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Preparation and quality evaluation of Maharashtrian traditional pulse - cereal - spice mix "Metkut"

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Abstract
Metkut is a traditional spice mixtures prepared all over the state of Maharashtra using pulse cereal and spice mix. The Pulse- Cereal - Spice mix "Metkut" was standardized using roasted Bengal gram (50%), black gram (5%), rice (5%), red gram (5%), green gram (10%), sorghum (10%), wheat (5%), spice mix (20.5%) and salt (5%). The prepared Pulse- Cereal - Spice mix "Metkut" was rich in protein (18.24%) and carbohydrates (57.59%). The fat content was found to be 2.86 per cent, fiber 3.85 per cent, total ash 3.36 per cent. The mineral content in Metkut was calcium 9.86mg/100g and iron 7.89mg/100g. The prepared Metkut could be stored for more than a year without any adverse changes in nutrient and sensory attributes.

Keywords: Traditional spice powders, legumes, pulses, cereals, Metkut, protein

Introduction
The demand for processed spice product is increasing continuously with growing consumer's response and awareness about the nutrition and quality. Initially, raw spices were used for food making, subsequently, handmade spices powders were used for cooking. As day passed on, people like tastier and flavoured food, the cause of which comes to true the utilization of the spices and masala powders (processed spices products). Use of whole spices was decreasing in even homes due to being cumbersome and to save time and afford people now-a-days preferred processed spices. Readymade spice mixtures are comparatively more acceptable than individual spices because of ease in cooking, ready to usefulness and variety in products. At present various processed spice products are the part of traditional spice mixtures prepared all over the state of Maharashtra and Metkut is one of them which is consumed all over the state specially in Brahmin community.

There are various national and international brands available for pickles like mango pickle, chili pickle, cucumber/gherkin, onion (prepared/preserved),chutney like mango chutney, tomato chutney and tamarind chutney those are prepared in cottage/ small scale industry. India exports papad, pickles and chutneys to other countries. Over 18000MT of papad worth Rs. 27,701 lacs was exported from India in the year 2014-15, Khedker *et al* (2016) [12]. The traditional food adjuncts in the Vidarbha region include dry chutneys made from roasted pulses, seeds like sesame, peanut and flaxseeds; vegetable chutneys (wet); wadis (small dried balls)made from pulses or millets like sorghum. Powdered chutneys contain pulses and oil seeds eg. Black gram, bengal gram, sesame seeds, groundnut, coconut, etc. and are an excellent supplement to the cereal based vegetarian staple diet for improving the protein quality.

Legumes represent a major source of nutrients, including valuable but incompletely balance protein, particularly in vegetarians' diet (Ghadge *et al.*, 2008) [9]. It has been estimated that the total production of legumes provide almost as much protein (20-30 %) to the world as wheat and over 50 % more than rice or corn (Rockland [13] *et al.*, 1981 and Gopalan [5] *et al.*, 1985). In addition, legumes supply significant amount of energy through carbohydrates (60-70 %), lipids (1-7 %), dietary fibers and minerals (2-5 %), also the legume oilseeds contains reasonable levels of thiamine, riboflavin and niacin (Bressani [2] *et al.*, 1974 and Arora [6], 1977). Legumes and cereals have complementary nutritional effects and their consumption together fulfils the need of balanced protein. (Ghadge *et al.*, 2008) [4].

Spices and condiments are being added not only to impart aroma, taste and colour to the food products but also to preserve the product of having antimicrobial and antioxidant properties. Earlier natural plant and spice extracts were used to prevent spoilage and preserve the food

products (Watts [15], 1962; Pratt and Watts [10], 1964; Mac Neil [8] *et al*., 1973). In addition, sodium chloride a common humectant is added in varying quantities to act as preservative (Kim and Park, 1981) [7] as well as to enhance the palatability of products without adversely affecting its proximate composition (Sofos 1985) [14]. To fulfill the requirement and satisfaction of people, various firms have started manufacturing of spices powder. Masala powders, ready mix powders under their branded names and marketing across the country. Apart from the fulfillment of the consumer requirement the processed spices products industry has started to produce and supply the product in the market.

Metkut is generally consumed as ready to eat spice mixture powder as alone like chutney or with rice, curd, chapatti etc. As it contains different cereal and legume blends the nutritional profile of finished product is very good. The shelf life of the Metkut is also more than six months without addition of any preservative as all the spices added do have preservative action on microbial quality of the same. With selective packaging material the shelf life can be increased to one year or more without any detectable changes in not only sensory quality but also chemical composition and microbial quality. The present study was planned to standardize the Pulse- cereal - spice mix "Metkut" formulation with addition of different ingredients like Bengal gram, green gram, black gram, red gram, sorghum, wheat, rice, different spices for preparation of acceptable quality traditional spice mixture Metkut.

Materials and Methods

Materials: The various ingredients used for formulation of recipe of Metkut were Bengal gram, green gram, black gram, red gram, sorghum, wheat, rice, different spices like mustard, cumin, fenugreek seed, coriander seed, dry ginger, red chilli powder, turmeric powder and salt. All ingredients were bought from the local market at Parbhani Maharashtra and were cleaned of any dirt or impurities.

Fig 1: Raw materials for preparation of Pulse- Cereal - Spice mix "Metkut"

Methods

Spices and cereal legume ingredients used for Metkut preparation were tried with certain modifications for formulation of self-stable spice mixture.

Preparation of Metkut

A spice mix was prepared by weighing the spices and roasting of cumin seeds, fenugreek seeds, coriander seeds and mustard seeds blending with, red chili powder, turmeric powder and dry ginger powder in a mixer grinder and sieving it. Bengal gram, black gram, green gram, red gram, wheat, sorghum and rice were also roasted on a slow flame at 150^0C till brownish colour and the roasted aroma developed. The roasted pulses and cereal blend were ground into a fine powder in the mixer grinder, mixed with spice mix and salt for taste and sieve to yield a uniform size, smooth, free flowing powder. The spice mix recipe was standardized keeping the levels of major ingredients, bengal gram (40%), green gram (10%), black gram (5%), red gram(5%), sorghum (10%), wheat(5) and rice (5%) constant. The composition of spice mix and that of salt (optional) was kept constant at 20.5 per cent and 5 per cent, respectively.

The preparation of Metkut involves two major steps like preparation of spice mix and addition of spice mix with other pulse cereal blend powder premix. The spice mix was standardized through various trials conducted using the different levels of mustard seeds (1-5%), cumin seeds (1-5%), coriander seeds (10-20%), dry ginger powder (0.5%), red chili powder (1-5%) fenugreek seeds (1-5%). Major ingredients in the Metkut recipe were optimized by using three different combinations of bengal gram(30-50%), green gram(10-30%) and sorghum(10-30%) keeping other ingredients like black gram, wheat, red gram and rice as constant i.e. 5 per cent respectively. The formulation of Metkut was standardized after conducting sensory evaluation on the various trials. Ready to eat Metkut was immediately served to panel list member for sensory evaluation to assess the acceptability of product on the basis of sensory attributes attributes color, flavor, taste, body, consistency and overall acceptability according to the method of Amerine *et al*., (1965) [1] on 9 point hedonic scale by a panel of five semi-trained judges where '9' denoted like extremely desirable and '1' denoted dislike extremely.

Proximate analysis

The standardized samples of Metkut were analyzed in triplicate for proximate composition. Moisture, crude fat, total protein, crude fibre and ash contents were estimated using standard methods (Ranganna, 2001) [11].

Storage studies

Metkut samples (100g each) were packaged in polyethylene pouch, home scale regular steel containers with lid and glass bottles. The packaged samples were kept under ambient temperature (15-35°C) conditions for a period of 180 days. The samples were drawn at an interval of 30 days and evaluated for the sensory quality in comparison with a freshly prepared sample.

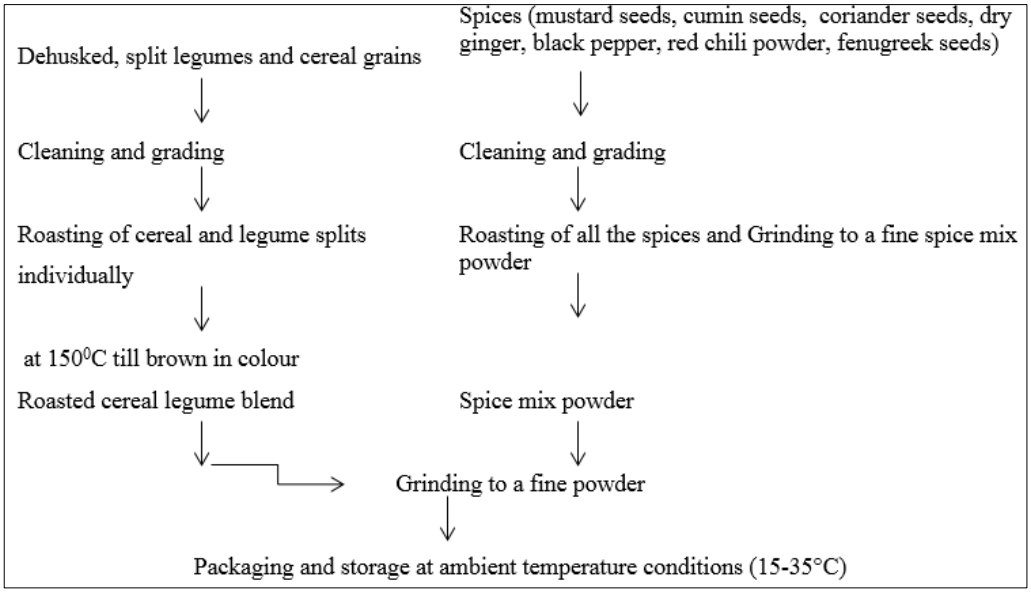

Fig 2: Process flowchart for Preparation of Pulse- Cereal - Spice mix "Metkut"

Fig 3: Pulse- Cereal - Spice mix "Metkut"

Results and Discussion

Proximate composition

The proximate composition for raw materials used for Metkut preparation and Metkut has been given in Table 2 and 3 respectively. The product had a low moisture content of 4.4 per cent. It can be seen that the product is rich in protein (18.24%) and carbohydrates (57.59%). The fat content was found to be 2.86 per cent, fiber 3.85 per cent, total ash 3.36 per cent. The mineral content in Metkut was calcium 9.86mg/100g and iron 7.89mg/100g. The results were in accordance with the research findings of Khedker *et al* (2016) [12].

Table 2: Proximate composition of raw materials (MAJOR) used in Metkut preparation

Ingredients / Parameter	Chick pea (%)	Green gram (%)	Black gram (%)	Red gram (%)	Sorghum (%)	Wheat (%)	Rice (%)
Carbohydrate	54.6	52.62	48.6	58.05	74	71.0	76.0
Protein	22.7	23.86	24.8	24.43	11.3	11.6	7.9
Fat	5.0	1.15	1.64	3.6	3.6	2.0	2.7
Fiber	2.6	2.3	1.3	2.8	2.0	2.0	1.0
Ash	3.0	1.9	1.9	3.36	1.5	1.6	1.3

Table 3: Proximate composition of Metkut

S. No.	Parameter	Value (%)
1	Moisture	4.4
2	Protein	18.24
3	Fat	2.86
4	Fiber	3.85
5	Ash	3.36
6	Carbohydrate	57.59
7	Calcium, mg/100g	9.86
8	Iron, mg/100g	7.89

Effect of different level of major ingredients (Bengal gram, green gram and sorghum) on organoleptic qualities of Metkut.

Table 4: Organoleptic evaluation of Metkut

Sample code	Sensory characteristics				
	Color	Appearance	Flavor	Taste	Overall acceptability
A	7.1	7	7.5	6.9	7.1
B	7.3	8.1	8.1	8.3	7.5
C	7	7.8	7.7	7.9	7.3
S.E.	0.187	0.140	0.140	0.149	0.147
C.D.at 5%	0.578	0.431	0.431	0.459	0.452

Where Sample A: Bengal gram (30%) + green gram (15%) + black gram (5%) + red gram (5%) + sorghum (15%) + wheat (5) + rice (5%) + spice mix (20.5%) + salt (optional) (5%) Sample B: Bengal gram (40%) + green gram (10%) + black gram (5%) + red gram (5%) + sorghum (10%) + wheat (5) + rice (5%) + spice mix (20.5%) + salt (optional) (5%) Sample C: Bengal gram (50%) + green gram (5%) + black gram (5%) + red gram (5%) + sorghum (5%) + wheat (5) + rice (5%) + spice mix (20.5%) + salt (optional) (5%).

The average scores of organoleptic evaluation of the Pulse-Cereal - Spice mix "Metkut" depicted in Table 4. It is revealed from table that the sample 'B' was recorded a highest score in all organoleptic characteristics which makes it more acceptable to the judges. Moreover, among the rest two samples, sample 'C' was also found to be superior in all the organoleptic characteristics except color over sample 'A'. Sample 'B' was found to be significant in taste and flavor which was extremely liked by the judges than sample A but it was at par with sample C.

Conclusion

The recipe of Metkut was standardized using roasted Bengal gram (50%), black gram (5%), rice (5%), red gram (5%), green gram (10%), sorghum (10%), wheat (5%), spice mix (20.5%) and salt (5%). Metkut is rich in protein, carbohydrates with considerable amounts of minerals and vitamins and is used as a functional food adjunct. Spices added for Metkut preparation like mustard seeds, cumin seeds, coriander seeds, dry ginger powder, red chili powder, fenugreek seeds helps in the digestion. The prepared Metkut could be stored for more than a year without any adverse changes in nutrient and sensory attributes. Metkut is a traditional spice powder mix with pulses and legumes so have good nutritional qualities. With proper processing facilities, knowledge regarding packaging material it could get a large range of market in future.

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