LAPORAN AKHIR

Penelitian Unggulan Perguruan Tinggi (M)

EFEK TERAPI DAN PENCEGAHAN DARI PEPTIDA BIOAKTIF SUSU KAMBING TERFERMENTASI PADA PENYAKIT KARDIOVASKULER

Tahun ke 1 dari rencana 2 tahun

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ABSTRACT

The increasing need for functional foods is rising in line with public awareness for healthy consumption. Provision of functional food source is developed through enhanced bioactive that has a regulatory function for the body. Bioactive peptides in milk is known to have a variety of beneficial functions of the body such as immunomodulators, immunostimulatory, anti- hypertensive, anti- hypercholesterolemia, as well as a variety of other beneficial functions. This study aimed to obtain a fermentation method to produce functional dairy products containing bioactive peptides, obtaining data on bioactive peptides in fermented goat milk, as well as obtain data about the biological function of bioactive peptides in fermented goat milk and produce innovative functional drinks from goat milk which can be developed into an industrial scale.

The results of this study indicated that goat milk fermented using a 3 % commercial statrter able to produce the best yogurt than use local yogurt starter starter also with different concentrations. Analysis of protein content showed the fermentation process increased the amount of protein in the sample. Using SDS - PAGE showed the breakdown of proteins into fractions greater than in goat milk. The results were then analyzed by LC MS/ MS and known of the three kinds of bioactive peptides, each of which consists of 16 amino acids that are safely protected from gastrointestinal proteases. These peptides were then tested for activity for antihypercholesterolemia through the preparation of an animal model fed dietary treatment of hypercholesterolemia .

Key words: goat milk/fermentation/bioactive peptide/lactic acid bacteria

RINGKASAN

Kebutuhan untuk pangan fungsional dan nutrasetika meningkat secara signifikan sebagai respon dari meningkatnya kesadaran masyarakat terhadap pola makan yang sehat. Dari berbagai hasil penelitian diketahui bahwa pangan mengandung komponen bioaktif yang mempunyai fungsi biologis sebagai regulasi sistem tubuh. Salah satu komponen bioaktif yang

banyak mendapat perhatian peneliti adalah protein spesifik dan peptida bioaktif. Susu merupakan sumber peptida bioaktif yang mempunyai potensi untuk dikembangkan sebagai pangan fungsional melalui teknologi pengolahan yang tepat.

Penelitian ini bertujuan untuk memperoleh metoda fermentasi berdasarkan kajian ilmiah untuk menghasilkan produk susu fungsional yang mengandung peptida bioaktif, memperoleh data ilmiah tentang peptida bioaktif dalam susu kambing terfermentasi, memperoleh data ilmiah tentang fungsi biologis dari peptida bioaktif pada susu kambing terfermentasi dan menghasilkan produk inovatif minuman fungsional berbasis susu kambing yang dapat dikembangkan ke skala industri.

Metoda yang digunakan adalah percobaan yang akan dilaksanakan selama dua tahun melalui empat tahap percobaan. Pada Tahun I akan dilakukan dua tahap percobaan yaitu : (1) kajian waktu fermentasi dan konsentrasi strater yang tepat untuk menghasilkan produk susu fermentasi dengan kandungan peptida bioaktif terbaik (2) Isolasi dan karakterisasi peptida bioaktif pada susu terfermentasi menggunakan hasil percobaan tahap 1. Hasil percobaan Tahun I adalah metoda fermentasi untuk menghasilkan produk susu fermentasi yang kaya peptida bioaktif dan informasi data komponen peptida bioaktif. Pada Tahun II ada dua tahap percobaan yang akan dilakukan yaitu (3) uji beberapa fungsi biologis peptida bioaktif hasil percobaan Tahun I secara *in vitro* dan *in vivo* menggunakan hewan coba dan (4) kajian komponen peptida bioaktif secara *in silico*. Dari percobaan Tahun II akan dihasilkan data tentang fungsi biologis peptida bioaktif dari susu terfermentasi dan sekuen asam amino dari masing-masing peptida. Pada akhir Tahun II dimana proyek ini selesai akan dihasilkan metoda standar untuk menghasilkan produk novel minuman fungsional berbasis susu dan informasi tentang bioaktif peptida dengan manfaat fungsionalnya.

Luaran yang diharapkan dari penelitian ini adalah menghasilkan produk pangan fungsional berbasis susu kambing dan metoda pembuatannya yang mempunyai peluang untuk mendapatkan hak paten. Menghasilkan artikel hasil penelitian yang dapat dipublikasikan pada jurnal nasional terakreditasi dan jurnal internasional serta buku teks tentang susu sebagai pangan fungsional. Dengan demikian penelitian yang akan dilakukan ini dapat memberikan penguatan pemahaman bagi masyarakat tentang manfaat susu fermentasi dengan cara memberikan dasar ilmiah produk fermentasi berbasis susu kambing. Selanjutnya diharapkan dapat menumbuhkembangkan industri pengolahan susu fermentasi dengan memanfaatkan sumberdaya lokal terutama bagi peternak kambing perah yang saat ini sudah berkembang. Penelitian ini juga dapat menunjang program Sistem Inovasi Nasional

melalui temuan produk inovasi minuman fungsional berbasis kearifan lokal, dimana untuk jangka panjang dapat dikembangkan menjadi produk strategis yang mempunyai daya saing di pasar internasional, serta dihasilkannya draf Hak atas Kekayaan Intelektual (HKI).

SUMMARY

The need for functional food and nutrasetical is increased significantly in response to increasing public awareness of a healthy diet. From the survey results revealed that various foods contain bioactive components that have a biological function as a regulatory body system. One of the many bioactive components which received great attention of researchers is specific proteins and bioactive peptides. Milk is a source of bioactive peptides that have the potential to be developed as a functional food through appropriate processing technology. This study aimed to obtain a fermentation method which based on scientific studies to produce functional dairy products containing bioactive peptides, obtaining scientific data on bioactive peptides in fermented goat milk, obtain scientific data about the biological function of bioactive peptides in fermented goat milk and produce innovative functional drinks goat milk-based. It can be developed into an industrial scale.

The method used in this experiment will be implemented over two years through the four stages of the experiment. In the first year will be conducted in two stages of the experiment were: (1) study the fermentation time and concentration Strater right to produce fermented milk containing bioactive peptides best (2) Isolation and characterization of bioactive peptides in milk fermented. Results In the first experiment is a method of fermentation to produce fermented milk products are rich in bioactive peptides and bioactive peptides component. In the second year there are two stages of the experiment to be performed, are (3) test the biological functions of bioactive peptides resulted from the previous research in vitro and in vivo using experimental animals, and (4) the study of bioactive peptides components in silico. By the end of 2nd years of the experiment will be produced data on the biological functions of bioactive peptides from fermented milk and amino acid sequence of each peptide . At the end of the second year in which the project is completed will produce a standard method to produce novel functional dairy-based drinks and information about bioactive peptides with has functional utility.

Expected outcomes of this research are to produce functional food products based on goat 's milk and a method of manufacture that have a chance to get a patent. Produce research results that the article can be published in nationally accredited journals and international journals and textbooks on milk as a functional food. Thus this study will be conducted to provide reinforcement for the public understanding of the benefits of milk fermented by providing a scientific basis goat's milk -based fermented products. Then expected to develop fermented

milk processing industry by utilizing local resources, especially for dairy goat farmers who are now grown. This research can also support the programs of the National Innovation System through the findings of functional beverage product innovation based on local wisdom, which in the long term can be developed into products that have strategic competitiveness in the international market, as well as the resulting draft Intellectual Property Rights.

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