

## Effects of synbiotic on anthropometry, lipid profile and oxidative stress in obese children

N. Ipar<sup>1</sup>, S. Durmus Aydogdu<sup>2</sup>, G. Kilic Yildirim<sup>2</sup>, M. Inal<sup>3</sup>, I. Gies<sup>4</sup>, Y. Vandenplas<sup>4</sup> and E.C. Dinleyici<sup>1\*</sup>

<sup>1</sup>Eskisehir Osmangazi University Faculty of Medicine, Department of Pediatrics, 26480 Eskisehir, Turkey; <sup>2</sup>Eskisehir Osmangazi University Faculty of Medicine, Department of Pediatrics, Nutrition and Metabolism Unit, 26480 Eskisehir, Turkey; <sup>3</sup>Eskisehir Osmangazi University Faculty of Medicine, Department of Biochemistry, 26480 Eskisehir, Turkey; <sup>4</sup>Department of Pediatrics, UZ Brussel, Vrije Universiteit Brussel, Laarbeeklaan 101, 1090 Brussels, Belgium; [enercagri@gmail.com](mailto:enercagri@gmail.com)

Received: 2 February 2015 / Accepted: 29 April 2015

© 2015 Wageningen Academic Publishers

### RESEARCH ARTICLE

#### Abstract

Recent studies have suggested some beneficial effects of probiotics and/or prebiotics on obesity in adults; such experience is limited in children and adolescents. This study was an open-label, randomised, controlled study including children with primary obesity. The first group was treated with a standard method with a reduced calorie intake and increased physical activity. The second group received add-on daily synbiotic supplementation during one month. The aim of this study was to evaluate potential effects of a synbiotic on anthropometric measurements, lipid profile and oxidative stress parameters. One month of supplementation of the synbiotic resulted in a significant reduction of weight ( $P < 0.001$ ) and body mass index ( $P < 0.01$ ). Changes (% reduction comparing to baseline) in anthropometric measurements, were significantly higher in the children receiving the additional synbiotic supplement ( $P < 0.05$ ). The percentage of children with weight loss was higher in the synbiotic group, but not statistically significant (71.4 vs 64.2%,  $P > 0.05$ ). At the 30<sup>th</sup> day of synbiotic intervention, serum total cholesterol, low density lipoprotein cholesterol and total oxidative stress levels significantly declined ( $P < 0.05$ ). Changes in serum lipid levels were significantly higher in the synbiotic group ( $P < 0.05$ ). Changes in serum total oxidative stress levels before and after the intervention period, were significant in synbiotic group ( $P < 0.01$ ). In our study, changes in weight, body mass index, and triceps skinfold thickness were higher in the group receiving the one month synbiotic supplement than in the standard method group. The supplement tested also had a beneficial effect on lipid profile and total oxidative stress. To the best of our knowledge, this is the first study showing the effects of synbiotics on oxidative stress in obese patients with an additional effect on weight loss regarding to previous studies.

**Keywords:** obesity, probiotics, synbiotics, adolescent, prebiotics

#### 1. Introduction

The global obesity epidemic presents an unprecedented challenge to the public health worldwide. The factors associated with obesity are complex, and include health behaviours, such as eating habits and daily physical activity, and broader social, environmental and biological determinants that influence these health behaviours (Malik *et al.*, 2013). The intestinal microbiota has several beneficial functions related to host health and accumulating evidence indicates that the gut microbiota is connected with the development of obesity, obesity-associated inflammation and insulin resistance (Thomas *et al.*, 2014). Differences in composition, functional genes and metabolic activities

of the gut microbiota appear to distinguish lean vs obese individuals, suggesting that gut 'dysbiosis' contributes to the development of obesity and/or its complications (Mehal, 2013; Mondot *et al.*, 2013; Power *et al.*, 2014; Shen *et al.*, 2013; Thomas *et al.*, 2014).

Recent studies have suggested some beneficial effects of probiotics and/or prebiotics on obesity and metabolic syndrome in adults; such experience is limited in children and adolescents (Alisi *et al.*, 2014; Göbel *et al.*, 2012; Kadooka *et al.*, 2013; Larsen *et al.*, 2013; Leber *et al.*, 2012; Luoto *et al.*, 2010; Safavi *et al.*, 2013; Sanchez *et al.*, 2014; Sharafedinov *et al.*, 2013; Vajro *et al.*, 2011). The aim of this study was to evaluate potential effects of add-on pro-