



Development of Flaxseeds Ladoos for arthritis patients in Gorakhpur city

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Abstract

The prevalence of arthritis in India, an analysis done by SRL diagnostic laboratories revealed that more women than men in India are suffering from rheumatoid arthritis. The analysis also revealed that high ESR and CRP levels prescribed in patients of arthritis. Arthritis affects more than 180 million of people in India. Around 14% of Indian population seeks a doctor help every year of this joints diseases. The most prevalent form of arthritis, osteoarthritis has been affecting 15 million adults annually with a prevalence ranging 22% to 39% in India. Osteoarthritis is most commonly observed in women and more prevalent with aging studies have observed that nearly 45% of the women over the age of 65 years symptoms, while radiological evidences is found 70% of those over 65 years. Alarming, India will emerge as the capital of osteoarthritis by 2025 with more than 60 million to be likely affected. Ironically one of the main reasons is the increasing longevity of India population another being fast rising obesity. Arthritis is disorder that affects joints. Symptoms include joints pain and stiffness. Flaxseeds, which is one of the best seeds which removes the joints problem. Flaxseeds contains heart healthy omega-3 and fiber. Flaxseeds is high in ALA (Alpha Linolenic Acids) a type of omega-3 fatty acids that converts into EPA and DHA, omega-3 is also known as anti-inflammatory properties.

Key words: Flaxseed, Ladoos, Arthritis, Patients, omega-3.

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Introduction

Arthritis pain affects millions of people worldwide yet we still have only a limited understanding of what make our joints ache. The most prominent reasons for loss of joints mobility and function is chronic or episodic pain which leads to physiological distress and impaired quality of life. Arthritis is most often used to mean any disorder that affects joints. Symptoms generally include joints pain and stiffness, inflammation and decreased motion of joints. The most common are osteoarthritis and rheumatoid arthritis (Rennie *et al.*, 2003). Osteoarthritis occur with age affects finger, knee and hip and rheumatoid is auto-immune that effects only hand and feet (Merashly and Uthman, 2012). In shot millions of patients are suffering from the effects of joint pain for

which there is no satisfactory treatment. Osteoarthritis is higher especially in elderly and middle-aged people and nearly about 70% of 65+. 40% of the people suffering from osteoarthritis say by the experts of WHO. The prevalence of osteoarthritis of elderly is nearly about 56.6% in India. Community survey data in rural and urban areas of Indian scenario showed prevalence 17-60.6%. Flaxseeds is one of the best seeds which gives relief from joints pain, inflammation not only joints pain but type-2 diabetes, heart diseases, cholesterol, blood pressure and cancer also.

Flaxseeds are also called linseeds and it has been grated as the healthy foods. This is due to heart healthy content of omega-3 fatty acids. Flaxseed is high in ALA (Alpha Linolenic Acids), a type of omega-3 fatty acids that can be converted into DHA and EPA. Study on flaxseeds shown that it improves the

symptoms of arthritis too. But, omega-3 is also known as anti-inflammatory. Dietary recommendation of flaxseeds is 30gm daily, in capsule form (1000-1300) mg and in form of flaxseeds oil 1-3 tablespoon and dietary recommendation of omega-3 fatty acids is 2.2gm of ALA and 0.22g/ day of EPA and DHA.

In the study we see that most of the elderly and old-aged people are affected from arthritis. The prevalence of osteoarthritis among elderly people is nearly about 56.6% in India. Community survey data in rural and urban areas in India showing prevalence of arthritis is 17%-60.6%. Flaxseed is an important food product for arthritis. Therefore, objective of the present study was to develop the product and access the effects of product on arthritis patients.

Methodology

The present study was to combat the symptoms of arthritis patients. A survey was conducted by selecting the nearby area in the Gorakhpur city for this study. The areas of Gorakhnath were selected for this study. They are the main areas of Gorakhpur city. The study was done on 50 arthritis patients in these two areas of Gorakhpur city. After, the survey was conducted on arthritis patients and then products were also developed for arthritis patients to get relief from the symptoms of arthritis. As the developed products were given for one week and was seen the positive effects of the product were seen among the arthritis patients.

Development of product: Flaxseeds laddoo, Ingredients used in this laddoo are flaxseeds 100 g, ghee 20 g, jiggery 30 g, almonds 20 g, cashew nuts 20 g. Method of making laddoo is take a pan and dry roast flaxseeds very carefully. Then the powdered the flaxseeds into fine powder. Then take a pan add ghee and slowly put the powdered flaxseeds and stir continuously so that it gets mix with ghee and jiggery to it slowly add almonds and cashew nuts finely chopped. Mix all the ingredients so that flaxseeds and other ingredients gets mixed and make laddoo of it.

Physio-chemical analysis: Energy, Carbohydrate, Protein, Fat, Moisture, Ash.

After the tools were developed then the self-prepared questionnaire were made in which the general (age, sex) and specific BMI were calculated. Then, the data was collected before and after consumption of product by the patients. These data were presented in tabular form and analyzed by percentage method.

Moisture Content: (IS-12711:1989), Bakery and Confectionary products (laddoo, biscuits, breads etc).

Apparatus: Moisture, disk, oven, desiccator.

Procedure:

- Weigh accurately about 5gm of the prepared samples in the moisture disks.
- Previously dried in oven at 105 degree and weighed.
- Place the disk in the oven maintained at 105±2 degree for four hours.
- Cool in the desiccator and weigh repeat the process of drying, cooling and weighing at
- 30 min in the difference between the two consecutive weighing is less than 1mg.
- Record the lowest mass.

Calculation: Moisture percentage by mass: $100 \times (M_1 - M_2) / (M_1 - M)$

Where,

M_1 = Mass in gram of the dish with the material before drying.

M_2 = Mass in gram of the dish with the material after drying to constant mass.

M = Mass in gram of the empty dish.

Total ash in flaxseeds laddoo (IS12711:1989)

Apparatus: Dish, silica, desiccator, muffle furnace.

Procedure:

- Weigh accurately about 5gm of the prepared samples in the tared and clean the dry silica dish.
- Ignite the material in the dish with the flame of the suitable burner of about one hour.
- Complete the ignition by keeping in a muffle furnace at 500±10 degree until the grey ash results.

- Cool in desiccator and weigh.
- Repeat the process of igniting, cooling and weighing at one hour interval until the difference between two successive weighing is less than 1gm.
- Note the lowest mass and preserve the ash for the determination of insoluble ash.

Calculation:

Total ash (on dry basis), percent by mass = $(M_1 - M) \times 10,000 / (M_1 - M) (100 - W)$
 $M_2 =$ Mass in gram of the dish with the ash.

$M_1 =$ Mass in gram of the dish with the material taken for the test.

$M =$ Mass in gram of the empty dish.

$W =$ percent moisture in the sample

Fat in flaxseeds ladoo [IS 12711:1989]

Apparatus: Soxhlet Extraction Apparatus.

Reagents: Petroleum Ether 40-60 degree.

Procedure:

- Weigh accurately about (10-30) gm of the dried material sufficient to give about 1gm of fat in the thimble and dry for 2 hours at 100 ± 2 degree.
- Place the thimble in the soxhlet extraction apparatus and extract with the solvent for about 16 hours.
- Dry the extract contained in soxhlet flask, the empty mass of which has been previously determined by training at (95-1000) degree for an hours.
- Cool in desiccator and weigh, continue the alternative drying and weighing at 30 min interval until the loss in mass, between two consecutive weighing is not more than 2mg.
- Record the lowest mass.

Calculation: Fat percent by mass = $100(M_1 - M_2) / 100$.

Where,

$M_2 =$ Mass in gm in the empty soxhlet flask clean and dry.

$M_1 =$ Mass in gm of the soxhlet flask with the extracted fat.

$M =$ Mass in gm of the material taken of the test.

Protein in flaxseeds Ladoo [AOAC-978.04]

Reagents

1. Potassium Sulphate (anhydrous).
2. Cupric Sulphate (anhydrous).
3. 40% NAOH solution.
4. 4% Boric Acids solution.
5. Mixed indicators (Bromocresol Crystal Green+ Methylene Red).
6. Standard Hydrochloric Acids (0.1N).
7. Standard Sodium Hydroxide (0.1N).

Apparatus

- Automated Biokjjet (Protein Estimation Machine).
- Digestion Units (Multi-Program/ Profile PID Controlled).
- Biodistillation Fests (Distillation Units).
- Bioscrub ES Controller Panel (Fumes Neutralises/Controller).

Procedure

1. Weigh 0.5 to 1.000 gm test proteins into digestion tube.
2. Add 3.0 gm potassium sulphate, 0.5 gm anhydrous cupric sulphate.
3. Add 10 ml of concentrated H_2SO_4 .
4. Place the tube with rakin digestion units and lock the tube with bioscrub fume nutilises.
5. Select the start program. 01 and click the start.

Adjust the temperature

- 250 degree-10 min
- 300 degree-10 min
- 350 degree-10 min
- 420 degree-75 min

Automatic Distillation: Place the tube into automatic digestion units add 40% NAOH in tube and 4% boric acids, 25 ml in receiver by machine. Select the program 0.1 distillation will complete in 9 min.

Titration manual: Remove the receiver flask. Add the mixed indicator 2-3 drops and titrate with 0.1 N HCL/ 0.1N H_2SO_4 end point shows pink colour.

Calculation: $14.01 \times (\text{sample T.V.} - \text{blank T.V.}) \times N \times PF \times 100 / \text{sample weigh} \times 1000$

Where,

Sample T.V. = volume of acids neutralize in the blank.

N = normality of acids.

PF= nitrogen to protein conversion factor.

Carbohydrate: Carbohydrate was determined by SP 18 (P-6n198) method. Carbohydrate content was calculated by subtracting the moisture, protein, fat and ash content from the total mass/

Calculation: Carbohydrate content= {moisture + protein+ fat + ash}.

Determination of energy in flaxseeds ladoo: Total energy of product is to determine by the formula.

Calculation: Total energy= $4 \times (C+P) + 9(F)$

Where, C= Carbohydrate, P=Protein, F=Fat

Results and Discussion

Table 1 revealed that the nutrient present in the developed product. Nutrients analysis were shown in macronutrients and micronutrients. The carbohydrate 43.11%, protein 20.39%, fat 25% were analyzed in the developed product. The micronutrients such as moisture 8.8% and ash 2.7% were observed.

Table 1: Nutrients analysis of the developed product

S. No.	Nutrient analysis	Content (%)
1.	Moisture	8.8
2.	Ash	2.7
3.	Fat	25
4.	Protein	20.39
5.	Carbohydrate	43.11

Table 2 revealed that maximum BMI range of the arthritis patients were no under-weight patients, but the 10% of the arthritis patients were normal weight (18.5-24.9) BMI,

30% Of the arthritis patients were overweight (25- 29.9) BMI and 60% of the arthritis patients were obese (more than 30) BMI.

Table 2: Percentage distribution according to the BMI of the arthritis patients

S. No.	Bmi-range	No. of patients	Percentage
1.	Under weight(less than 18.5)	-	-
2.	Normal weight(18.5-24.9)	5	10%
3.	Over weight(25-29.9)	15	30%
4.	Obese(more than 30)	30	60%

Table 3 revealed that 24% of the patient were having rubbing of joints, 30% of the patients were having joints pain, 22% of the patients were having swelling near joints, 24% of the patients were having stiffness of joints in pre-analysis. And the 24% of the patient were

having rubbing of joints, 26% of the patients were having joints pain, 26% of the patients were having swelling near joints because in this most of the women were obese therefore 2% is increased and 12% of the patient were having stiffness in joints.

Table 3: Percentage distribution according to the symptoms of arthritis patients.

S. No.	Symptoms of arthritis	Pre		Post	
		No. of patients	Percentage	No. of patients	Percentage
1.	Rubbing of joints	12	24%	12	24%
2.	Joints pain	15	30%	13	26%
3.	Swelling near the joints	11	22%	13	26%
4.	Stiffness of joints	12	24%	12	24%
	Total	50	100%	50	100%

Conclusion

At last we conclude that the positive effects of the developed product were seen among the arthritis patients were getting relief in arthritis symptoms. If the product will be used for a long time it will show more positive response in treating arthritis.

References

1. Merashly, M. and Uthman, I. (2012). Management of knee osteoarthritis- An evidence-based review of treatment options. The Lebanese Medical Journal, 60 (4): 237-242
2. Rennie K.L., Hughes L, Lang R, Jebb S.A (2003). Nutritional management of rheumatoid arthritis- Journal on Human Nutrition and Dietetics, 16 (2): 97-109.

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