



Formulation And Sensory Evaluation Of High Fibre Multigrain Bar With Ashwagandha And Different Seeds

Subhangi Dey, Anuradha Shekar

Dr BMN College of Home Science, Matunga, Mumbai

Department of Food Science and Nutrition

ABSTRACT: In this International millet year, ayushman bar a product that is a combination of multi grain, millets that contain jowar, bajra, ragi, soya bean, barley, corn, bengal gram, wheat grain with flax, watermelon, white sesame seeds that will lower your chance of developing type 2 diabetes, heart disease, colorectal cancer, and obesity, and gut related health issues, This product is high in fiber, calcium, magnesium and other minerals, It's different from other product as it has the benefits of ashwagandha which improves a person's memory, attention, concentration, serenity, and alertness. The purpose of this study is to create a nutritious ready-to-eat ayushman bar that will instantly offer a range of advantages in a matter of seconds, further its evaluated by sensory to ascertain how long it will last. The packaging, nutritional labeling, budgeting, and marketing factors will all be examined in the study.

Keywords: multigrain,ashwagandha,flax seeds,gut health,white sesame seed, marketing, budgeting, shelf life

INTRODUCTION

These products are a combination of multi grain that contain high fiber with various seeds that contain many nutrients and benefits. It has been hypothesized that eating whole grains regularly will lower your chance of developing type 2 diabetes, heart disease, colorectal cancer, and obesity. The gut microbiota, a diverse and dynamic collection of microorganisms found in the human gastrointestinal (GI) tract, has a significant impact on the host during homeostasis and disease. Short chain fatty acids (SCFA) are an important energy source for intestinal mucosa therefore fiber is the major constituent that promote the growth of SCFA in the gut.[1] As these product contain these multigrain atta that contain these ingredients,jowar, bajra,ragi,soya bean,barley,corn,bengal gram(chana),wheat grain it includes all the benefits, also the seeds that is added in these product which includes flaxseed lower inflammation and stop cholesterol from building up in your heart's blood arteries.[2]

potentially protective against cancer lignans,Some research links flaxseed consumption to a reduced risk of breast cancer, especially in postmenopausal women, Also full of fiber as insoluble fiber bulks up the stool, which may prevent constipation and encourage regular bowel movements.[3]Secondly it contains watermelon seeds which enhances cognitive functioning, tranquility, and alertness.Char Magaz, a potent antioxidant that nourishes the skin, aids in lowering the body's risk of free radical damage. Being a rich source of fatty acids, the oil seeds prevent many ageing symptoms, including wrinkles, fine lines, dark circles, and spots. Additionally, skin cancer risk is decreased.improves cardiac performance. The amount of proteins found in watermelon seeds not only improves hair health by encouraging hair growth but also regulates hair loss. As it also contain sesame seeds which may reduce cholesterol [8]Last but not the least, the important herb ashwagandha (*Withania somnifera*) is its scientific name, although it is commonly referred to by a number of other names, such as "Indian ginseng" and "winter cherry."

Ashwagandha is a tiny shrub with yellow blooms that is indigenous to Southeast Asia and India. There are several illnesses that can be treated using extracts or powder from the plant's root or leaves, including anxiety and problems with conception. minimize anxiety and stress.It reduces oxidative stress, may enhance mental processes, including memory, Ashwagandha supplementation might enhance cognitive function. Early research suggests that ashwagandha may enhance cognitive functioning in several populations, including older persons with mild cognitive impairment and people with schizophrenia. It helps to executive function, attention, response time, and cognitive task with better performance,Ashwagandha is commonly used to encourage sound sleep, and some research indicates it may be effective for other sleep-related problems.reasonably secure and widely accessible, Although its long-term effects are not known, ashwagandha is generally regarded as a safe dietary supplement..

Further ghee and jaggery are the most organic taste booster ingredients that can be added in these products to enhance the flavor to increase its accessibility in terms of smell, taste, after taste, its texture, color. These product is tested on the above following basis.[13]

OBJECTIVE:

1. To design a nutrition label
2. To check the shelf life of the product
3. To ensure the standardization of the product
4. To design a suitable packaging for the product

While brainstorming, a variety of goods were initially considered, but multigrain atta bar and multigrain atta ashwagandha powder mix were the recipes which were zeroed on.

METHODOLOGY: An innovative item constructed of multigrain atta bars with different seeds and ashwagandha, which is not typically seen or used in commercial preparations, was created as part of the Food Science and Nutrition undergraduate curriculum. There are no multigrain bars with ashwagandha to be found in stores or online.

Multigrain atta: With significant advantages, it contains wheat, jowar, bajra, ragi, soya beans, barley, and corn. In addition to ashwagandha advantages, these products also contain flaxseed, watermelon seed, and white sesame seed. These millets have been discovered to be high in fiber, high in protein when compared to wheat or rice, high in energy, and they also have a decreased incidence of coronary heart disease and a number of malignancies. Due to the benefits of ashwagandha, these products also contain flaxseed, watermelon seed, and white sesame seed. It enhances a person's memory, focus, attention, calmness, and alertness.

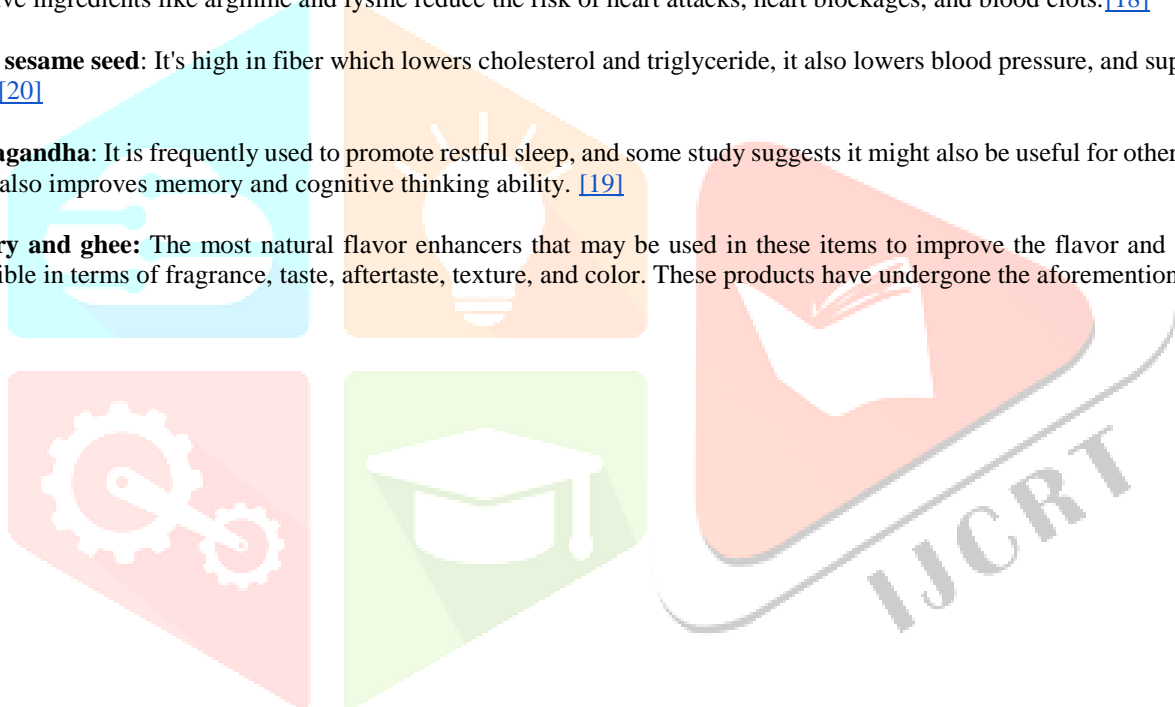
Flaxseed: It lowers the risk of breast cancer, particularly in postmenopausal women. Contains insoluble fiber, which adds weight to the stool and may help avoid constipation.[\[5\]](#)

Watermelon seed: It helps to prevent constipation and promote regular bowel movements. By lowering the levels of NEFA, bioactive ingredients like arginine and lysine reduce the risk of heart attacks, heart blockages, and blood clots.[\[18\]](#)

White sesame seed: It's high in fiber which lowers cholesterol and triglyceride, it also lowers blood pressure, and supports healthy bones.[\[20\]](#)

Ashwagandha: It is frequently used to promote restful sleep, and some study suggests it might also be useful for other sleep-related issues. also improves memory and cognitive thinking ability. [\[19\]](#)

Jaggery and ghee: The most natural flavor enhancers that may be used in these items to improve the flavor and make it more accessible in terms of fragrance, taste, aftertaste, texture, and color. These products have undergone the aforementioned testing.







Preparation of multigrain atta bar

1. Take 200 gm of multigrain atta flour
2. Take 15gm of Flaxseeds, white sesame seeds, watermelon seeds and
3. Take 15gm of ashwagandha and 30gm of cocoa powder
4. Then add the ghee in the pan, add the weighted multigrain atta and seeds with ashwagandha
5. Then boil the jaggery till it turns thick caramelize consistency then add the melted jaggery in the roasted ghee multigrain atta with seeds and ashwagandha,
6. Stir this mixture vigorously, then remove it in a butter paper
7. Let it cool down and place it in the shape of a bar.

Table(1) Amount of Ingredients for the preparation of Multigrain Atta with seeds and ashwagandha

Ingredients	Trial 1	Trial 2	Standard
Multigrain atta	200gms	200gms	200gms
Flax seed	15gms	15gms	15gms
White sesame seed	15gms	15gms	15gms
Watermelon Seed	15gms	15gms	15gms
Ashwagandha	15gms	15gms	15gms
Cocoa Powder	15gms	15gms	15gms
Ghee	30gms	30gms	30gms
Jaggery	100gms	100gms	100gms

SENSORY EVALUATION OF THE STANDARDIZED RECIPE

The multigrain bars were confirmed after 1 trial. The sensory evaluation was done for the 1st trial and was done among 6 naive panel members using a scorecard method. The scorecard consists of a 5 point hedonic scale ranging from - like a lot to dislike a lot. Attributes that were scored are color, texture, taste, acceptability, after taste, smell.

Score Value Assigned

5- Like a lot

4- Like a little

3-Neither like nor dislike

2-Dislike a little

1-Dislike a lot

Average rating

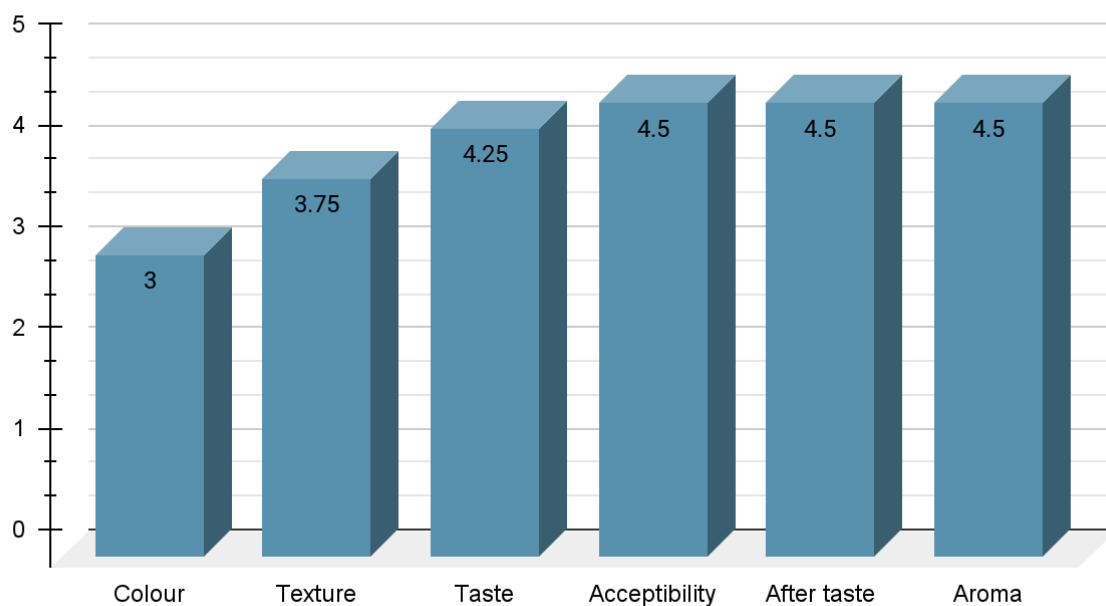


Fig 1.RESULT OF SENSORY EVALUATION OF FIRST TRIAL.

During the first trial, the results showed that the color of the bar was not up to the mark, also a melted chocolate added on top will increase its acceptability, the taste and smell of the product was appreciated by the evaluators, as per the feedback, the sweetness could be reduced.

Trial 2

21 members of the naive panel participated in the sensory evaluation for the first experiment, which was conducted utilizing a scorecard system. The scorecard consists of a 5 point hedonic scale ranging from - like a lot to dislike a lot. Attributes that were scored are color, texture, taste, acceptability, after taste, smell.

Score Value Assigned

5- Like a lot

4- Like a little

3-Neither like nor dislike

2-Dislike a little

1-Dislike a lot

Average rating

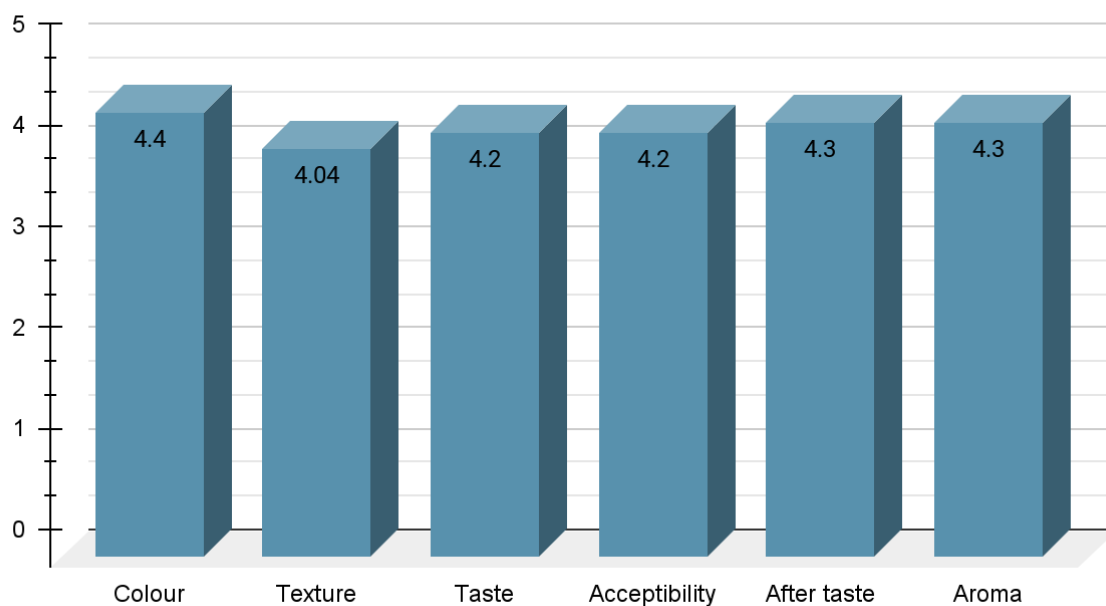


Fig 2. RESULT OF SENSORY EVALUATION OF SECOND TRIAL.

So to improve its colour, the 2nd trial was done by adding melted chocolate on top, with sprinkling some white sesame seed from top, This resulted in the improvement of the taste by making it more palatable and the texture aspect also enhanced. (Figure no. 2) Due to positive feedback from the panel members, this product was finalized. This standardized product was packed in butter paper with a transparent plastic sheet and kept in the refrigerator for further shelf study.

Nutritional Labeling:

Table(2) Nutritional Table of Multigrain bar

Amount (g)	Ingredient	Energy (kcal)	Carbohydrate(g)	Protein(g)	Fat(g)	Fiber(g)
200	Multigrain					
28	Jowar	94.92	20.3	3.08	0.51	3.06
28	Bajra	100	18.5	3.2	1.6	3.4
28	Ragi	91.84	20.16	2.1	0.36	3.3
28	Soyabean	124	3	11.3	5.6	6.7
28	Barley	99.12	18.3	3.36	0.39	4.76
28	Corn	24	5.33	0.89	0.33	0.75
28	Bengal gram	99.4	11.8	5.6	1.53	7.5
15	Flax seed	64	1.6	2.7	5.3	4.05
15	White Sesame seed	75	1.6	3.2	6.4	2.52
15	Watermelon seed	83	2.29	4.2	7.1	0
30	Ghee	260	0	0	27	0
100	Jaggery	102	84	0.43	0.12	0
15	Cocoa Powder	61	8.7	3	2.1	4.95
15	Ashwagandha	36.75	7.4	0.58	0.04	4.8
400g	Total	1315.03	202.98	43.64	58.38	45.79

	30g	100	15	3.2	4.3	3.4
	100g	328	50	11	14	12

Table(3) For Nutritional Fact for 100g of Multigrain bar

Nutritional fact for 100 g	
Energy	328 Kcal
Carbohydrate	50g
Protein	11g
Fibre	12g
Fat	14g
Iron	3.19mg
Magnesium	113mg
Phosphorus	209 mg
Potassium	355mg
Calcium	115mg

Nutritional Labeling: The portion of a food label known as nutrition labeling makes explicit claims about the nutrients it contains. "Nutrition labeling is effective when it gives the consumer information about a food to allow him or her to make healthy eating choices," said the Codex Alimentarius. Food labels provide consumers with information.

To prevent confusion and shield the consumer from abuse, risk, and misuse, information should be provided on the makeup and nature of items. Along with instructions on the safe storage, preparation, and handling of the food product, marketing materials also include the selling price, brand name, and promotional offers. Information about ingredients, nutrition, potential allergies, and nutrition and/or health claims aids consumers in making educated purchasing decisions.

Using the digital design tool Canva, the Ayushman bar included all the major nutrient amounts as well as other details like the net packing date, vegetarian logo, and ingredients. The fact that this bar is high in energy, high in protein, high in fiber, and that it also contains the benefits of ashwagandha were highlighted on the front label, for example, serves to increase the sale of the product through innovation for good marketing to draw customers. Along with the dietary statistics, the bar's health advantages were listed on the back of the nutrition label. Important details like the fact that the food is 100 percent organic, free of additional preservatives or colors, and that it should be wrapped in butter paper before being stored in any kind of plastic packaging or airtight container.

Sensory evaluation of shelf life study

Ten uninformed panel members participated in a sensory evaluation of multigrain bar stays only for one week. A scoring test was conducted, using a 5-point hedonic scale to evaluate appearance, scent, taste, sweetness, and texture/mouthfeel.

The product is best to be consumed in 2-3 consecutive days, as it retains its flavour and all the taste, aroma are maintained, further this product stays for one week.

Sensory Evaluation for shelf life study

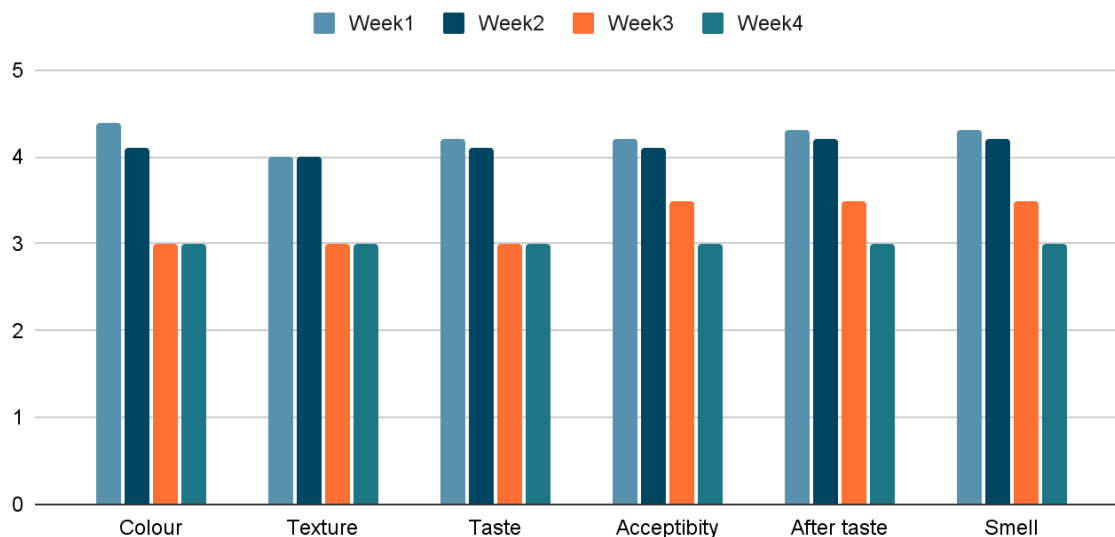


Fig 3. Sensory evaluation for the shelf life.

A change in the product's qualities was noted after the sensory evaluation was conducted for 4 weeks. As seen in fig. 3, the product looked fantastic for the first two weeks before beginning to degrade after four. The product's aroma, which was enhanced by the use of cocoa powder and finally diminished by the end of week 4, was its finest feature. Every week, only little changes in taste were noticed. • Although the flavours blended nicely, the product's sweetness, along with its texture and mouthfeel, were at their peak in week 2 before declining in the final week. As a result, the product's final label read: Best. before 4 weeks have passed since the packaging date

Packaging: The purpose of product packaging is to safeguard the contents. Packaging must protect the product from damage both during transportation from the manufacturing plant to the retailer and while it is on the shelf. As a result, product packaging needs to be durable and strong. It's crucial to establish a look and palette that will appeal to customers and persuade them to buy your product, as well as premium packaging supplies. The way a product is packaged reflects both the contents of the package and the brand as a whole.

Therefore, 11 cm by 6 cm plastic ziplock bags were used as the packaging material, and the product was first wrapped in butter paper. The product was kept in this package for three weeks while undergoing the sensory evaluation, and it was found to be completely free from any environmental or physical damages.



Marketing:

Marketing is crucial since it aids in the sale of goods and services. Making money is the ultimate goal of any organization, and marketing is a crucial means of achieving that objective. The cost of playing the marketing game today is lower than before. Reaching out to customers is now much more financially feasible thanks to social media platforms and email marketing initiatives.

The food was marketed as a nutritious snack for people of all ages, with a special emphasis on those with diabetes and digestive issues. On social media sites including Instagram, Facebook, WhatsApp, and Pinterest, the product image and nutritional information were posted. Although no particular age group was intended, diabetic patients received extra attention. The response of the populace, and remarks were noted. The product piqued a lot of people's interest because of its nutritious content. The favorable reviews demonstrated that this product might be a good beginning point for a business.

Budgeting

Budgeting is crucial since it facilitates cost tracking, spending control, and increased savings. Moreover, budgeting can aid in better financial decision-making, emergency preparedness, debt reduction, and maintaining focus on long-term financial objectives. Budgeting is a crucial component of creating a food item since it influences the product's pricing and contributes to its financial success. The price of the goods must be reasonable for everyone to afford.

Table(4) Cost of Ingredients For Three Multigrain bar

Ingredients	Amount	Price(Rs)
Multigrain atta	200gms	16
Flax seed	15gms	0.84
White sesame seed	15gms	1.26
Watermelon Seed	15gms	1.68
Ashwagandha	15gms	3.57
Cocoa Powder	15gms	5.46
Ghee	30gms	10
Jaggery	45gms	3.15
Total		42

**For Three Multigrain bar
Therefore Each product cost 17 Rs**

Table(4) Budget for 3 Bars

Expenditure	Price (Rupees)
Raw ingredients	42
Labeling	2
Packaging Material	3
Miscellaneous	3
Total	50

Using the total raw material of ingredients 3 multigrain bars were prepared, The raw materials were bought from the wholesale market and therefore profit. To achieve profit each bar was sold at the price of Rs.25. The profit behind one bar was Rs.8.

Summery:

As a result, Ayushman multigrain bars are rich in several nutrients and suitable for all age groups. A good amount of fiber, vitamins, and minerals are present. They are a fantastic alternative for those with stomach issues of any kind, and they have ashwagandha's stress-relieving properties, which are beneficial for everyone. The multigrain bar's shelf life of three weeks demonstrated their excellent shelf life and the fact that none of their qualities degraded when stored in a refrigerator, where they can easily last for a long time. When promoted, it received favorable responses from customers as well.

Reference:

1. https://www.healthline.com/nutrition/benefits-of-flaxseeds#TOC_TITLE_HDR_2
2. Han, J., Lu, S. S., Wang, Z. J., & Li, Y. L. (2015). Flax seed oil inhibits metastatic melanoma and reduces lung tumor formation in mice. *Journal of B.U.ON. : official journal of the Balkan Union of Oncology*, 20(6), 1546–1552.
3. Edel, A. L., Rodriguez-Leyva, D., Maddaford, T. G., Caligiuri, S. P., Austria, J. A., Weighell, W., Guzman, R., Aliani, M., & Pierce, G. N. (2015). Dietary flaxseed independently lowers circulating cholesterol and lowers it beyond the effects of cholesterol-lowering medications alone in patients with peripheral artery disease. *The Journal of nutrition*, 145(4), 749–757. <https://doi.org/10.3945/jn.114.204594>
- 4.
5. Naumann, S., Haller, D., Eisner, P., & Schweiggert-Weisz, U. (2020). Mechanisms of Interactions between Bile Acids and Plant Compounds-A Review. *International journal of molecular sciences*, 21(18), 6495. <https://doi.org/10.3390/ijms21186495>
6. <https://m.netmeds.com/health-library/post/char-magaz-benefits-uses-ingredients-method-dosage-and-side-effects#:~:text=Char%20Magaz%20is%20a%20powerful,the%20risk%20of%20skin%20cancer>.
7. <https://www.healthline.com/nutrition/sesame-seeds>
8. Khosravi-Boroujeni, H., Nikbakht, E., Natanelov, E., & Khalesi, S. (2017). Can sesame consumption improve blood pressure? A systematic review and meta-analysis of controlled trials. *Journal of the science of food and agriculture*, 97(10), 3087–3094. <https://doi.org/10.1002/jsfa.8361>
9. <https://www.healthline.com/nutrition/ashwagandha>
10. Lopresti, A. L., Smith, S. J., Malvi, H., & Kodgule, R. (2019). An investigation into the stress-relieving and pharmacological actions of an ashwagandha (*Withania somnifera*) extract: A randomized, double-blind, placebo-controlled study. *Medicine*, 98(37), e17186. <https://doi.org/10.1097/MD.00000000000017186>
11. Pérez-Gómez, J., Villafaina, S., Adsuar, J. C., Merellano-Navarro, E., & Collado-Mateo, D. (2020). Effects of Ashwagandha (*Withania somnifera*) on VO2max: A Systematic Review and Meta-Analysis. *Nutrients*, 12(4), 1119. <https://doi.org/10.3390/nu1204111>
12. Gannon, J. M., Brar, J., Rai, A., & Chengappa, K. N. R. (2019). Effects of a standardised extract of *Withania somnifera* (Ashwagandha) on depression and anxiety symptoms in persons with schizophrenia participating in a randomised, placebo-controlled clinical trial. *Annals of clinical psychiatry : official journal of the American Academy of Clinical Psychiatrists*, 31(2), 123–129.
13. Durg, S., Bavage, S., & Shivaram, S. B. (2020). *Withania somnifera* (Indian ginseng) in diabetes mellitus: A systematic review and meta-analysis of scientific evidence from experimental research to clinical application. *Phytotherapy research : PTR*, 34(5), 1041–1059. <https://doi.org/10.1002/ptr.6589>
14. <https://pharomeasy.in/blog/15-amazing-health-benefits-of-ghee/>
15. https://www.healthifyme.com/cdn.ampproject.org/v/s/www.healthifyme.com/blog/jaggery/amp/?amp_gsa=1&_js_v=a9&usqp=mq331AQKKAFQArABIACAaw%3D%3D#amp_tf=From%20%251%24s&aoh=16739625664924&referrer=https%3A%2F%2Fwww.google.com&share=https%3A%2F%2Fwww.healthifyme.com%2Fblog%2Fjaggery%2F
16. <https://www.theayurveda.org/general-awareness/multigrain-atta>
17. <https://www.semanticscholar.org/paper/Nutritional-composition-of-dehydrated-ashwagandha%2C-Kumari-Gupta/341ca01571bb8f8138f5098dafcb3be85fed7d68>
18. <https://pubmed.ncbi.nlm.nih.gov/20824684/>
Wani, A. A., Sogi, D. S., Singh, P., Wani, I. A., & Shivhare, U. S. (2011). Characterisation and functional properties of watermelon (*Citrullus lanatus*) seed proteins. *Journal of the science of food and agriculture*, 91(1), 113–121. <https://doi.org/10.1002/jsfa.4160>
19. <https://pubmed.ncbi.nlm.nih.gov/34858513/>
20. <https://pubmed.ncbi.nlm.nih.gov/27074618/>
21. <https://fdc.nal.usda.gov/fdc-app.html#/food-details/174270/nutrients>