were thoroughly cleaned to remove insect and admixture of other food grains. The seed were ground in electric grinder to make fine powder and sieved by 80-100 mesh sieve. The

flour samples obtained were kept in airtight container before use.

#### D. Preparation of vegetables powder

All the fresh vegetables, after washing tray dried for 7-10 days or till the material were completely dried having 6-8% moisture content. Dry matter of tomatoes, carrots, beans and green chillies were grinded in the electric grinder to get a fine powder except coriander leaves and onion flakes and then packed in air tight container for further use.

#### E. Standardization of ready-to-cook nutritious mixture

For the purpose of standardization of ready-to-cook nutritious mix, a number of preliminary trials were conducted. Different combinations of chickpea along with powders of seeds (niger and flaxseed), oats and vegetables powder viz., 100 (besan, control, T0), 95:2.5:1.25:1.25 (T1), 90:5:2.5:2.5 (T2), 85:5:5:5 (T3), 80:5:7.5:7.5 (T4), 75:5:10:10 (T5), 70:5:12.5:12.5 (T6), 65:5:15:15 (T7), 60:5:17.5:17.5 (T8), 55:5:20:20 (T9) percent were used to prepare 100g of ready-to cook nutritious mixture. Salt and haldi (2%) were added in final product to improve the taste and appearance.

#### F. Preparation of ready-to-cook pulse based nutritious mixture

The different kinds of blends along with 100% chickpea flour control were used to make the products. For preparation of product like cheela from the nutritious mixture, all the ingredients were taken in a plastic bowl and hand stirred to make the paste by the addition of water. The standardized ladle was used to ladle out manually and make a round shape cheela and frying with (30±5ml) oil in an open non-strick pan (5cm radius and thickness of about 0.16cm). It was fried on both sides and served it hot.

#### G. Reconstitution of Dry Mix

100 g of ready-to-cook nutritious mixture was added to 210±10 ml of normal water and stirred continuously for 3 - 4 min until desired consistency was attained.

**Statistical Analysis:** All the measurements were performed in triplicate for each treatment. Data were analyzed using statistical software (Graph pad prism for Windows Version 6.0). Significant differences between the means were estimated Duncan's multiple range tests. Differences were considered significant at  $p < 0.05$ .

#### H. Results and Discussion

The RTC nutritious mixture with varied oats, seeds and vegetables powder content (5-10%) in mix with chickpea flour, with initial moisture content (6.52 dry basis) was prepared. The coded samples of developed treatments were given to the panel members and the average sensory scores (Table-1) were calculated for each treatment.

#### I. Organoleptic evaluation of developed ready-to-cook nutritious mixture

The prepared ready-to-cook nutritious mixture were served to group of 7 trained panellists for the evaluation of colour and appearance, body and texture, taste and flavour and overall acceptability on a nine point hedonic scale (Chowdhury et.al 2011) with a scores ranging from 9 to 1 where scores 9 to 1 represented like extremely to dislike extremely. The quality parameters of all coded samples were quantified and the mean scores were calculated. Table 1, shows the organoleptic scores of ready-to-cook nutritious mixture prepared by utilizing selected chickpea flour, oats, seeds and vegetables powder.

**Table: 1. Average sensory scores of different parameters in the control and treated sample of "Ready-to-Cook Nutritious Mixture"**

Control/Treatment	Colour and appearance	Body and Texture	Taste and flavour	Overall acceptability
T <sub>0</sub>	8.16±0.08	8.0±0.05	8.10±0.1	8.0±0.00
T <sub>1</sub>	7.98±0.11	8.03±0.03	8.23±0.12	8.30±0.06
T <sub>2</sub>	7.83±0.18	8.03±0.14	7.10±0.06	8.20±0.12
T <sub>3</sub>	7.90±0.20	7.97±0.03	6.9±0.05	8.03±0.15
T <sub>4</sub>	7.96±0.24	8.18±0.04	8.17±0.09	8.13±0.08
T <sub>5</sub>	7.97±0.23	8.63±0.09	8.60±0.06	8.47±0.03
T <sub>6</sub>	7.47±0.24	8.03±0.14	7.73±0.38	7.47±0.24
T <sub>7</sub>	6.67±0.33	6.23±0.14	7.50±0.05	6.67±0.35
T <sub>8</sub>	6.10±0.55	6.32±0.04	6.9±0.06	5.03±0.09
T <sub>9</sub>	6.00±0.06	4.23±0.15	3.07±0.07	4.10±0.06
F (9, 18), (P<0.05)	38.91*	177.7*	141.2*	124.7*
CD @ 5%	0.17	0.13	0.173	0.17

9-point hedonic scale is as follows: 1-dislike extremely, 2-dislike very much, 3-dislike moderately, 4-dislike slightly, 5-neither like or dislike, 6-like slightly, 7-like moderately, 8-like very much, 9-like extremely.

\* -Significant difference is at 0.05 levels

Values are expressed as means ± SEM.

The treatment T5 (10%,5%,10% incorporation) of the product was found to be highly acceptable with scores 7.97, 8.63, 8.60 and 8.47 for colour, body and texture, taste and flavour and overall acceptability than control (T0), making it quite obvious that the addition of 10% oats, 5% seeds and 10% vegetables dehydrated powders, increases the colour, consistency, flavour, taste and overall acceptability of the ready-to-cook nutritious mixture. The other levels of incorporation were also liked at various degrees although a little less than T5.

Analysis of variance (ANOVA) reveals that the calculated value of F (124.7) in terms of overall acceptability is greater than tabulated value (2.46) on 9,18 (d.f.) at 5% probability level. Therefore it can be concluded that there was a significant difference ( $p \leq 0.05$ ) between treatments regarding the overall acceptability of the product. Turmeric has antimicrobial property and it act as traditional food preservative, which increases the shelf life of the product (Prakash & Gupta 2005, Kaefer & Milner,

2008). It's providing more energy and proteins than traditional cheela mix. Other similar research works done by **Rathi and Mogra (2013)** of vegetable chilla revealed that the general mean scores obtained for colour, appearance, texture, aroma, flavour and overall acceptability were 7.36, 8.13, 7.76, 7.63, 7.76 and 8.13 respectively and **Kumar et al. (2004)** also incorporated powder of amaranths leaf powder and onion stalk in mathri and chilla at three different levels: 5, 10 and 15 percent. They reported that mathri and chilla were liked the most with 5 percent incorporation of the dried amaranths leaf and onion stalk, however, incorporation at 10 and 15 percent were also in highly acceptable zone.

**Table:2, Comparison between the preparation and cooking time of traditional and ready-to-cook nutritious cheela mix**

Particulars	Traditional Besan Cheela	Particulars	Ready-to Cook nutritious mixture	Remark
Collection of Raw Ingredients/ Preparation Time	0 hr 20 min	-	-	
Chopping of raw ingredients	0 hr 10 min	-	-	
Paste making	0 hr 2 min	Paste Making	0 hr 2 min	
Roasting time	0 hr 30min	Roasting time	0 hr 30min	
Total	0 hr 62 min (1 hr 2 min)		0 hr 32 min	The present process reduced time required up to ½ of that required using traditional process

From table 2 observed that the sample of ready-to-cook (RTC) nutritious cheela mixture and traditional besan cheela were compared on the basis of process time required of the cooked products. It is seen that the present process reduces time required up to half of that required using traditional process. Similar work done by **Pardeshi et al. (2013)** developed cold extruded Ready-to-Cook (RTC) mung nuggets and evaluated that one third time than that required for preparation of traditional mung nuggets (wadi).

## II. CONCLUSION

It can be concluded from the results that the incorporation of selected ingredients viz.oats, seeds and vegetables powder in the pulse based nutritious mixture adds variety in diet. During preliminary trials, it was noticed that incorporation of seeds flour more than 5% and vegetables powder and oats at 20 percent was unacceptable in nutritious mixture. At this level of incorporation of oats, seeds and vegetables flour, the appearance and texture of the product was affected i.e. darker in colour, sticky texture and taste wise, bitterness was found by the panels where as 5percent of seeds powder and 10 percent of oats and vegetables incorporation produced good results. Hence, in the present study seeds powder, vegetables powder and oats was incorporated at 5 percent and 10 percent level for the standardized of final recipe (T5) besides reduced time of preparation. Therefore the development of dehydrated ready to cook nutritious mixture has great potential to use

throughout the year for the preparation of several types of other new dishes after rehydration.

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