Judiono . Plain Kefir Antidiabetic Potential: Study on glycemic, antioxidants status, immune response and pancreatic β cell regeneration on hyperglycemia Wistar rats Streptozotocin induced.

Abstract.

Background. Oxidative stress triggers the function and structure of pancreatic β cell damage in hyperglycemia through lipid peroxidation, proinflammatory cytokines modulation and interleukin-10. The available therapy so far has not been reaching an optimal of the blood glucose control. Kefir’s bioactive have potential as a supplement therapy. This study was aimed at validating the effect of plain kefir on glycemic, antioxidants status, immune response and pancreatic β cell regeneration of hyperglycemia Wistar Strain Rats induced by Streptozotocin (STZ).

Materials and Method. The randomized pretest - posttest control group study design was conducted in male hyperglycemia Wistar rats induced by 40 mg / kg body weight streptozotocin (STZ) dissolved in 0,1 M buffer citrate pH 4,5. Rats were randomized into four groups, namely: (1) STZ-induced animals group and given insulin treatment UI/200 0.76 g bw, (2) STZ-induced animals group and given treatment plain kefir 3.6 cc/200 g bw/day for 30 days, (3) STZ-induced animals group (non-STZ induced) as a positive control (ad libitum), (4) normal animals group as a negative control (ad libitum). Blood glucose was measured by enzymatic method. Antioxidants status (SOD, GPX) were measured by ELISA. Catalase was measured by Spectrofometry. Lipid peroxide was measured MDA-TBARs by spectrofotometry. Immune response (cytokines IL1, IL6, TNFα, IL10) were measured by ELISA. Pancreatic histology was observed by immunohistochemistry. Data were analyzed by One Way Anova, Mann Whitney test, Duncan, Ancova with significance level p <0.05.

Result. Plain kefir supplementation 3.6 cc / day affect significantly on blood glucose, antioxidants (SOD, Catalase, GPX), lipid peroxidation (MDA), and pancreatic β-cells regeneration. Statistical analysis showed respectively decrease of glucose (p<0.001), MDA (p<0.001), level of proinflammatory cytokines (IL1, IL6) (p<0.001), except of controls. Antioxidant capacity showed increase of catalase, GPx (p<0.001) and SOD (p <0.05). Similarly, there was increased of IL10 (p<0.05) and the normal cells pancreatic β expression (p <0.001), except of control. TNFα was reduced. Ancova test showed MDA and IL10 were the most contributed to the pancreatic β cells regeneration by 91.0% and 9% determined by TNF-α, antioxidants, blood glucose, body weight. Probiotics kefir were found in as many as 10^6-10^9 cfu / mL and declined to 10^5 as the decrease in pH during storage.

Conclusion and recommendation. Kefir supplementation about 3.6 cc/ day has significantly decreased (1) blood glucose, (2) lipid peroxide (MDA), (3) level of cytokines ( IL1, IL6) and (4) enhanced IL10 and (5) antioxidants capacity (SOD, Catalase, GPx) and (6) normal pancreatic β cell expression. Insulin and kefir descriptively reduced TNF α level. It is necessary to disclose underlying biomolecular mechanism and characterization of plain kefir probiotics before applying clinically to diabetic patients.

Keyword: Probiotic, plain kefir, diabetes mellitus, hyperglycemia, free radicals, β cells regeneration, proinflammatory cytokines