

Effects of Probiotics on Liver and Kidney Function Parameters

Dhelal A. Jumaah^{1*}, Kassim, M. A²

¹Imam Alkadhim University, Baghdad, Iraq

²Department of Biology, College of Science, Mustansiriyah University, Iraq

*Corresponding Author: Dhelal A. Jumaah
Imam Alkadhim University, Baghdad, Iraq

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Abstract: This study aimed to study the effects of probiotics on liver and kidney function parameters. An in vitro study was used to identify food-grade probiotics for human consumption. As far as probiotic strains used, *B. longum* subspecies *infantis*, *L. acidophilus*, as well as *B. bifidum* are all GRAS (Generally Recognized as Safe). Over the course of six months, 100 patients with CKD and Liver disease 50 patients were without treatment and 50 patients were given two capsules each morning and evening containing 2.5×10^9 CFU *B. longum* subspecies *infantis*, *L. acidophilus*, as well as *B. bifidum* at a ratio of 1:1:1, and 50 normal individuals were used in this study. Pre-test nutritionists recommended the participants to eat low-protein diets and to avoid any lifestyle or dietary changes throughout the experiment time. Blood was collected for evaluation of AST, ALT, Total protein, Urea, and creatinine levels in both patients and normal. These kits were obtained from Biolabo company, these were done according to company instructions. The results showed that the probiotics had a therapeutics effect which causes a significant difference in all parameters in treated patients as compared with patients that were not treated. In conclusion, Probiotics have therapeutic effects on the injured kidney and the liver, which are indicated by decreasing the liver and kidney functions.

Keywords: Probiotics, biochemical, liver, Kidney.

INTRODUCTION

Probiotics may have the ability to enhance renal and liver function, according to recent research. CKD [1] and non-alcoholic steatohepatitis [2] patients' gut microbiota have been shown to be different from healthy controls, which supports the claims made above. Clinical investigations in hemodialysis patients [3, 4], or those in stages 3 and 4 of CKD [5, 6], have shown a non-significant improvement in renal profiles after a period of probiotic use lasting 2 to 6 months. It has been found that the liver function is improved in patients with nonalcoholic steatohepatitis (NASH) or NASH (non-alcoholic steatohepatitis) by a meta-analysis involving four randomized controlled trials, which included 134 patients with NASH or NASH and 134 nonalcoholic fatty liver (NAFL) patients [7].

The increased systemic inflammation caused by the spread of dangerous germs from the intestines into the bloodstream contributes to liver damage. Probiotics are helpful in the treatment of liver disease because they reduce the growth of dangerous bacteria in the stomach and strengthen the gut mucosa's integrity [8]. In fact, CKD alters the gut microbiome. Because of uremia, the intestinal barrier function is impaired and the gastrointestinal tract is inflamed. This modification may cause problems with renal parameters by interfering with the gut's usual processes. Gut microbiota management may thus improve renal profile [1].

Many of probiotics' physiological effects come from altering the microbiota in your gut, stimulating your body's own microorganisms, and controlling your immune system [9]. Gastrointestinal disorders such as Crohn's disease and ulcerative colitis may be treated or alleviated by oral probiotic supplements. Oral probiotics have been shown in certain trials to reduce lactose intolerance, prevent gastroenteritis, constipation, and diarrhea, and modify the gut flora [10, 11]. Probiotics (*B. bifidum* and *L. plantarum* 8PA3) dramatically raised the amount of *Lactobacillus* and *Bifidobacterium* in

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human feces and considerably improved blood levels of ALT, low-density lipoprotein (LDL), and total bilirubin (STB) in Kirpich, the first to employ them to treat ALD patients [12].

This study aimed to study the effects of probiotics on liver and kidney function parameters.

MATERIALS AND METHODS

An in vitro study was used to identify food-grade probiotics for human consumption. As far as probiotic strains go, *B. longum* subspecies *infantis*, *L. acidophilus*, as well as *B. bifidum* are all GRAS (Generally Recognized as Safe).

Over the course of six months, 100 patients with CKD and Liver disease 50 patients were without treatment and 50 patients were given two capsules each morning and evening containing 2.5×10^9 CFU *B. longum* subspecies *infantis*, *L. acidophilus*, and *B. bifidum* at a ratio of 1:1:1, and 50 normal individuals were used in this study. Pre-test nutritionists recommended the participants to eat low-protein diets and to avoid any lifestyle or dietary changes throughout the experiment time.

Blood was collected for evaluation of AST, ALT, Total protein, Urea, and creatinine levels in both patients and normal. These kits were obtained from Biolabo company, these were done according to company instructions.

RESULTS AND DISCUSSION

The results showed that the probiotics had a therapeutics effect which causes a significant difference in all parameters in treated patients as compared with patients that were not treated (Table 1, Figure 1).

Table 1: Biochemical parameters in normal, patients and patients treated by Probiotics

Parameters	Patient	Patients treated	Normal
AST (U/L)	35.4 ± 2.1 A	23.1 ± 1.3 B	20.1 ± 4.7 B
ALT (U/L)	49.5 ± 0.7 A	33.1 ± 0.1 B	32.53 ± 16.10 B
Total protein (g/L)	42.7 ± 6.8 C	66.8 ± 2.3 B	73.87 ± 3.73 A
Urea (mmol/L)	6.9 ± 0.3 A	4.2 ± 0.1 B	4.03 ± 0.89 B
Creatinine (µmol/L)	85.2 ± 5.3 A	74.7 ± 2.9 B	72.10 ± 18.84 B

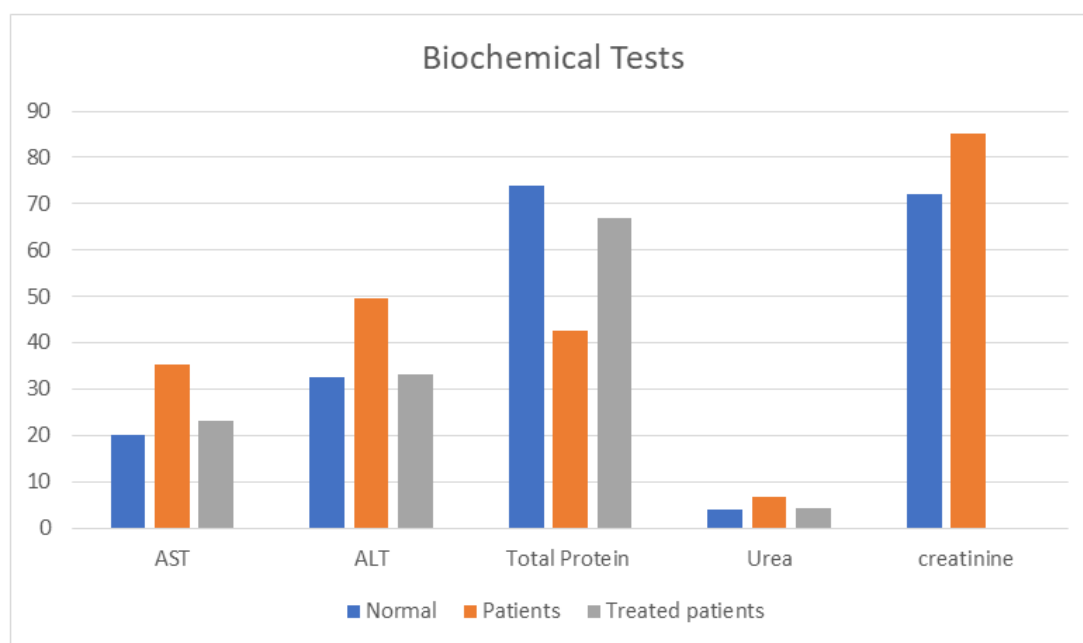


Figure 1: Biochemical parameters in normal, patients and patients treated by Probiotics

The levels of albumin and total protein in patients with ulcerative colitis [13] and elderly hospitalized participants [14] were shown to improve following probiotic ingestion in two human trials. Probiotics have an important function in preventing infection, thus these increases cannot be applied to diabetics since they maintain the integrity of the gut mucosa and the participants' overall health.

There is a growing body of data that probiotic supplementation improves outcomes in patients with alcoholic or non-alcoholic fatty liver disease [15–17] or cirrhosis. To summarize, it can be stated that probiotics do not improve liver parameters among type 2 diabetics with good liver status, according to this study's results.

Predicting whether probiotic supplementation is safe is another way to determine liver function, even if probiotics may alter liver function. Drug-induced liver toxicity may be determined by conventional liver function testing. Adverse drug-induced liver effects range from minor symptoms to severe hepatitis, which may be detected by changes in liver enzymes such as the liver enzyme ALT [18]. It's also important to note that each liver function test component reflects a specific liver function.

The pH may be lowered by fermenting carbohydrates with lactic acid bacteria such *Lactobacillus* and *Bifidobacterium* [19]. This is because they prevent aerobic bacteria from proliferating and maintain a healthy microbiome in the gut [20]. Another possibility is that some probiotic bacteria, such as *Bacteroides*, degrade urea via urease activity [20].

In OW/OB participants, urea levels improved considerably following probiotic treatment. It's not clear how urea levels alter between those who are normal weight and those who are obese or overweight. One possibility is that OW/OB have a higher percentage of certain bacterial phyla than normal weight individuals. *E. coli* levels are greater in obese persons for some reason [21]. We may infer from this finding, and from other research, that probiotic treatment reduces *E. coli* levels more quickly in obese and overweight people.

Each group had a considerable rise in creatinine levels. Chronic use of angiotensin-converting enzyme inhibitors (ACE inhibitor) has been shown to raise creatinine levels [22].

CONCLUSION

Probiotics have therapeutic effects on the injured kidney and the liver, which are indicated by decreasing the liver and kidney functions.

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