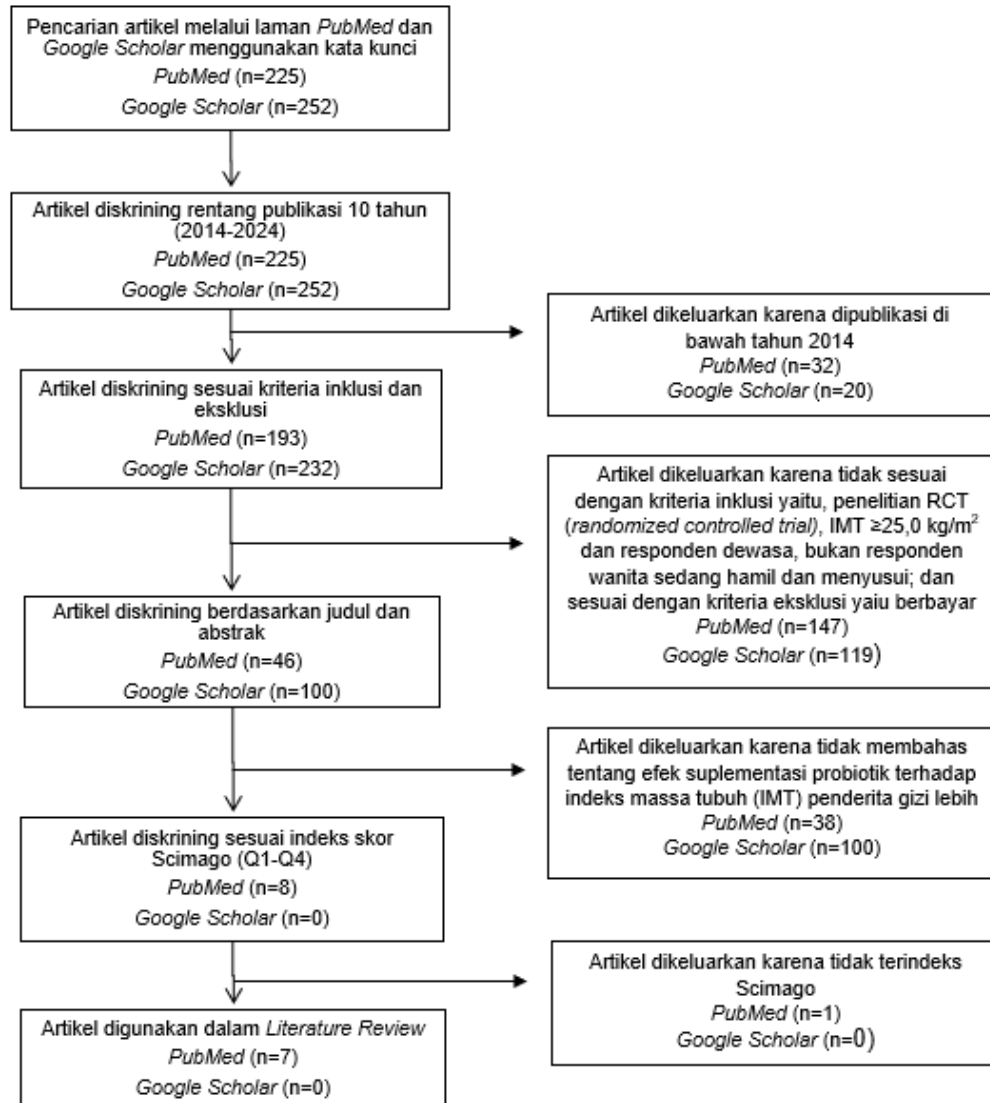


LAMPIRAN

A. Alur Seleksi Artikel



B. Data Ekstraksi

Penelusuran artikel dengan menggunakan *keyword* metode PICO bahasa Inggris, lalu dilakukan pemilihan artikel sesuai dengan kriteria inklusi dan eksklusi sehingga didapatkan 7 artikel dengan **Tabel 4**.

Tabel 1.
Data ekstraksi artikel

No	Judul	Penulis	Tahun	Indeks
1	<i>Effects of 60-Day Saccharomyces boulardii and Superoxide Dismutase Supplementation on Body Composition, Hunger Sensation, Pro/Antioxidant Ratio, Inflammation and Hormonal Lipo-Metabolic Biomarkers in Obese Adults: A Double-Blind, Placebo-Controlled Trial</i>	Rondanelli, dkk.	2021	Scopus Q1
2	<i>Effect of probiotic Lactobacillus plantarum Dad-13 powder consumption on the gut microbiota and intestinal health of overweight adults</i>	Rahayu, dkk.	2021	Scopus Q1
3	<i>Daily supplementation with the Lab4P probiotic consortium induces significant weight loss in overweight adults</i>	Michael, dkk.	2021	Scopus Q1
4	<i>Effect of Lactobacillus sakei, a Probiotic Derived from Kimchi, on Body Fat in Koreans with Obesity: A Randomized Controlled Study</i>	Lim, dkk.	2020	Scopus Q1
5	<i>Effect of a low energy diet, containing a high protein, probiotic condensed yogurt, on biochemical and anthropometric measurements among women with overweight/obesity: A randomised controlled trial</i>	Razmpoosh, dkk.	2020	Scopus Q2
6	<i>Lactobacillus gasseri BNR17 Supplementation Reduces the Visceral Fat Accumulation and Waist Circumference in Obese Adults: A Randomized, Double-Blind, Placebo-Controlled Trial</i>	Kim, dkk.	2018	Scopus Q3
7	<i>Can psychobiotics intake modulate psychological profile and body composition of women affected by normal weight obese syndrome and obesity? A double blind randomized clinical trial</i>	De Lorenzo, dkk.	2017	Scopus Q1

C. Bukti hasil pencarian artikel

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1 Effects of Synbiotic Supplement on Human Gut Microbiota, Body Composition and Weight Loss in **Obesity**.
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Nutrients. 2020 Jan 15;12(1):222. doi: 10.3390/nu12010222.
PMID: 31952249 Free PMC article. Clinical Trial.
Share Targeting gut microbiota with synbiotics (**probiotic** supplements containing prebiotic components) is emerging as a promising intervention in the comprehensive nutritional approach to reducing **obesity**. ...However, the decrease over time in body mass, **BMI**, waist ...

2 Anti-Inflammatory and Immunomodulatory Effects of **Probiotics** in Gut Inflammation: A Door to the Body.
Cite Cristofori F, Dargenio VN, Dargenio C, Miniello VL, Barone M, Francavilla R.

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Nutrients. 2020 Jan 15;12(1):222. doi: 10.3390/nu12010222.
PMID: 31952249 Free PMC article. Clinical Trial.
Share Targeting gut microbiota with synbiotics (**probiotic** supplements containing prebiotic components) is emerging as a promising intervention in the comprehensive nutritional approach to reducing **obesity**. ...However, the decrease over time in body mass, **BMI**, waist ...

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H Sulisty, E_Harmayani - Jurnal Gizi Klinik Indonesia, 2021 - academia.edu

... program penurunan berat badan, **IMT**, dan persen lemak, serta menghambat kenaikan kadar kolesterol total dan trigliserida pada orang dewasa dengan status gizi **obesitas**. ...

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... Massa Tubuh (**IMT**) yaitu > 27 sebanyak 19 orang penderita **obesitas** sebelum dan sesudah ... minuman **probiotik** (dengan salah satu merk yaitu "Y") sebanyak 1 botol per hari selama 16 ...

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[CITATION] Pengaruh Dangke pada Perubahan Neutrofil to Lymphocyte Ratio Tikus Putih **Obesitas**

AMNA Natsar, A Saffitri, RPL Basri, S Julyani... - Fakumi Medical ..., 2024 - fmj.fk.umi.ac.id

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4

D. Artikel terpilih



nutrients



Article

Effects of 60-Day *Saccharomyces boulardii* and Superoxide Dismutase Supplementation on Body Composition, Hunger Sensation, Pro/Antioxidant Ratio, Inflammation and Hormonal Lipo-Metabolic Biomarkers in Obese Adults: A Double-Blind, Placebo-Controlled Trial

Mariangela Rondanelli ^{1,2}, Niccolò Miraglia ^{3,4}, Pietro Putignano ⁵, Ignazio Castagliuolo ⁶, Paola Brun ⁶, Stefano Dall'Acqua ⁷, Gabriella Peroni ^{8,*}, Milena Anna Faliva ⁹, Maurizio Naso ⁸, Mara Nichetti ⁸, Vittoria Infantino ² and Simone Perna ⁹



Citation: Rondanelli, M.; Miraglia, N.; Putignano, P.; Castagliuolo, I.; Brun, P.; Dall'Acqua, S.; Peroni, G.; Faliva, M.A.; Naso, M.; Nichetti, M.; et al. Effects of 60-Day *Saccharomyces boulardii* and Superoxide Dismutase Supplementation on Body Composition, Hunger Sensation, Pro/Antioxidant Ratio, Inflammation and Hormonal Lipo-Metabolic Biomarkers in Obese Adults: A Double-Blind, Placebo-Controlled Trial. *Nutrients* **2021**, *13*, 2512. <https://doi.org/10.3390/nu13082512>

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Abstract: In animals it has been demonstrated that *Saccharomyces boulardii* and Superoxide Dismutase (SOD) decrease low-grade inflammation and that *S. boulardii* can also decrease adiposity. The purpose of this study was to evaluate the effect of a 60-day *S. boulardii* and SOD supplementation on circulating markers of inflammation, body composition, hunger sensation, pro/antioxidant ratio, hormonal, lipid profile, glucose, insulin and HOMA-IR, in obese adults (BMI 30–35 kg/m²). Twenty-five obese adults were randomly assigned to intervention (8/4 women/men, 57 ± 8 years) or Placebo (9/4 women/men, 50 ± 9 years). Intervention group showed a statistically significant ($p < 0.05$) decrease of body weight, BMI, fat mass, insulin, HOMA Index and uric acid. Patients in intervention and control groups showed a significant decrease ($p < 0.05$) of GLP-1. Intervention group showed an increase ($p < 0.05$) of Vitamin D as well. In conclusion, the 60-day *S. boulardii*-SOD supplementation in obese subjects determined a significant weight loss with consequent decrease on fat mass, with preservation of fat free mass. The decrease of HOMA index and uric acid, produced additional benefits in obesity management. The observed increase in vitamin D levels in treated group requires further investigation.

Keywords: *Saccharomyces boulardii*; superoxide dismutase; obesity

1. Introduction

Obesity is a clinical condition of excess body adiposity, and is associated with several risk factors, such as cardiovascular risk, diabetes and cancer [1].

The prevalence of obesity and excess weight in adults, but also in children and adolescents, has increased extensively in recent years, leading to high healthcare costs [2].

Randomized Controlled Trial

Effect of probiotic *Lactobacillus plantarum* Dad-13 powder consumption on the gut microbiota and intestinal health of overweight adults

Endang Sutriswati Rahayu, Mariyatun Mariyatun, Nancy Eka Putri Manurung, Pratama Nur Hasan, Phatthanaphong Therdthatha, Riko Mishima, Husnita Komalasari, Nurul Ain Mahfuzah, Fathyah Hanum Pamungkaningtyas, Wahyu Krisna Yoga, Dina Aulia Nurfiana, Stefanie Yolanda Liwan, Mohammad Juffrie, Agung Endro Nugroho, Tyas Utami

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Author contributions: Rahayu ES led the research project and together with Utami T designed the study; Juffrie M supervised the ethical approval and acted as the consultant for the clinical trial; Nugroho AE supervised the production of probiotic powder; Mariyatun M and Hasan PN supervised the on-site study; Putri Manurung NE, Komalasari H, Yoga WK, Therdthatha P, Mishima

Endang Sutriswati Rahayu, Mariyatun Mariyatun, Nancy Eka Putri Manurung, Pratama Nur Hasan, Husnita Komalasari, Nurul Ain Mahfuzah, Fathyah Hanum Pamungkaningtyas, Wahyu Krisna Yoga, Dina Aulia Nurfiana, Stefanie Yolanda Liwan, Tyas Utami, Department of Food and Agricultural Technology, Faculty of Agricultural Technology, Universitas Gadjah Mada, Yogyakarta 55281, Indonesia

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Abstract

BACKGROUND

Shifting on lifestyle, diet, and physical activity contributed on increasing number of obese people around the world. Multiple factors influence the development of obesity. Some research suggested that gut microbiota (GM) plays an important role in nutrient absorption and energy regulation of individuals, thus affecting their nutritional status. Report of Indonesia Basic Health Research showed that the prevalence of obesity in every province tended to increase. Although the root



OPEN

Daily supplementation with the Lab4P probiotic consortium induces significant weight loss in overweight adults

D. R. Michael^{1,2,3}, T. S. Davies¹, A. A. Jack¹, G. Masetti^{1,4}, J. R. Marchesi^{1,3}, D. Wang⁴, B. H. Mullish¹ & S. F. Plummer¹

This 9-month randomised, parallel, double-blind, single-centre, placebo-controlled study (PROBE, ISRCTN18030882) assessed the impact of probiotic supplementation on bodyweight. Seventy overweight Bulgarian participants aged 45–65 years with BMI 25–29.9 kg/m² received a daily dose of the Lab4P probiotic comprising lactobacilli and bifidobacteria (50 billion cfu/day). Participants maintained their normal diet and lifestyle over the duration of the study. The primary outcome was change from baseline in body weight and secondary outcomes included changes in waist circumference, hip circumference and blood pressure. A significant between group decrease in body weight (3.16 kg, 95% CI 3.94, 2.38, $p < 0.0001$) was detected favouring the probiotic group. Supplementation also resulted in significant between group decreases in waist circumference (2.58 cm, 95% CI 3.23, 1.94, $p < 0.0001$) and hip circumference (2.66 cm, 95% CI 3.28, 2.05, $p < 0.0001$) but no changes in blood pressure were observed. These findings support the outcomes of a previous shorter-term Lab4P intervention study in overweight and obese participants (PROMAGEN, ISRCTN12562026). We conclude that Lab4P has consistent weight modulation capability in free-living overweight adults.

The gastro-intestinal (GI) microbiota is a contributor to human health and has been implicated in many metabolic processes including the digestion and absorption of nutrients and the fermentation of undigested carbohydrates into short chain fatty acids and other metabolites¹. The link between dysbiosis and obesity is well recognised but nearly 40% of the adults worldwide are categorised as overweight² and this population gains on average 0.2–1.0 kg/year³. In addition to progressive weight gain, the aging process itself is characterised by changes in the gut microbiota and the development of a chronic inflammatory status⁴ which is linked to weight associated comorbidities such as diabetes, cardiovascular disease and cancer^{5,6}. Consequently, attention is being drawn to the potential for modulation of these changes as an additional approach in the battle against obesity.

The World Health Organisation (WHO) defines probiotic bacteria as 'live microorganisms that, when administered in adequate amounts confer a health benefit on the host'⁷, and there is accumulating evidence supporting their impact on the gut microbiota resulting in beneficial effects^{8–10}. Recent meta-analyses report that body weight reductions have been achieved in short-term probiotic intervention studies (averaging 2 months) in overweight/obese participants^{11–13}. It is considered that a 3% reduction in bodyweight over a 6–12 month period represents successful weight loss¹⁴ whilst current clinical guidelines state that a 5% reduction is required to illicit significant improvements in health¹⁵.

In an exploratory placebo-controlled study (PROMAGEN, ISRCTN12562026) the impact of supplementation with the Lab4P probiotic consortium in overweight and obese adults with no dietary or lifestyle restrictions resulted in a significant reduction in body weight (1.5%) over a 6-month period together with improvements in quality-of-life and reductions in the incidence of upper respiratory tract infections¹⁶. Stratification of the study population indicated greater weight losses in older participants (2% compared to ≤ 1.2% in younger participants) and with 1.9% weight reduction in overweight participants compared to 1.2% in obese participants¹⁶. The design

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Effect of *Lactobacillus sakei*, a Probiotic Derived from Kimchi, on Body Fat in Koreans with Obesity: A Randomized Controlled Study

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Background: The increased prevalence of obesity has led to increases in the prevalence of chronic diseases worldwide. There is interest whether probiotics have an effect on obesity, but the effectiveness and safety of only a few probiotics for the treatment of obesity have been reported. The purpose of this study was to investigate whether ingestion of *Lactobacillus sakei* (CJLS03) derived from kimchi causes weight loss in people with obesity.

Methods: This randomized, double-blind, placebo-controlled, clinical trial involved 114 adults with a body mass index (BMI) ≥ 25 kg/m² who were assigned randomly to a CJLS03 or placebo group. The groups received two allocations of either 5×10^8 colony-forming units of CJLS03/allocation or the equivalent vehicle for 12 weeks. Demographic and biochemical parameters, and body composition including fat and muscle mass were measured at baseline and after 12 weeks. Changes in body fat, weight, and waist circumference were compared between the two treatment groups. Adverse events were monitored during study period.

Results: Body fat mass decreased by 0.2 kg in the CJLS03 group and increased by 0.6 kg in the placebo group (0.8 kg difference, $P=0.018$). After the 12 weeks, waist circumference was 0.8 cm smaller in the CJLS03 group than in the placebo group ($P=0.013$). BMI and body weight did not change after the 12 weeks. Adverse events were mild and did not differ between the two groups.

Conclusion: These data suggest that *L. sakei* (CJLS03) might help people with obesity reduce body fat mass without serious side effects (ClinicalTrials.gov: NCT03248414).

Keywords: Lactobacillus sakei; Probiotics; Obesity; Body fat

INTRODUCTION

Over the past 10 years, the prevalence of obesity has been increasing steadily not only in Western countries but also in Korea and other Asian countries [1]. This increase in obesity prevalence is caused mainly by increased energy intake and decreased physical activity levels, and this trend is expected to continue

for some time [2,3]. The increased prevalence of obesity is associated with increased mortality for type 2 diabetes (T2D), hypertension, and cardiovascular disease, and the incidence of some cancers [4]. Safe and effective treatment modalities for obesity are scarce and more research is needed.

An association between the microbiome and obesity was first suggested in 2006 [5]. It has been reported that people with obe-

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Original article

Effect of a low energy diet, containing a high protein, probiotic condensed yogurt, on biochemical and anthropometric measurements among women with overweight/obesity: A randomised controlled trial

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Obesity
Anthropometry
Blood pressure
Blood glucose
Lipids

SUMMARY

Background & aims: The aim of this study was to determine the effect of low energy diet containing condensed processed yogurt (Kashk), as a high protein, calcium and probiotic enriched product, on glycemic control, lipid profile, anthropometric measurements and blood pressure among women with overweight/obesity.

Methods: 70 women with overweight/obesity were randomly assigned to receive either a low energy diet contained 50 g of Kashk (intervention group) or a low energy diet without Kashk (control group) for 8 weeks. Anthropometric, blood pressure and biochemical measurements were obtained before and after the intervention.

Results: Between-group comparisons showed that the intervention group significantly decreased triglycerides ($P = 0.013$) and low density lipoprotein cholesterol ($P = 0.049$) levels relative to the control group. Significantly greater reductions in body mass index ($P = 0.018$), fat percent ($P = 0.037$) and waist circumference ($P = 0.047$) were observed in the intervention group compared to control. Within-group comparisons revealed significant reductions in systolic blood pressure ($P = 0.035$) and weight ($P = 0.005$) in the intervention group.

Conclusions: Long-term consumption of Kashk, as a high protein and calcium product enriched with probiotic that is accompanied by a low energy diet, might have beneficial effects on anthropometric and biochemical indices, though more cross-over and parallel blinded trials with placebo groups are needed to confirm these results. (The clinical trial registration number is IRCT2013042913163N1).

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1. Introduction

Obesity is considered as a major health problem in both developed and developing countries [1]. The increasing incidence of

obesity has become a key factor for healthcare systems in recent decades. Strategies of obesity management are usually related to reducing energy intakes, increasing physical activity, behavioral and lifestyle changes as well as psychological and social supports [2]. Meanwhile, recent strategies focus on the efficacy of lifestyle interventions in creating a negative energy balance to achieve meaningful weight loss and minimising the side effects of surgical and pharmaceutical interventions [3]. Hence, nutritional programs have reduced negative outcomes and therefore are better solutions for weight management.

Dairy products have been suggested to play a role in weight reduction and decreasing the risk of many diseases such as type-2

Abbreviations: BMI, body mass index; WC, waist circumference; FFM, fat free mass; FPG, fasting plasma glucose; TC, total cholesterol; TG, triglycerides; HDL-C, high density of lipoprotein cholesterol; LDL-C, low density of lipoprotein cholesterol; SBP, systolic blood pressure; DBP, diastolic blood pressure; SD, standard deviation; CFU, colony forming units.

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***Lactobacillus gasseri* BNR17 Supplementation Reduces the Visceral Fat Accumulation and Waist Circumference in Obese Adults: A Randomized, Double-Blind, Placebo-Controlled Trial**

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ABSTRACT *Lactobacillus gasseri* BNR17 is a probiotic strain isolated from human breast milk. Animal studies reported that BNR17 inhibited increases in body weight and adipose tissue weights. The purpose of this study was to evaluate the antiobesity effects of BNR17 in humans. In a randomized, double-blind, placebo-controlled trial, 90 volunteers aged 20–75 years with body mass index (BMI) from 25 to 35 kg/m² were randomized to receive a placebo, low-dose BNR (BNR-L, 10⁹ CFU/day), or high-dose BNR (BNR-H, 10¹⁰ CFU/day) for 12 weeks. Body weight, BMI, waist and hip circumferences, waist-to-hip ratio, abdominal adipose tissue areas, body fat mass, lean body mass, and biochemical parameters were assessed at the beginning and end of the trial. Visceral adipose tissue (VAT) was significantly decreased in the BNR-H group compared with the placebo group ($P = .038$). Difference of VAT areas of the BNR-H group compared with the placebo group after 12-week consumption of BNR17 was significant (-21.6 cm^2 , $P = .012$). Waist circumferences were significantly decreased in both the BNR-L and BNR-H groups ($P = .045$ and $.012$, respectively) compared with the baseline values, but not in the placebo group. Biochemical parameters were not significantly different among the groups. These findings suggest that daily consumption of BNR17 may contribute to reduced visceral fat mass in obese adults.

KEYWORDS: • body weight • *Lactobacillus gasseri* • obesity • probiotics • visceral adipose tissue

INTRODUCTION

OBESITY IS DEFINED as an excessive fat accumulation that may impair health-related quality of life. Numerous studies have shown that the regional distribution of body fat is a more important variable than the magnitude of generalized obesity in the relationship between obesity, metabolism, and health.^{1,2} Especially, visceral fat obesity is known to be more strongly correlated with an adverse metabolic risk profile than is subcutaneous fat obesity.³

Microbiota is regarded as one of the critical factors related to obesity and metabolic disorders.^{4,5} The potential role of gut microbiota in the development of obesity led several groups to investigate the effects of probiotic consumption on weight management. Probiotics, which are bacteria known to confer health benefits on the host, modulate the gut microbiota and therefore may affect the energy balance and metabolism of the host. The administration of specific strains of *Lactobacillus* or *Bifidobacterium* has shown to prevent weight gain

in mouse models of obesity.⁶ There is some evidence to demonstrate the effects of probiotic consumption on weight management in humans. Kadooka *et al.*⁷ reported that a supplementation of fermented milk with *Lactobacillus gasseri* SBT2055 for 12 weeks induces significant weight loss and a decrease in abdominal visceral and subcutaneous fat mass in overweight adults under *ad libitum* conditions. Omar *et al.*⁸ demonstrated that the consumption of two yogurts per day supplemented with *Lactobacillus amylovorus* leads to a decrease in total body fat mass in a placebo-controlled, double-blind, crossover clinical study. Ilmonen *et al.*⁹ showed that nutritional counseling combined with probiotic treatment (*Lactobacillus rhamnosus* GG and *Bifidobacterium lactis* Bb12) in pregnant women can reduce the risk of central adiposity at 6 months postpartum. Sanchez *et al.*¹⁰ demonstrated the effect of an *L. rhamnosus* CGMCC1.3724 supplementation on weight loss and maintenance in obese women during the moderate energy restriction period for the first 12 weeks followed by 12 weeks of weight maintenance, in a double-blind, placebo-controlled, randomized trial.

L. gasseri BNR17 is a probiotic strain isolated from human breast milk. Previous studies have demonstrated that *L. gasseri* BNR17 suppressed body weight and fat weight

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RESEARCH

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Can psychobiotics intake modulate psychological profile and body composition of women affected by normal weight obese syndrome and obesity? A double blind randomized clinical trial

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Abstract

Background: Evidence of probiotics effects on gut function, brain activity and emotional behaviour were provided. Probiotics can have dramatic effects on behaviour through the microbiome–gut–brain axis, through vagus nerve. We investigated whether chronic probiotic intake could modulate psychological state, eating behaviour and body composition of normal weight obese (NWO) and preobese–obese (PreOB/OB) compared to normal weight lean women (NWL).

Methods: 60 women were enrolled. At baseline and after a 3-week probiotic oral suspension (POS) intake, all subjects underwent evaluation of body composition by anthropometry and dual X-ray absorptiometry, and psychological profile assessment by self-report questionnaires (i.e. EDI-2, SCL90R and BUT). Statistical analysis was carried out using paired t test or a non-parametric Wilcoxon test to evaluate differences between baseline and after POS intake, one-way ANOVA to compare all three groups and, where applicable, Chi square or t test were used to assess symptoms.

Results: Of the 48 women that concluded the study, 24% were NWO, 26% were NWL and 50% were PreOB/OB. Significant differences in body composition were highlighted among groups both at baseline and after a POS ($p < 0.05$). After POS intake, a significant reduction of BMI, resistance, FM (kg and %) ($p < 0.05$), and a significant increase of FFM (kg and %) ($p < 0.05$) were observed in all subjects in NWO and PreOB/OB. After POS intake, reduction of bacterial overgrowth syndrome ($p < 0.05$) and lower psychopathological scores ($p < 0.05$) were observed in NWO and PreOB/OB women. At baseline and after POS intake, all subjects tested were negative to SCL90R_GSI scale, but after treatment subjects positive to BUT_GSI scale were significantly reduced (8.33%) ($p < 0.05$) compared to the baseline (33.30%). In NWO and PreOB/OB groups significant differences ($p < 0.05$) in response to the subscales of the EDI-2 were observed. Significant improvement of the oro-cecal transit time was observed ($p < 0.05$) after POS intake. Furthermore, significant differences were observed for meteorism ($p < 0.05$) and defecation frequency ($p < 0.05$).

Conclusions: A 3-week intake of selected psychobiotics modulated body composition, bacterial contamination, psychopathological scores of NWO and PreOB/OB women. Further research is needed on a larger population and for a longer period of treatment before definitive conclusions can be made.

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