

Intisari

Oatmeal cookies merupakan makanan kering yang diminati konsumen, namun tidak dapat dikonsumsi dalam jumlah banyak oleh penderita diabetes dan anak-anak karena mengandung gula dan lemak yang tinggi mencapai 70% dari total adonan. *Spirulina platensis* merupakan alga hijau biru yang mengandung protein tinggi sekitar 55-70% berat kering, dapat digunakan untuk meningkatkan gizi *oatmeal cookies*. Penggunaan gula yang tinggi dapat disubstitusi gula stevia sebagai pemanis alami rendah kalori. Tujuan dari penelitian ini adalah mengetahui pengaruh penambahan gula stevia pada *oatmeal cookies* yang difortifikasi *Spirulina platensis* untuk mengurangi penggunaan gula dan *masking* rasa serta menciptakan produk pangan fungsional. Metode optimasi formula produk menggunakan *response surface method* (RSM), rancangan 2^k faktorial (2 faktor dan 3 level). Faktor I, penambahan *Spirulina platensis* (1.5, 3, dan 4.5%) dan Faktor II, substitusi gula stevia (30, 60%, dan 90%). Hasil penelitian menunjukkan, substitusi gula stevia 90% memiliki minat beli terendah, menyebabkan struktur pori *cookies* besar dan tidak rata. Perlakuan penambahan spirulina dan substitusi gula stevia mempengaruhi volume pengembangan *cookies* ($p\text{-value} < 0,05$). Analisis *lack of fit* menunjukkan penambahan spirulina 1.5% dan substitusi gula stevia 30% sebagai titik optimum. Hasil komparasi *oatmeal cookies* optimum dengan kontrol menunjukkan peningkatan kadar air 0,36%, kadar abu meningkat 0,03%, protein meningkat 0,34%, kandungan lemak meningkat 0,25%, karbohidrat *by difference* menurun 0,94%, kandungan gula total menurun 1,35%, energi menurun 0,22 (kal/20 g) dan persentase penghambatan inhibisi DPPH *oatmeal cookies* optimum sebesar 75%. Penambahan spirulina dan gula stevia mempengaruhi warna dan tekstur ($p\text{-value} < 0,05$). Uji *Temporal Dominance of Sensation* (TDS) menunjukkan atribut dominan adalah rasa manis dan rasa *after taste* spirulina sedikit terdeteksi. Analisis *paired comparison* menunjukkan tidak terdapat beda nyata antara *oatmeal cookies* optimum dan kontrol, dengan demikian *oatmeal cookies* spirulina dapat dijadikan alternatif pangan fungsional.

Kata kunci: pangan fungsional, fortifikasi spirulina, gula stevia, *tailor food recipe*, RSM

Abstract

Oatmeal cookies are snack foods that are in demand by consumers, unfortunately, it cannot be consumed in large quantities by diabetics and children because it contain high sugar and fat reaching 70% of the total dough. *Spirulina platensis* is a blue-green alga, contains high protein around 55-70% dry weight, can be used to improve the nutrition of oatmeal cookies. Substituted sugar by stevia as a low-calorie natural sweetener is the way to reduce calories. The purpose of this research is to study the effect of stevia sugar on oatmeal cookies fortified with *Spirulina platensis* as a functional products. The response surface method (RSM) was used using a 2^k factorial design with two factors and three levels for determined the optimum combination formula. The level of *Spirulina platensis* were 1.5, 3, and 4.5% and substitution of stevia to sugar combined in (30, 60, and 90%). Stevia sugar substitution up 90% has the lowest costumer buying interest also causes a large and unequal pore structure product. Accelerating the increase in spirulina and the substitution of stevia sugar influence to the volume of developing cookies (p-value <0.05). The inadequate analysis shows spirulina 1.5% and 30% stevia sugar substitution as the optimal point. The results of comparative between optimal oatmeal cookies with control show the increasing of moisture 0.36%, ash 0.03%, protein 0.34%, fat 0.25% content, in the other hand, total sugar content decreased by 1.35%, energy decreased by 0.22 (cal / 20 g) and the optimal percentage of inhibition of DPPH oatmeal cookies inhibition was 75%. The results prove that spirulina and stevia sugar effect on sensories properties (color and texture). The Temporal Dominance of Sensation (TDS) analysis show that the dominant attribute is sweet taste, slightly spirulina after taste. Paired comparison analysis shows no significant difference between optimal oatmeal cookies and control. Based on the analysis, the optimal oatmeal spirulina cookies can be given as functional food.

Keywords: functional food, spirulina fortification, stevia sugar, tailor food recipe, RSM