

## INTISARI

Teh hitam merupakan salah satu jenis teh yang membutuhkan waktu yang lama dalam pengolahannya, terutama untuk pembuatan teh siap minum atau *ready to drink* (RTD) *tea*. Permasalahan dari *ready to drink* (RTD) *tea* yaitu proses pengolahan yang panjang dan memiliki kandungan senyawa fenolik serta aktivitas antioksidan yang rendah akibat proses oksidasi enzimatis. Beberapa penelitian mencoba membuat teh hitam siap minum dari daun teh segar atau teh hijau. Viscozyme merupakan enzim yang mendegradasi dinding sel tanaman selama ekstraksi sehingga mengeluarkan komponen aktif dari dalam sel, seperti kandungan fenolik dan aktivitas antioksidan. Sedangkan tirosinase termasuk enzim polifenol oksidase, yang dapat memanfaatkan konversi katekin menjadi *theaflavin* dan *thearubigin*. Penelitian ini bertujuan untuk menentukan penambahan kombinasi viscozyme dan tirosinase terhadap kandungan senyawa fenolik, aktivitas antioksidan, dan memperbaiki kenampakan teh hitam (warna).

Klon yang digunakan dalam penelitian ini yaitu klon 15 (p+2) yang telah diinaktivasi enzimnya dan ditambahkan viscozyme 250  $\mu$ l (108 FBGU/ml) pada ekstrak daun teh segar selama 30 menit inkubasi (40°C). Penambahan viscozyme pada ekstrak teh meningkatkan total senyawa fenolik dan aktivitas antioksidan (metode DPPH) masing-masing sebanyak 24,56 mg GAE/g daun teh (db) dan 33,53 mg GAE/g daun teh (db). Ekstrak teh yang telah diberi viscozyme kemudian ditambahkan tirosinase (223, 893, 3.571 U/ml) serta waktu inkubasi 20 dan 40 menit. Penambahan tirosinase dengan konsentrasi tinggi dan waktu inkubasi yang lama menurunkan total senyawa fenolik, aktivitas antioksidan DPPH, serta meningkatkan pembentukan *tea cream*, kandungan *theaflavin*, *thearubigin*, dan rasio TF:TR pada ekstrak teh yang telah diberi viscozyme. Kombinasi viscozyme dan tirosinase memberikan total senyawa fenolik, aktivitas antioksidan, kandungan *theaflavin*, *thearubigin*, dan rasio TF:TR lebih tinggi dibandingkan dengan kontrol serta dapat mencegah terbentuknya *tea creaming*. Penggunaan viscozyme (108 FBGU/ml) dan tirosinase (3.571 U/ml) selama 20 menit pada teh hitam siap minum memberikan pengaruh terbaik dalam penelitian ini.

**Kata kunci:** Teh Hitam, Daun Teh Segar, Viscozyme, Tirosinase

## ABSTRACT

Black tea is a tea type that takes a long time to process, especially making ready-to-drink (RTD) tea. The problem with ready-to-drink (RTD) tea is a long manufacturing process and contains phenolic compounds and low antioxidant activity due to the enzymatic oxidation process. Several studies have tried to produce ready-to-drink black tea from green tea or fresh tea leaves. Viscozyme is an enzyme that degrades plant cell walls during extraction so that it releases active components from the cell wall, such as phenolic contents and antioxidant activity. Meanwhile, tyrosinase includes the polyphenol oxidase enzyme, which can take advantage of catechins' conversion into theaflavins and thearubigins. This study aimed to determine the addition of viscozyme and tyrosinase combination to increase the content of phenolic compounds, antioxidant activity, and improve the appearance of black tea (color).

The clone used in this study was a clone of 15 (p+2) that had their enzymes inactivated was added with viscozyme 250  $\mu$ l (108 FBGU/ml) to fresh tea leaves extract for 30 minutes of incubation at 40°C. The addition of viscozyme to the tea extract increased total phenolic contents and antioxidant activity (DPPH method) of 24,56 mg GAE/g tea leaves (db) and 33,53 mg GAE/g tea leaves (db). The tea extract that had been given viscozyme was then added with tyrosinase (223, 893, 3.571 U/ml), and the incubation time was 20 and 40 minutes. The addition of tyrosinase with higher concentrations (3.571 U/ml) and longer incubation times (40 minutes) decreased total phenolic contents, antioxidant activity DPPH, increased tea cream formation, the compound of theaflavins, thearubigins, and TF:TR ratio in tea extracts that had been treated with viscozyme. The combination of viscozyme and tyrosinase gave higher total phenolic compounds, antioxidant activity, theaflavins, thearubigins content, and TF:TR ratio compared to control and could prevent the formation of tea cream. The use of viscozyme 250  $\mu$ l/40 ml and tyrosinase 3.571 U/ml for 20 minutes on ready-to-drink black tea gave the best effects in this study.

**Keywords:** Black Tea, Fresh Tea leaves, Viscozyme, Tyrosinase