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## Development and organoleptic evaluation of herbal mixture for prevention of Metabolic Syndrome

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**Abstract**

Metabolic syndrome describes a group of metabolic irregularities that occur together in an individual. The number of individuals diagnosed with metabolic syndrome has risen dramatically in recent years. Metabolic syndrome significantly raises the risk of developing cardiovascular disease and type 2 diabetes mellitus, obesity, and hypertension. Hence, the prevention of metabolic syndrome is need of the time. Therefore, it is seen that people are looking forward for herbal and natural products to overcome this syndrome, in this regard herbal mixture was developed with natural herbs namely tulsi, ginger, cinnamon, stevia, cardamom, black pepper etc. Trend panel members on 9-point hedonic scale standardized the herbal mixture through sensory evaluation. The best-selected herbal mixture was on twenty percent.

**Keywords:** Cardiovascular disease and type 2 diabetes mellitus, obesity

**Introduction****Metabolic syndrome**

In both developed and developing world, Metabolic syndrome (MetS) is prevalent as clinical challenge and escalating public health due to inactivity, urbanization and high energy intake in the form of processed foods, high obesity and sedentary life habits. Metabolic syndrome is the cluster of various diseases such as diabetes mellitus, obesity and risk of developing cardiovascular disease (CVD) over the next 5 to 10 years (Alberti *et al.* 2009) <sup>[2]</sup>.

**Cumin**

Cumin belongs to the family of Apiaceae (*Cuminum cyminum* L.) is mainly grown in arid and semi arid climate condition mainly in the country such as India, China, Iran and Indonesia. Cumin is aromatic herbaceous, thin and subglabrous dicotyledonous annual plant. Various compounds such as cuminal,  $\beta$ -myrcene,  $\beta$ -pinene,  $p$ -cymene,  $p$ -mentha-1,4-dien-7-ol and  $\gamma$ -terpinene. In terms of its cultivation, cumin is *Homo sapiens* as like coriander that also used as an alternative to pepper and can be used on the bread as paste spreading. It is also used as a spice in ethnic cuisines for its strong flavor around the world. (Mandal *et al.* 2016) <sup>[7]</sup>.

**Ginger**

Gingerol (1-[4'-hydroxy-3'- methoxyphenyl]-5-hydroxy-3-decanone) is the bioactive components from the rhizomes of ginger that exerts various physiological and pharmacological Properties. (Wilkinson 2000a) <sup>[16]</sup>.

**Fennel**

Fennel belongs to the family apiaceae known as *Foeniculum vulgare* (FVE) wic is majorly cultivated in native habitat as Egypt and India and has a long history of Herbal uses in the foods and famous for its strong edible flavored leaves and seeds (Roby *et al.* 2013). Fennel can be used in medicine and foods where traditionally it was acts as carminative (Flatulence control) and used for production of breast milk (Senatore *et al.* 2013), increase libido, promote menstrual flow, facilitate birth, soothes cough and indigestion (Namavar *et al.* 2003, Ostad *et al.* 2001) <sup>[9, 10]</sup>.

### Stevia

*Stevia rebaudiana* is also considered as honey leaf. It can be safe for daily consumption in drinks not occasionally but many times in a day with no side-effects but dried leaves cannot be acceptable in domestic cooking as leaves green color (Rajbhandari and Roberts 1985, Tsanava *et al.* 1991) <sup>[11, 15]</sup>.

### Black Peeper

Black pepper (*Piper nigrum* L.) is considered as the “King of spices” which is widely used as flavor in the food and spice to enhance flavor, dishes and to enhance the taste of the food as main ingredients and can be used as spreads in pasta and pizza. It possess various bioactive phyto- compounds and biological properties (Critical Reviews in Food Science and Nutrition)

### Cardamom

Cardamom (*Elettaria cardamomum*) is the family of Zingiberaceae. Cardamom have two subspecies such as *Elettaria* and *Amomum* in which green or true cardamom as *Elettaria* and black white, or red cardamom stands for *Amomum* (Mays *et al.*, 2014) <sup>[8]</sup>.

### Cinnamon

Overall, 250 species are identified among the cinnamon genus all over the world. Cinnamaldehyde and trans cinnamaldehyde are the main constituents present in

Cinnamon (Yeh *et al.* 2013) <sup>[4]</sup>.

### Carom seeds

Carom seeds (*C. copticum*) belongs to the family of Apiaceae plants. It also called as Ajwain in Hindi. It is also an Egyptian aborigine plant which grows in arid and semi arid condition in the regions central Europe, Asia, India (Rajasthan, Gujarat, and West Bengal), Iraq, Afghanistan, Iran (Baluchistan) and Pakistan (Zargari *et al.* 1996, Zahin *et al.* 2010) <sup>[1, 6]</sup>.

Carom seeds extensively used as food additive and also for therapeutic use in India and also known as Persian traditional medicine.

It also act as antidyspnea, antitussive, antilithiasis, amoebiasis expectorant, antiseptic, antiparasitic, antimicrobial, antiplatelet-aggregatory, and bronchodilatory effect. It also helpful i gastrointestinal disorders, reflux, infection disorders, cramps, abdominal tumors, and abdominal pain (Zarshenas *et. al.* 2013) <sup>[5]</sup>.

### Tulsi

Tulsi is famous by various names such as “The Queen of Herbs,” “Mother Medicine of Nature,” “elixir of life” and “The Incomparable One” that possess both type of properties as spiritual and medicinal Within Ayurveda (Singh *et al.* 2010) <sup>[14]</sup>.

### Methodology

**Table 1:** Shows the Ingredients and its variation

S. No.	Ingredients	Variations					
		5%	10%	15%	20%	25%	30%
1.	Herbal Powder	10g	20g	30g	40g	50g	60g
2.	Cumin seeds	5g	5g	5g	5g	5g	5g
3.	Carom seeds	5g	5g	5g	5g	5g	5g
4.	Fennel seeds	20g	20g	20g	20g	20g	20g
5.	Black peeper	0.5g	0.5g	0.5g	0.5g	0.5g	0.5g
6.	Black salt	0.2g	0.2g	0.2g	0.2g	0.2g	0.2g
	Total Weight of Mixture	40.7g	50.7g	60.7	70.7	80.7	90.7

### Method of Preparation

#### Herbal mixture

- Cumin seeds, Carom Seeds, Fennel Seeds were Roasted at low flame for 5 to 10 minutes.
- All the roasted seeds were grind separately
- Seeds powder was prepared after grinding.
- Further, Herbal Powder was added at different ratio such as 5, 10, 15, 20, 25 and 30 with prepared herbal seed powder
- Black salt and Black pepper were added in herbal powder
- Finally herbal mixture was prepared.

### Sensory evaluation of developed products

The acceptability of gravies was evaluated by a panel of 10 judges using 9-point Hedonic Scale (Ranganna, 1986) to test the liking or disliking of products. Semi -trained panel did the evaluation. The panelist asked to record the level of liking or disliking by giving marks for various characteristics of the products. The samples were rated on 9-point Hedonic Scale for quality attributes according to following grade descriptions and scoring.

### Result and Discussion: Development and Distribution of Herbal premix

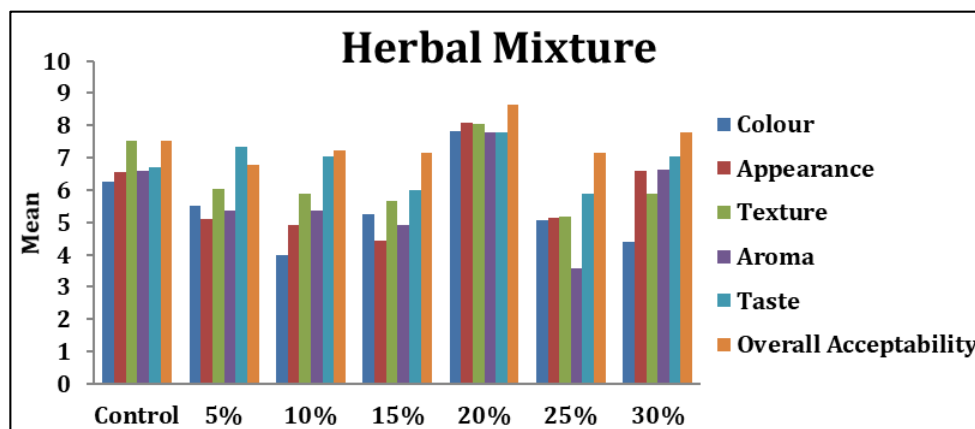
– various products were developed with the use of herbal premix further physiochemical and shelf life assessment of premix was evaluated and dietary intervention of premix was observed on selected subjects for ninety days.

In the present study, Herbal mixture were prepared with the variation of 5%, 10%, 15%, 20%, 25% and 30% in corporation with herbal premix and the mean score assigned for its attributes by panel members has been presented in the above table that depicted the highest score for all sensory attributes was at 20%. Among the treatment of herbal mixture, it was found that in color, 20% (7.83±0.7) with followed by control (6.25±0.13), and 25% (5.07±2.21) was accepted. In appearance at 20% (8.07±0.49) with control (6.57±0.21) and next to 30% (6.6±0.46). Similar, pattern was observed in other sensory attributes of herbal mixture.

Statistical data revealed that there was significant difference in a mean score for color at 10%(3.97±0.96), Aroma 25%(3.57±1.15) and over acceptability was on 10%(6.77±0.6) and 20%(8.63±0.25) whereas highly significant mean score were observed in appearance 10%(4.49±1.54) and 15%(4.43±0.12) with compare to other variation.

**Table 2:** Mean Acceptability scores of Herbal Mixture prepared by incorporating Herbal Premix

Sensory Evaluation of Herbal Mixture												
Variation	Colour		Appearance		Texture		Aroma		Taste		Overall Acceptability	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Control	6.25	0.13	6.57	0.21	7.53	0.35	6.6	0.3	6.72	0.2	7.52	0.39
5%	5.5	1	5.1	1.71	6.03	1.27	5.37	1.51	7.33	1.32	6.77#	0.6
10%	3.97#	0.76	4.9#	1.54	5.87	0.67	5.37	1.85	7.03	0.67	7.23	0.42
15%	5.27	0.97	4.43#	0.12	5.67	1.52	4.93	1.8	6	1.13	7.17	0.31
20%	7.83	0.7	8.07	0.49	8.03	0.38	7.77	0.29	7.8	0.36	8.63#	0.25
25%	5.07	2.21	5.13	0.55	5.17	0.85	3.57#	1.15	5.87	0.57	7.17	0.32
30%	4.4	0.85	6.6	0.46	5.87	2.41	6.63	0.51	7.03	0.9	7.8	0.4
F-value	3.980		5.728		2.087		3.685		2.135		6.924	
p-value	.016*		.003**		.120		.021*		.114		.001**	

**Fig 1:** Mean Acceptability scores of Herbal Mixture prepared by incorporating Herbal Premix

It is noted from the above data that the panel list like herbal mixture with 20% incorporation of herbal products on the overall basis and 20% herbal mixture was selected for the further investigation of the study.

### Conclusion

Metabolic syndrome is defined as combination of various disease such as obesity, diabetes mellitus and hypertension e.t.c. due to lack of time, activity, sedentary lifestyle, consumption of processed foods such as juice ready to eat foods that undergoes high heat production. Thus, people are keenly interested towards herbal products and organic foods that have no side effects and safe for consumption.

Hence, in this study herbal mixture was prepared with the use of various herbs such as cumin seeds, fennel, black pepper, ginger, cinnamon, cardamom e.t.c at different variation further it was evaluated by the selected panel members at 9 point hedonic scale on the variables color, texture, taste e.t.c in which highest acceptability was given to 20% of herbal mixture.

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