



Research Paper

Food – Sources of Dietary Fiber for A Healthy Liver

Desislava Gyurova¹, Tzveta Georgieva²

^{1, 2} (Directorate Analytical and laboratory activities, National center of public health and analyses, Sofia, Bulgaria)

Corresponding Author: Desislava Gyurova

ABSTRACT: Food (diet) plays a key role in maintaining liver health. Many foods contain compounds that have been shown to help improve liver enzymes, prevent fat accumulation, and reduce inflammation and oxidative stress. In modern everyday life, due to the hectic way of working and living, we increasingly resort to food products that are highly processed or refined for the “delicate” liver.

Dietary fiber is a vital nutrient that aids digestion. One of the tips for a healthy and well-functioning liver is the consumption of foods rich in dietary fiber and whole grains.

The purpose of this study is to present a new analytical data on the dietary fiber content in foods: legumes, cereals, nuts, fruits and vegetables.

Methods: In the period 2023 - 2025, various crops (legumes, cereals, nuts, fruits and vegetables) offered on the Bulgarian market were analyzed for dietary fiber content using a verified enzymatic-gravimetric method AOAC 985.29.

Results: The obtained results for fiber content with the specified standard uncertainty of the method are presented in tabular form.

Conclusions: Maintaining the liver in good shape is important for maintaining health. The presented data from food analyses are important for the objective assessment of the daily dietary fiber intake of the population, for the correct information of the Bulgarian consumer regarding the contained fiber value (Gyurova, 2023), as well as to help physicians, specialists and researchers concerned with the benefits for human health.

Keywords: food, dietary fiber, liver

Received 06 July., 2026; Revised 15 July., 2026; Accepted 17 July., 2026 © The author(s) 2026.

Published with open access at www.questjournals.org

I. INTRODUCTION

Food (diet) plays a key role in maintaining liver health. Many foods contain compounds that have been shown to help improve liver enzymes, prevent fat accumulation, and reduce inflammation and oxidative stress [1, 2].

In modern daily life, due to the fast – passed nature of work and life, we increasingly turn to food industry products that are highly processed or refined, which can be hard on the “delicate” liver.

Dietary fibers (DF) are defined as carbohydrate polymers with 3 or more monomeric units that are naturally occurring, extracted or synthetic, resistant to human digestive enzymes in the small intestine, and for the isolated/ synthetic types, have a proven beneficial physiological effect.

Dietary fibers are essential nutrients that aid digestion [3]. One of recommendations for a healthy and properly functioning liver is the consumption of foods rich in dietary fiber and whole grains.

SPECIFIC FIBER RICH FOODS FOR LIVER HEALTH

1. Whole grains: oats, brown rice and wholegrain pasta are rich in fibers, vitamins and minerals that help reduce liver fat and inflammation.

2. Cruciferous vegetables: broccoli, cauliflower, Brussel sprouts and leafy greens like spinach and kale are excellent source of fiber and contain chlorophyll, which helps the liver clear toxins.

3. Fruits: berries, apples and pears provide fiber and other nutrients that support liver health.

4. Legumes: beans, peas and lentils are rich in fiber and support liver function.

HOW DOES FIBER SUPPORT THE LIVER?

1. **Regulates blood sugar:** fiber helps stabilize blood sugar levels, which is crucial because high blood sugar levels can contribute to liver disease.
2. **Reduces fat in the liver:** fiber rich foods can help reduce fat buildup in the liver – a key factor in preventing non – alcoholic fatty liver disease.
3. **Support toxin removal;** fiber in fruits, vegetables and wholegrains supports the liver's detoxification pathways, helping to remove toxins from the body.
4. **Acts as prebiotic:** soluble fiber ferments in the large intestine, acting as a prebiotic, which promotes a healthy gut microbiome.
5. **Anti – inflammatory properties:** dietary fiber has anti – inflammatory properties that may help reduce inflammation in the liver.

INTERESTING STUDIES

In 2021, Lui and colleagues [4] assessed the association between wholegrain and fiber intake and the risk of liver cancer. The researchers found that high intake of wholegrains and fiber and total fiber was associated with a significant reduction in the risk of hepatocellular carcinoma (HCC) by 22% and 31% respectively.

Another new funding in this study is the correlation between the intake of wholegrains and fiber and mortality from chronic liver disease (CLD) (e.g. fibrosis, cirrhosis, alcoholic liver disease and chronic hepatitis), with a reduction in mortality from (CLD) of 56% to 63% respectively.

Regarding the foods fiber sources in this study: fruits showed no benefit; legumes (33% showed a significant reduction in the mortality (CLD), along with vegetables (45%) and grains (71%).

The object of current study is to present in a comparative manner a new analytical data of dietary fiber content in different foods: legumes, grains, nuts, fruits and vegetables.

III. MATERIAL AND METHODS:

Between 2023 and 2025, 17 various types of foods/ crops (legumes, grains, nuts, fruits and vegetables) available on the Bulgarian market were analyzed for dietary fiber content using the verified enzymatic – gravimetric method AOAC 985.29 [5]. Duplicate samples of dried foods, fat extracted if containing > 10 % fat, are gelatinized with Termamyl (heat-stable α -amylase), and then enzymatically digested with protease and amyloglucosidase to remove protein and starch. Four volumes of ethyl alcohol are added to precipitate soluble dietary fiber. The total residue is filtered, washed with 78 % ethyl alcohol, 95 % ethyl alcohol, and acetone. After drying, the residue is weighed. One duplicate is analyzed for protein, and the other is incinerated at 525 °C and ash is determined.

A laboratory sample was prepared and subjected to analysis in two parallel determinations.

IV. RESULTS AND DISCUSSION:

The average values obtained from analyses are presented in Table 1 and discussed below [6, 7].

Product	DF, g/100g $\pm$ SU
Oat kernels (fine), raw	11,75 $\pm$ 0,34
Oat kernels, raw	7,40 $\pm$ 0,06
Almonds, raw, with skin	9,70 $\pm$ 0,07
Quinoa, raw (from Peru)	7,00 $\pm$ 00,20
Lentils, raw, extra	24,50 $\pm$ 0,28
White beans, raw, traditional	15,00 $\pm$ 0,45
Brown rice, raw, wholegrain	4,60 $\pm$ 0,13
Fusilli, raw, from wholegrain durum wheat	5,93 $\pm$ 0,17
Wheat bread, wholegrain	7,59 $\pm$ 0,06
Broccoli, raw	1,92 $\pm$ 0,06
Cauliflower, raw	0,73 $\pm$ 0,02

Spinach, raw	3,15 ± 0,10
Beets, red, salad, raw	3,26 ± 0,09
Green peas, sterilized (high in fiber)	4,23 ± 0,12
Blueberries, raw	2,00 ± 0,06
Red apples, with skin	5,28 ± 0,04
Pears Lukas, with skin	2,63 ± 0,08

*SU-standard uncertainty

Table 1: Dietary fiber content in foods

The results for dietary fiber content in individual foods vary widely. The highest values are observed in legumes: lentils (24,50%) and white beans (15,00%), followed by raw fine oats (11,75%) and almonds (9,70%). The lowest values are found in broccoli (1,92%) and cauliflower (0,73%).

Almost identical values were observed in spinach (3,15%) and beets (3,26%). Of interest is higher fiber content in wholegrain wheat bread (7,59%), a finding most likely attributable to the type of grain and/ or the bread fortification technology, for which no information is available.

The results of this initial study showed higher fiber content in cereals and legumes and lower fiber content in fruits and vegetables.

V. CONCLUSION:

The presented data from the analyses will supplement the established "archival" database on the chemical composition of foods at the National Center for Food and Drug Safety (NCFDA) regarding fiber content; and may be important for:

- an objective assessment of the daily intake of dietary fiber by the population;
- for correct information of the Bulgarian consumer regarding the amount of fiber contained in them, as well as for assistance to physicians, specialists and researchers concerned with the benefits for human health.

Maintaining and functioning of the liver at an optimal level is important for maintaining health.

For public health in general, and in particular for the protection of the body, quality, complete nutrition, diet and optimal amount of food are important. For complete and healthy nutrition - you need a diverse and complete food - a source of fiber and other beneficial nutrients.

Messages and advice from Public Health for increasing fiber intake:

- Aim for the consumption of 25–38 grams of fiber daily.
- Choose whole grains over refined white flour products.
- Eat fruits and vegetables with their skins, as they contain a significant amount of fiber.
- Increase your fiber intake gradually to avoid bloating and gas.

REFERENCES

- [1] Jones T., Ajmera R. 11 Foods That Are Good for Your Liver (2023), Available at: <https://www.healthline.com/nutrition/11-foods-for-your-liver#bottom-line>.
- [2] Benisek A. 14 Best and Worst Foods for Your Liver (2025), Available at: <https://www.webmd.com/fatty-liver-disease/ss/slideshow-best-and-worst-foods-for-your-liver>.
- [3] Gyurova D. Dietary fiber. Classification, physiological role, sources, methods (monograph) (2024), *UPFV*, Sofia, pp.101, ISBN: 978-619-90176-9-2 (in Bulgarian).
- [4] Liu X, Yang W, Petrick JL, et al. Higher intake of whole grains and dietary fiber are associated with lower risk of liver cancer and chronic liver disease mortality (2021, *Nat Commun* 2021;12:6388).
- [5] AOAC Official Methods of Analysis, Total Dietary Fiber in Foods, Enzymatic – Gravimetric method 985.29, 1990. 1105.
- [6] Gyurova, D. Results for dietary fiber content based on comparative studies based on analyses. 2006 – 2023. Science plan topic of National center of public health and analyses (NCPHA).
- [7] Gyurova, D., Georgieva, Tzv. Food – sources for healthy liver. Symposium “NutriExcellence: Bulgarian Dietetic Days, March 2026, Varna, Bulgaria.