

ABSTRAK

Anggun Sri Mulyani Sagala : Pengaruh Konsentrasi Starter dan Lama Fermentasi Terhadap Karakteristik Sensori dan Fisikokimia Kefir Air Kelapa Tua (*Cocos nucifera* L.). Skripsi. Fakultas Teknik Universitas Negeri Medan. 2026.

Permintaan minuman probiotik di Indonesia terus meningkat seiring meningkatnya kesadaran masyarakat terhadap gaya hidup sehat. Kefir adalah salah satu minuman probiotik yang dapat diproduksi dari bahan baku susu maupun non-susu. Air kelapa tua (*Cocos nucifera* L.) yang sering terbuang sebagai limbah dapat dimanfaatkan sebagai bahan baku pembuatan kefir karena masih memiliki nilai gizi yang potensial untuk media fermentasi. Konsentrasi starter dan lama fermentasi adalah dua faktor yang sangat krusial yang menentukan kualitas akhir kefir. Pengembangan kefir berbasis air kelapa serta kajian mengenai pengaruh konsentrasi starter dan lama fermentasi terhadap kualitas sensori dan fisikokimia produk masih terbatas. Oleh karena itu, penelitian ini bertujuan untuk mengkaji pengaruh variasi konsentrasi starter dan lama fermentasi terhadap karakteristik sensori dan fisikokimia kefir air kelapa tua.

Tempat penelitian dilaksanakan di Laboratorium Analisis Zat Gizi Universitas Negeri Medan, Balai Standarisasi dan Pelayanan Jasa Industri dan Laboratorium Fakultas Farmasi Fisik Universitas Sumatera Utara pada bulan Agustus 2025-September 2025. Desain penelitian dalam penelitian ini ialah eksperimental dengan metode Rancangan Acak Lengkap Faktorial dengan 2 faktor, yang terdiri dari 3 taraf yaitu konsentrasi starter (5%, 10%, 15%) dan lama fermentasi (18 jam, 24 jam, 36 jam), dengan 2 kali ulangan sehingga menghasilkan 18 satuan percobaan. Parameter sensori yang diuji meliputi warna, aroma, rasa, kekentalan, dan sensasi soda sedangkan parameter fisikokimia mencakup pH, total padatan terlarut (TPT), kadar protein, lemak, abu, total gula dan karbohidrat sederhana. Untuk uji viskositas dan kadar alkohol, analisisnya terbatas pada formula terbaik yang terpilih berdasarkan Indeks Efektivitas De Garmo. Kemudian hasil penelitian dianalisis dengan menggunakan *Permutation Two-Way Anova* dan uji lanjut *Pairwise Two-Sample Permutation Test*.

Berdasarkan uji sensori, perlakuan terbaik yaitu formula S2W2 (10% starter dan 24 jam fermentasi). Karakteristik fisikokimia kefir air kelapa tua pada seluruh perlakuan berkisar pada pH 3,79-4,47, total padatan terlarut 5,3-9,8°Brix, kadar protein 0,15-0,55%, kadar lemak 0,25-2,63%, kadar abu 0,19-0,41%, total gula 1,49-5,27% dan kadar karbohidrat sederhana 1,34-4,74%. Viskositas dan kadar alkohol formula terbaik masing-masing 39,7 mP.s dan 5,18%. Interaksi antara konsentrasi starter dan lama fermentasi berpengaruh nyata terhadap parameter sensori rasa, sedangkan pada parameter fisikokimia tidak memberikan pengaruh nyata. Secara tunggal, kedua faktor memberikan pengaruh yang nyata terhadap sebagian besar parameter sensori dan fisikokimia produk.

Kata Kunci : Kefir air; fermentasi; air kelapa tua; fisikokimia; sensori

ABSTRACT

Anggun Sri Mulyani Sagala: The Effect of Starter Concentration and Fermentation Time on the Sensory and Physicochemical Characteristics of Mature Coconut Water Kefir (Cocos nucifera L.). Thesis. Faculty of Engineering, Universitas Negeri Medan. 2026.

The demand for probiotic beverages in Indonesia continues to increase along with the growing public awareness of healthy lifestyles. Kefir is one of the probiotic beverages that can be produced from dairy and non-dairy raw materials. Old coconut water (Cocos nucifera L.), which is often discarded as waste, can be used as a raw material for kefir production because it still has potential nutritional value for fermentation media. Starter concentration and fermentation time are two crucial factors that determine the final quality of kefir. The development of coconut water-based kefir and studies on the effect of starter concentration and fermentation time on the sensory and physicochemical quality of the product are still limited. Therefore, this study aims to examine the effect of variations in starter concentration and fermentation time on the sensory and physicochemical characteristics of old coconut water kefir.

The research was conducted at the Nutrition Analysis Laboratory of the State University of Medan, the Center for Standardization and Industrial Services, and the Physical Pharmacy Laboratory of the University of North Sumatra from August 2025 to September 2025. The research design in this study was experimental using a completely randomised factorial design with two factors, consisting of three levels, namely starter concentration (5%, 10%, 15%) and fermentation time (18 hours, 24 hours, 36 hours), with two replicates, resulting in 18 experimental units. The sensory parameters tested included color, aroma, taste, viscosity, and carbonation sensation, while the physicochemical parameters included pH, total dissolved solids (TDS), protein content, fat, ash, total sugar, and simple carbohydrates. For viscosity and alcohol content tests, the analysis was limited to the best formulas selected based on the De Garmo Effectiveness Index. The research results were then analyzed using Permutation Two-Way ANOVA and the Pairwise Two-Sample Permutation Test.

Based on sensory testing, the best treatment was formula S2W2 (10% starter and 24 hours of fermentation). The physicochemical characteristics of aged coconut water kefir in all treatments ranged from pH 3.79-4.47, total dissolved solids 5.3-9.8°Brix, protein content 0.15-0.55%, fat content 0.25-2.63%, ash content 0.19-0.41%, total sugar content of 1.49-5.27%, and simple carbohydrate content of 1.34-4.74%. The viscosity and alcohol content of the best formulas are 39.7 mP.s and 5.18%, respectively. The interaction between starter concentration and fermentation time had a significant effect on sensory taste parameters, while it did not have a significant effect on physicochemical parameters. Individually, both factors had a significant effect on most of the sensory and physicochemical parameters of the product.

Keywords: *Water kefir; fermentation; mature coconut water; physicochemical; sensory*