MINI REVIEW

A brief review of fermented foods' anti-diabetic effects

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ABSTRACT

Fermented Foods (FFs) are typically regarded as beneficial foods. Since people are more aware of the health advantages of FFs, FF intake has dramatically increased in recent decades. One of the biggest risks to a person's health span is diabetes. The general procedures for producing FFs are described in the current publication, together with the outcomes of numerous investigations (including in vitro, in vivo, and clinical trials) on the antidiabetic effects of FFs. The technique used for fermentation and the active microorganisms employed in the procedure are key factors in the functional characteristics of FFs. Several in vitro and in vivo studies have been published on the health-promoting qualities of FFs, including better gastrointestinal health, anti-inflammation, anti-cancer, and antioxidant effects. There are very few randomized controlled clinical trials involving human volunteers to study the functional characteristics of FFs for a variety of reasons, including as moral considerations, safety issues, regulatory approval, etc. The development of complementary and alternative medications is being pursued by numerous scientific teams in an effort to enhance hyperglycaemia treatment plans

Key Words: *Fermented foods; Fermentation; Active microorganisms; Gastrointestinal health9*

INTRODUCTION

Raw food components are transformed by microorganisms into fermented foods (FFs). Since the beginning of civilisation, perhaps many thousand years ago, FFs have been prepared and used [1]. The majority of people are exposed to FFs through a variety of foods, including dairy products, pickled vegetables, meat, and fish products. Based on geographic location, weather conditions, and source accessibility, different individuals utilise different FFs and use them in different ways [2].The FFs' quality is significantly impacted by the preparation techniques. The type and quality of the FFs are determined by the bacteria involved in the fermentation process. The common microbes involved in fermentation are lactic acid bacteria (LAB), Propionibacterium, Acetobacter, yeast, moulds, and Bacillus species. These microbes are responsible for the presence of lactic, acetic, and propionic acids, alcohol, ammonia, and fatty acids. The fermentation process increases the nutritional and organoleptic quality, as well as the potential for foods to promote health, while also extending their shelf life [3]. The fermentation of conventionally fermented meals is caused by bacteria that naturally exist in the raw materials. The fermentation process has been modernized by creating suitable phases such starter culture development, to minimise infection of pathogenic microbes, a negative byproduct created by unwanted microbes during the fermentation, and to acquire an enhanced health beneficial fermented product [4]. By creating practical procedures like starter culture generation, the fermentation process has been modernized. As a result, in order to prepare the starter culture, it is important to identify the naturally present bacteria. When choosing starter cultures, the specific fermented product's quality, safety, and shelf life are taken into account [5]. The habitat is then optimized in order to enhance the performance of the starting culture. The starter culture strains within the species are evaluated in order to identify an appropriate starter culture with high efficiency or a unique property of the relevant fermented product. Even in controlled multi-step fermentation procedures, the generated cultures are used to enhance the quality of the fermented product [5]. According to reports, FFs have a number of health advantages, including the ability to prevent and treat metabolic disorders, cardiovascular diseases, boost immune function, and more. The consumers' health is improved by the FFs made with advantageous microorganisms. It has been reviewed that FFs are a multisource of bioactive microorganisms with numerous health-promoting features for instance, the consumption of galactosidases generating microbes via FFs helps people consume dairy products without any effects of lactose intolerance. The creation of cosmetic products has also utilised the fermented plant extracts .However, in order to establish the food's functionality, the proposed findings must be supported by clinical trials. Recent scientific studies have suggested that adding fermented foods to your diet will reduce the negative health effects of

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diabetic mellitus (DM) .The current review covers the sustainable use of functional fermented foods for the effective management of the DM condition and compiles information from recent studies on the antidiabetic characteristics of these foods. The antidiabetic property of the phenolic extracts of the fermented soymilk was evaluated using enzyme assays (-amylase, -glucosidase, and angiotensin-converting enzyme (ACE) inhibitory activities).Soymilk was fermented with Kefir culture (Lactobacillus plantarum, L. casei, Leuconostoc cremoris, Streptococcus lactis, S Tyrosol content increased during fermentation, but salidroside concentration fell and -glucosidase-inhibiting capacity improved. By causing fewer negative side effects like flatulence, stomach distension, etc., the decrease in -amylase inhibition activity also has a positive advantage. In addition, it was discovered that the ACE inhibitory activity was different from non-fermented soymilk.

The percentage of 2-[N-(7-nitrobenz-2-oxa-1, 3-diazol-4-yl) amino] is about 60%. When exposed to a 50 g/mL ethanol extract of fermented rice bran and soybean, C2C12 cells were found to take up 2-deoxy-D-glucose (FRBSB). The FRBSB exposure enhanced the insulin signal transmission by phosphorylating the glucose synthase kinase-3 and boosted the phosphorylation of Akt in a dose-dependent manner. The AMPK (5' adenosine monophosphate-activated protein kinase) signalling is unaffected by FRBSB exposure.

Laminaria japonica J.E. Areschoug was used to make rice wine (Makgeolli), and its alcohol level, sugar content, viable cell count, and protein tyrosine phosphatase 1B inhibitory capabilities have all been investigated. The quantity of sugar, alcohol, and microorganisms has not been considerably impacted by the varied L. japonica concentrations. Human volunteers accepted the presence of L. japonica in Makgeolli at a range of 5-7.5%. Overall acceptability and a high degree of protein tyrosine phosphatase 1B inhibitory activity were both present in the Makgeolli made with 5%-7.5% *L. japonica*.

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