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## JOWAR CHIVDA

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### ABSTRACT

Jowar chivda is developed as a snack for a cardiovascular disease individual. It is based on a traditional Maharashtrian savoury item, "Pohyancha Chivda". The traditional recipe is modified in aspects to improve its fiber, fat and sodium content. Jowar is used as it is high in fiber which makes it beneficial for CVD. Other ingredients like flaxseeds, sesame seeds confer benefits on CVD. Jowar when compared with traditional poha is not only more adequate for CVD but also better nutritionally. After designing this product, sensory evaluation was conducted by 14 naive panel members and 4 expert panel members using 5 point ranking scale. The product was standardised. The product provides up to 14g of fiber and moreover low in sodium.

**Keywords:** Jowar chivda, Pohyancha (rice flakes) chivda, CVD, Fiber.

### INTRODUCTION

Cardiovascular disease is a group of interrelated diseases that include coronary heart disease (CHD), atherosclerosis, hypertension, ischemic heart disease, peripheral vascular disease, and heart failure. These diseases are interrelated and often coexist. An estimated 81,100,000 adult Americans (one in three) have one or more types of CVD. In 2010 it was estimated that 1.26 million Americans had a new or recurrent coronary attack (American Heart Association [AHA], 2010). Hence product planned was high in fiber, low in fat and sodium (Stradling, 2013).

Jowar chivda was finalised based on the results of sensory evaluation and was improved by adding functional foods such as flaxseeds and garlic. It was based on the Maharashtrian traditional savoury "Pohyancha chivda". The traditional recipe was modified in order to improve the fiber content and lower the fat and sodium content. Jowar has considerable amount of fiber (9.7g/100g) of fiber. Flaxseeds and sesame seeds provide a proper balance of  $\omega 3$  and  $\omega 6$  fatty acids beneficial in cardiovascular disease.

### AIM

Aim of the study is to develop a food product for CVD patients

### OBJECTIVES

- To modify a traditional food product and develop a modified product suitable for CVD patients.
- To analyze acceptability using sensory evaluation of the product.
- To standardize the product.

### METHODOLOGY

#### DEVELOPING THE FOOD PRODUCT

- Rice flakes replaced by jowar to improve the fiber content.
- Dry coconut was removed to lower the saturated fat content.
- Salt content is lowered to reduce the sodium content.
- Sugar was reduced as it increases calories without other nutritional benefits
- Flaxseeds & sesame was added as a functional food to balance the  $\omega 3$  and  $\omega 6$  fatty acids necessary to prevent cardiovascular disease.
- Amount of groundnut was reduced to decrease the fat content.
- Other ingredients are similar in both the recipes.

**Table no: 1 - Recipes of Pohyancha chivda and Jowar chivda (100g)**

Pohyancha chivda		Jowar chivda	
Rice flakes	100g	Jowar	100g
Chana dal	7.5g	Chana dal	7.5g
Dry coconut	20g	Flaxseeds	5g
Groundnut	10g	Groundnut	5g
Curry leaves	5g	Curry leaves	5g
Garlic	10g	Garlic	10g
Oil	20g	Oil	10g
Sugar (powdered)	10g	Sugar (powdered)	2g
Chillies	5g	Seasame seeds	5g
Other ingredients	Turmeric, mustard seeds, coriander seeds, salt, asafoetida		

**Table -2 Pohyancha chivda (100g)**

Ingredients	Amount (gm)	Energy (kcal)	CHO (gm)	Protein (gm)	Fat (gm)	TDF (gm)	Na (mg)
Rice flakes	100	346	77.3	6.6	1.2	-	10.9
Chana dal	7.5	28	4.5	1.56	0.42	1.4	5.45
Dry coconut	20	132	3.68	1.36	12.5	-	-
Groundnuts	10	56	2.6	2.52	4	1.1	-
Sugar	5	20	5	-	-	-	-
Salt	5	-	-	-	-	-	726
Oil	20	180	-	-	20	-	-
<b>Total</b>		<b>762</b>	<b>93.08</b>	<b>12.04</b>	<b>38.12</b>	<b>2.5</b>	<b>742.35</b>

**Table 3 - Jowar chivda (100g)**

Ingredients	Amount (gm)	Energy (kcal)	CHO (gm)	Protein (gm)	Fat (gm)	TDF (gm)	Na (mg)
Jowar	100	349	72.6	10.4	1.9	9.7	7.3
Flaxseeds	5	27	1.5	1	1.9	1.37	-
Seasame seeds	5	28	1.25	0.9	2.16	0.85	-
Chana dal	7.5	28	4.5	1.56	0.42	1.14	5.47
Groundnut	5	28	1.30	1.26	2	0.55	-
Sugar	2	8	2	-	-	-	-
Salt	2	-	-	-	-	-	363
Oil	7.5	67	-	-	7.5	-	-
<b>Total</b>		<b>535</b>	<b>83.15</b>	<b>15.12</b>	<b>15.88</b>	<b>13.61</b>	<b>375.77</b>

**Table no 4 - Comparison between traditional Pohyancha chivda and Jowar chivda for 100g**

Sr. No	Nutrients	Units	Poha chivda	Jowar chivda	RDA for men	RDA for women
1	Energy	Kcal	762	535	2320	1900
2	CHO	Gm	93.08	83.15	-	-
3	Proteins	Gm	12.04	15.12	60	55
4	Fat	Gm	38.12	15.88	25	20
5	TDF	Gm	2.5	13.61	-	-
6	Na	Mg	742.35	375.77	-	-

RDA reference [4]

**Table -5 Standardisation of product**

Ingredients	Amount
Jowar pops	100 gm
Flaxseeds & aniseeds	5 gm + 5gm
Seasame seeds	5gm
Garlic cloves	6-7 cloves
Coriander seeds	5 gm
Mustard seeds	5gm
Curry leaves	6-7 leaves
Asafoetida	½ tsp
Turmeric	1tsp
Salt	¼ tsp
Sugar powder	½ tsp
Oil	10 gm

#### METHOD OF PREPARATION

Pop jowar in a microwave

↓  
Heat an iron kadhai

In oil splutter mustard seeds, sesame seeds, coriander seeds, garlic cloves, curry leaves, aniseeds

↓  
Add asafoetida, turmeric powder and flaxseeds

↓  
Pour puffed jowar into it and stir continuously

↓  
Turn off the gas and sprinkle salt and sugar powder

↓  
Stir it well

#### EVALUATION OF THE PRODUCT

Sensory evaluation was done to find the acceptability of the product on the basis of ranking scale with the characteristics of colour, texture & aroma, concept, taste and after taste. This test was done by 14 naive panel members and 4 expert panel members.

#### RESULTS AND DISCUSSION

Certainly modified food product has lowered the total energy and carbohydrates as compared to traditional recipe. It contains good amount of protein, total dietary

fiber (TDF) and low sodium as compared to the traditional recipe. Traditional recipe is higher in fats than modified product. The fats in the traditional recipe are more of saturated fat as it is provided by coconut but modified product contains fat from flax seeds, sesame seeds which provide  $\omega 3$  and  $\omega 6$  fatty acids. In sensory evaluation the product was ranked “excellent” from both the panel members. The product was acceptable.

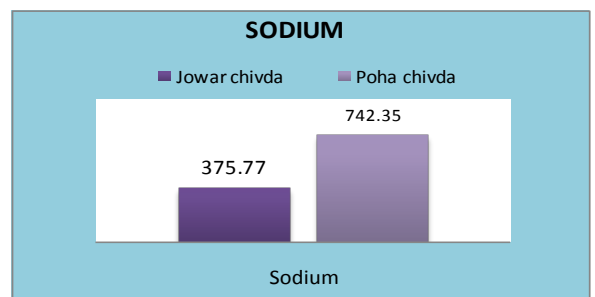
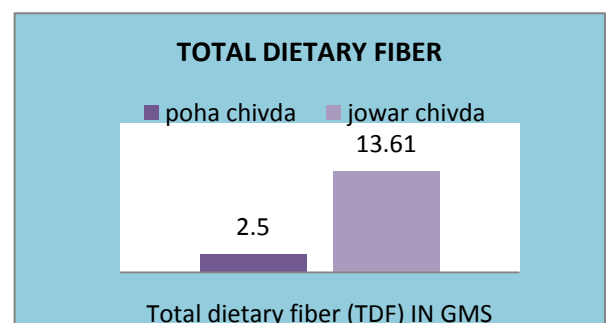
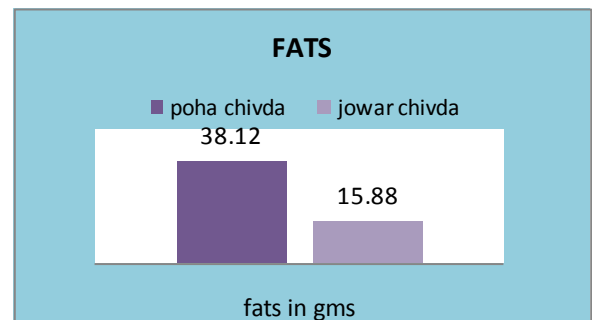
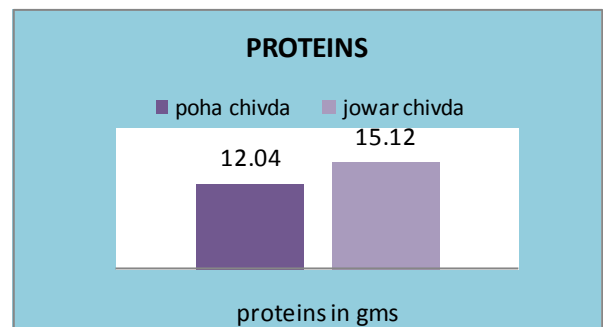
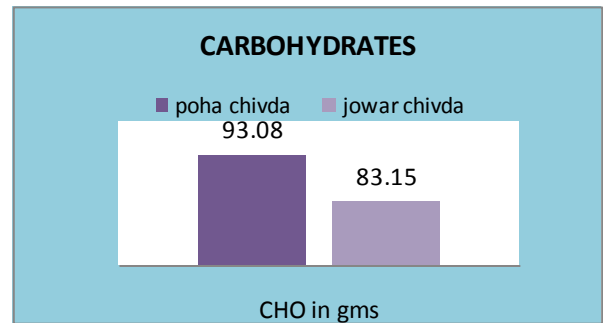
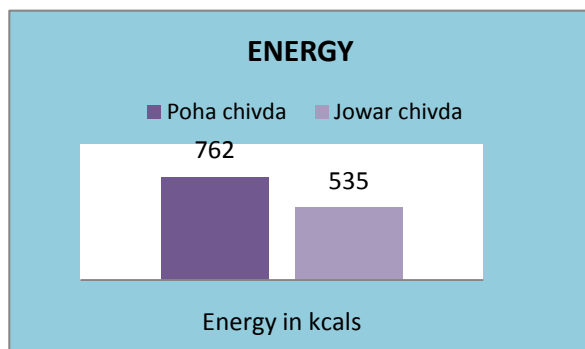
**Table 6 – sensory evaluation report**

Characteristics	Naive panel members (average)	Expert panel members (average)	Out of
Colour	4	4	5
Texture & aroma	4	3.5	5
Concept	4	4.5	5
Taste	4	4	5
After taste	4	4	5
Total	20	20	5
Percentage	80%	80%	100%

**Table no: 7 - sensory evaluation report**

Characteristics	Naive panel members (average)	Expert panel members (average)	Out of
Colour	5	5	5
Texture & aroma	5	5	5
Concept	5	5	5
Taste	5	5	5
After taste	5	5	5
Total	25	5	25
Percentage	100%	100%	100%

The product was ranked “very good” during the first sensory evaluation test. Furthermore improvements were done and sensory evaluation ranked the product “excellent” by both the panel members and the product was then standardised.



**Figure 1 – Nutrients present in Jowar chivda**

## CONCLUSION

Jowar chivda with jowar as a main ingredient being high in fiber is beneficial in CVD. Jowar chivda was further enriched with flaxseeds, sesame seeds which have made this product a functional food with high biological value.

## DISCUSSION

A one cup serving of jowar contains 12 grams of dietary fiber. The amount supplies approximately 48% of the Food and Nutrition Board's recommended dietary allowance of the fiber for the average adult. Compared to rice, jowar contains a much higher concentration of fiber. According to a 2009 study published in "Nutrition Reviews" Hamid M, et al., a diet rich in fiber foods may lower the risk of obesity, stroke, high blood pressure, heart disease, diabetes, elevated blood cholesterol and digestive problems (Healthyating.sfgate.com).

Flaxseeds are not only high in  $\alpha$  linolenic acid ( $\omega$ -3 fatty acids) but also in fiber, lignans and micronutrients. Meta-analysis consisting 28 studies including flaxseeds intervention concluded that whole flaxseeds lowered serum total and LDL cholesterol especially in postmenopausal women with high cholesterol levels at baseline (Pan et al., 2009).

Sesame contains high levels of natural antioxidants like sesamin, sesamol and sesamol which prevent it from oxidative free radical damage to a great extent. Sesame is rich in  $\omega$ -6 poly unsaturated fatty acids. Sesame ingestion improved blood lipids and antioxidant status. Subjects consuming sesame seed powder for 5 weeks showed a significant reduction in plasma total cholesterol, LDL cholesterol, LDL to HDL cholesterol ratio, reactive substances in oxidised LDL (Wu et al, 2006). Phytosterols present in sesame seeds are shown to lower cholesterol. Sesame is rich in calcium (Wu, 2006).

Human clinical trials have demonstrated the cardiovascular protective properties of peanuts and peanut oil in decreasing total and low density lipoprotein cholesterol (LDL-C) without reducing high density lipoprotein cholesterol (HDL-C) (Stephens et al., 2010).

Epidemiological studies suggest that garlic may have beneficial effects on risk factors associated with cardiovascular disease (CVD) as it acts as a vasodilator (Martijn et al., 2010). Thus this product which is an amalgamation of all these functional foods is widely suitable for people who are suffering from lifestyle disease.

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