Gluten-free cereal products and beverages: a review of their health benefits in the last five years

ABSTRACT

Background: Indoor air pollution has globally known as the risk factor of acute respiratory infection in young children. The exposure to indoor particulate matter 2.5 (PM2.5) and nitrogen dioxide (NO2) at house or school can be a potential risk to children's health. This study aimed to examine the association between indoor PM2.5 and NO2 with oxidative stress markers in junior high school students. Design and method: This study was conducted using a cross sectional study with 75 students collected randomly from four junior high schools in Jakarta. PM2.5 and NO2 were measured in classrooms and school yards. The schools were categorized based on the exposure level of PM2.5 and NO2 in classrooms. Superoxide dismutase (SOD) and reduced glutathione (GSH) were examined from the blood sample. All students were interviewed with questionnaires to determine upper respiratory tract infection, smoking family members, mosquito repellent usage, and dietary supplement consumption. Results: Mean concentration of indoor PM2.5 and NO2 were 0.125±0.036 mg m-3 and 36.37±22.33 µg m-3, respectively. The schools which located near to highway showed lower PM2.5 and higher NO2 level indicated the emission of traffic activity. Mean activity of SOD was 96.36±50.94 U mL-1 and mean concentration of GSH was of 0.62±0.09 µg mL-1. Most of the students reported upper respiratory tract infection history, smoking family member, use mosquito repellent at home, and do not consume dietary supplement. Conclusion: The level of oxidative stress markers and the exposure categories of classroom PM2.5 and NO2 was not significantly different, however there were significant correlation with cigarette smoke and mosquito repellent at home. Nevertheless, the exposure of indoor PM2.5 and NO2 increased the risk of the exposure to cigarette smoke and mosquito repellent at home. Further study on the air pollution at school and home is needed to affirm association towards student's health and to design strategic control efforts.

Keyword: Gluten-free products; Cereals; Pseudo-cereals; Gluten-free beverages; Health benefits