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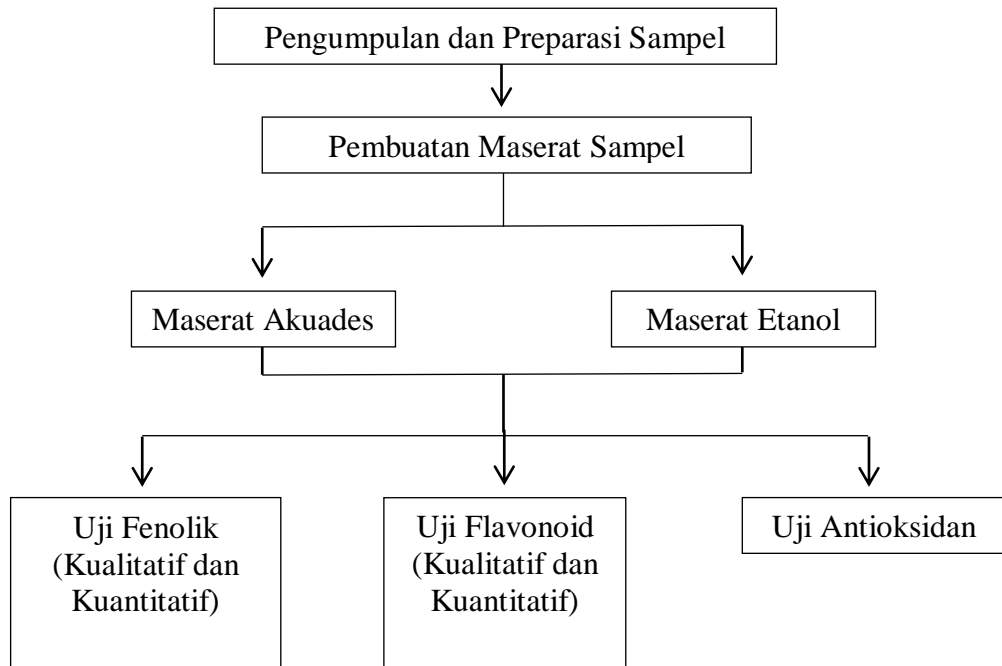
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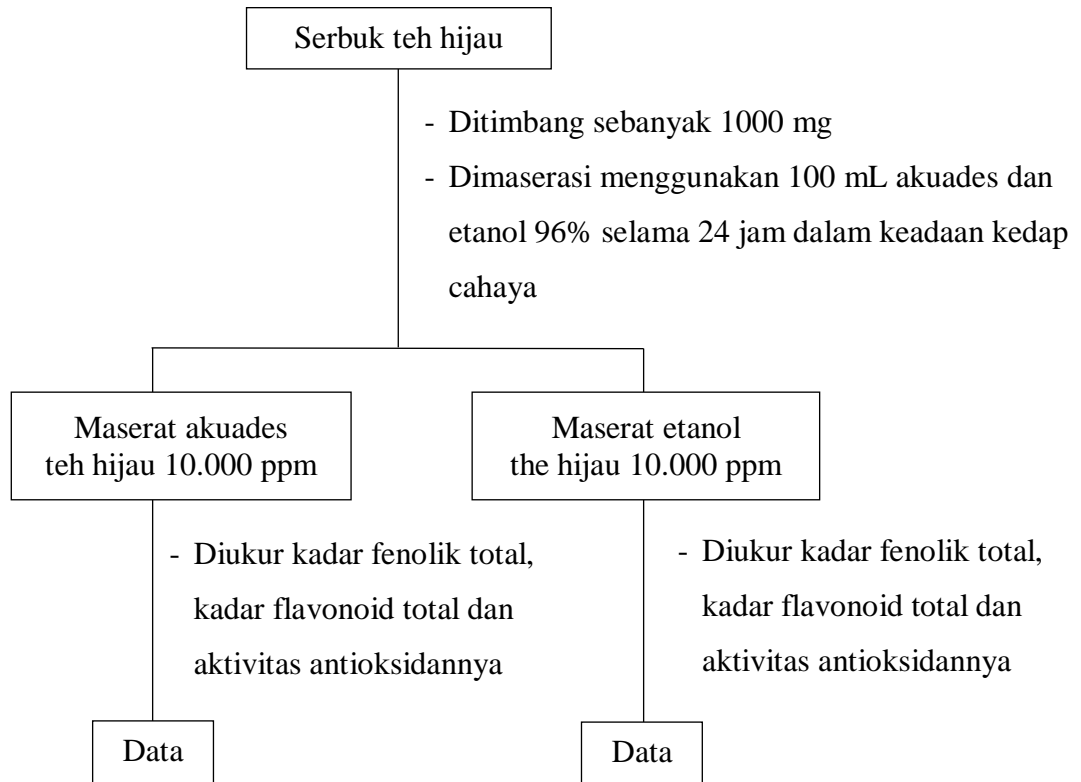
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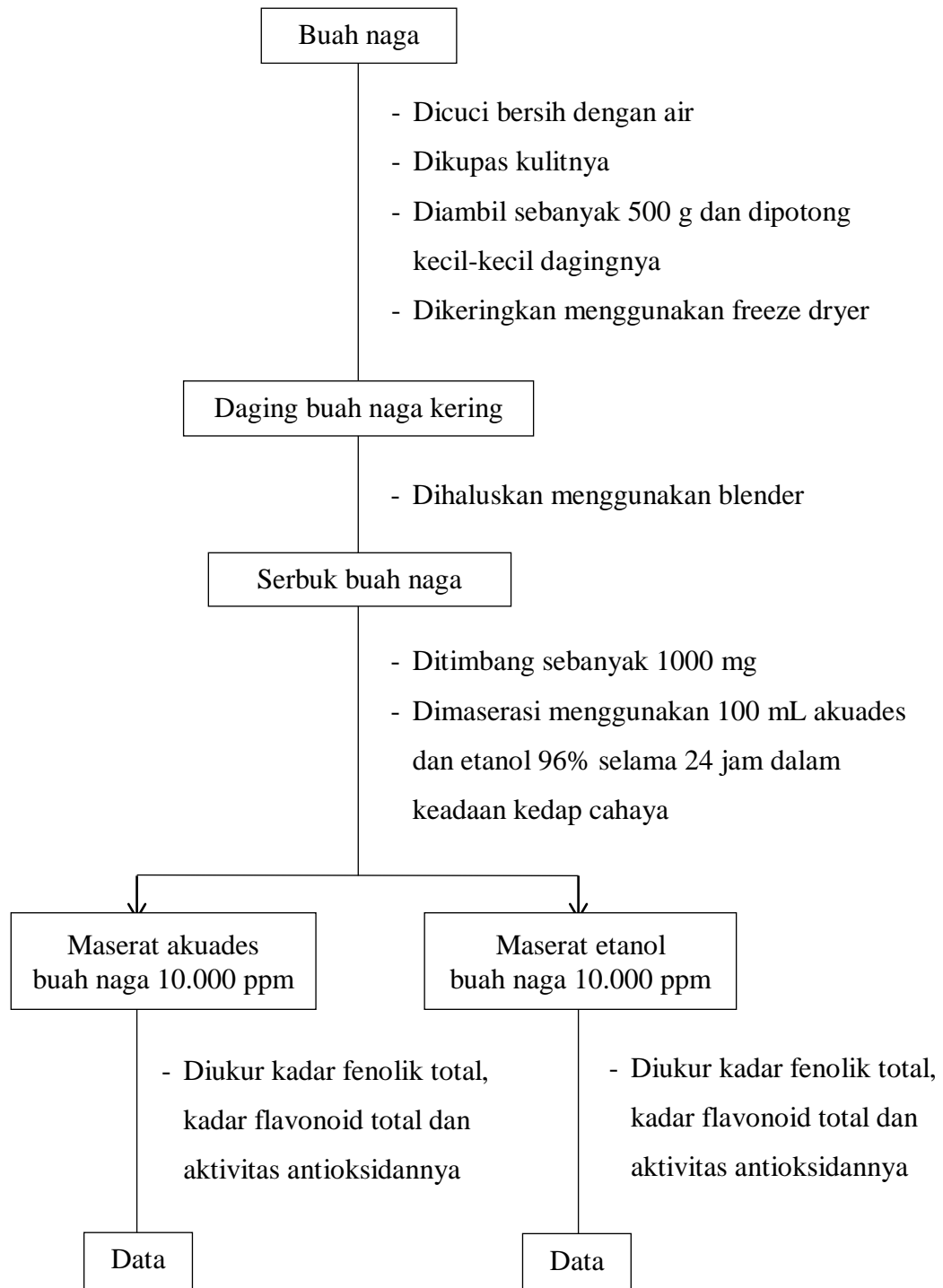
**Lampiran 1. Diagram alur penelitian**



## Lampiran 2. Bagan kerja preparasi dan maserasi teh hijau



**Lampiran 3. Bagan kerja preparasi dan maserasi sampel buah naga dan buah jeruk manis**



**Catatan:** dilakukan hal yang sama untuk jeruk manis seperti semua prosedur di atas.



#### Lampiran 4. Perhitungan pembuatan maserat sampel dan DPPH

##### a. Maserat sampel 10.000 ppm

$$\text{ppm} = \frac{\text{massa zat terlarut (mg)}}{\text{volume pelarut (L)}}$$

$$10.000 \text{ ppm} = \frac{\text{mg}}{0,1 \text{ L}}$$

$$\text{Massa zat terlarut} = 1.000 \text{ mg}$$

##### b. Pengenceran sampel

$$M_1 \times V_1 = M_2 \times V_2$$

**Contoh,**

$$1000 \text{ ppm} \times 5 \text{ mL} = 10.000 \text{ ppm} \times V_2$$

$$V_2 = \frac{5.000 \text{ ppm.mL}}{10.000 \text{ ppm}}$$

$$V_2 = 0,5 \text{ mL}$$

##### c. Larutan DPPH 0,4 mM

$$\text{mM} = \frac{\text{mg}}{\text{Mr} \times \text{L}}$$

$$0,4 \text{ mM} = \frac{\text{mg}}{394,32 \text{ g/mol} \times 0,1 \text{ L}}$$

$$\text{mg} = 15,7728$$

**Lampiran 5. Tabel data absorbansi penentuan  $\lambda_{\text{maks}}$  larutan standar asam galat, larutan standar kuersetin dan larutan DPPH 0,4 mM**

**a. Larutan standar asam galat**

Panjang gelombang (nm)	Absorbansi
750	0,032
755	0,034
<b>760</b>	<b>0,038</b>
765	0,036
770	0,034

**b. Larutan standar kuersetin**

Panjang gelombang (nm)	Absorbansi
410	0,050
420	0,054
430	0,063
<b>440</b>	<b>0,067</b>
450	0,065
460	0,060
470	0,050

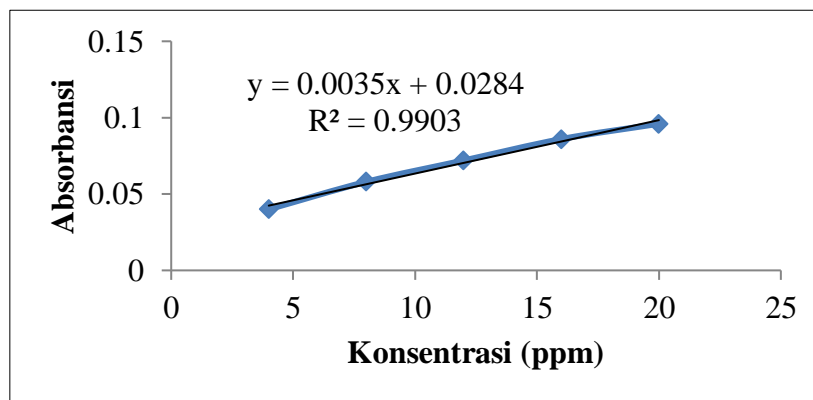
**c. Larutan DPPH**

Panjang gelombang (nm)	Absorbansi
500	0,364
505	0,446
510	0,534
<b>515</b>	<b>0,550</b>
520	0,500
525	0,401

**Lampiran 6. Kurva standar asam galat dan kuersetin untuk penentuan kadar fenolik total dan kadar flavonoid total**

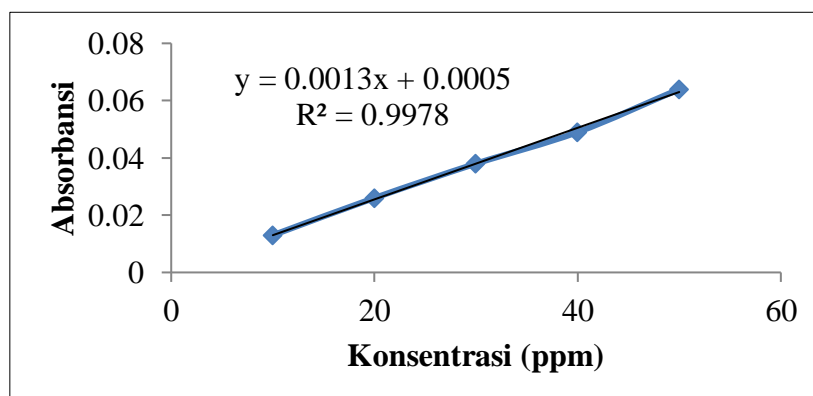
**a. Larutan standar asam galat**

<b>Konsentrasi (ppm)</b>	<b>Absorbansi (<math>\lambda = 760 \text{ nm}</math>)</b>
4	0,040
8	0,058
12	0,072
16	0,086
20	0,096



**b. Larutan standar kuersetin**

<b>Konsentrasi (ppm)</b>	<b>Absorbansi (<math>\lambda = 440 \text{ nm}</math>)</b>
10	0,013
20	0,026
30	0,038
40	0,049
50	0,064



### Lampiran 7. Kadar fenolik total semua maserat sampel

Maserat Sampel	Absorbansi	Kadar Fenolik Total (mg ekuivalen asam galat/g sampel)
Maserat Akuades Buah Naga	0,032	6,614
Maserat Etanol Buah Naga	0,048	13,149
Maserat Akuades Teh-Buah Naga	0,056	18,555
Maserat Etanol Teh-Buah Naga	0,052	39,663
Maserat Akuades Teh	0,070	69,791
Maserat Etanol Teh	0,094	109,562
Maserat Akuades Jeruk	0,038	3,304
Maserat Etanol Jeruk	0,046	5,758
Maserat Akuades Teh-Jeruk	0,082	17,946
Maserat Etanol Teh-Jeruk	0,054	42,819

#### Contoh perhitungan kadar fenolik total

$$x = \frac{y-b}{a} \cdot FP$$

$$\text{Kadar Fenolik Total (C)} = x \cdot \frac{v}{m}$$

Keterangan:

a = *slope*,

b = *intercept*

y = absorbansi sampel

FP= faktor pengenceran

x = kadar fenolik maserat sampel (mg/L)

v = volume maserat sampel (mL)

m = berat maserat sampel (g)

C = kadar fenolik total ekuavalen Kuersetin per g sampel

**Diketahui:**

$$y = 0,003x + 0,028$$

$$y = 0,032$$

$$FP = 50 \text{ kali}$$

**Penyelesaian:**

$$x = \frac{0,032 - 0,028}{0,003} \cdot 50$$

$$x = 66,6667 \text{ mg/L}$$

$$C = x \cdot \frac{v}{m}$$

$$C = 66,6667 \text{ mg/L} \cdot \frac{0,1 \text{ L}}{1008 \text{ mg}}$$

$$C = 0,006614 \text{ mg/mg GAE} = 6,614 \text{ mg GAE/g sampel}$$

**Lampiran 8. Kadar flavonoid total semua maserat sampel**

Maserat Sampel	Absorbansi	Kadar Flavonoid Total (mg ekivalen kuersetin/g sampel)
Maserat Akuades Buah Naga	0,031	92,261
Maserat Etanol Buah Naga	0,018	53,254
Maserat Akuades Teh-Buah Naga	0,036	96,948
Maserat Etanol Teh-Buah Naga	0,058	69,013
Maserat Akuades Teh	0,035	104,686
Maserat Etanol Teh	0,028	83,665
Maserat Akuades Jeruk	0,018	21,407
Maserat Etanol Jeruk	0,024	13,244
Maserat Akuades Teh-Jeruk	0,036	43,071
Maserat Etanol Teh-Jeruk	0,034	40,316

**Contoh perhitungan kadar flavonoid total**

$$x = \frac{y-b}{a} \cdot FP$$

$$\text{Kadar Fenolik Total (C)} = x \cdot \frac{v}{m}$$

Keterangan:

a = *slope*,

b = *intercept*

y = absorbansi sampel

FP= faktor pengenceran

x = kadar flavonoid maserat sampel (mg/L)

v = volume maserat sampel (mL)

m = berat maserat sampel (g)

C = kadar flavonoid total ekuavalen Kuersetin per g sampel

**Diketahui:**

$$y = 0,001x + 0,000$$

$$y = 0,023$$

$$FP = 6 \text{ kali}$$

**Penyelesaian:**

$$x = \frac{0,023 - 0,000}{0,001} \cdot 50$$

$$x = 138 \text{ mg/L}$$

$$C = x \cdot \frac{v}{m}$$

$$C = 138 \text{ mg/L} \cdot \frac{0,1 \text{ L}}{1042 \text{ mg}}$$

$$C = 0,013244 \text{ mg/mg GAE} = 13,244 \text{ mg GAE/g sampel}$$

**Lampiran 9. Perhitungan % Inhibisi dan Nilai IC<sub>50</sub>**

**a. Aktivitas antioksidan kontrol positif asam askorbat**

Konsentrasi (ppm)	Absorbansi	Absorbansi Kontrol	% Inhibisi	IC <sub>50</sub> (ppm)
2	0,301	0,338	10,947	6,1327
4	0,241		28,698	
6	0,171		47,633	
8	0,082		75,739	
10	0,034		89,941	

$$\% \text{ Inhibisi} = \frac{\text{Absorbansi kontrol} - \text{Absorbansi sampel}}{\text{Absorbansi kontrol}} \times 100\%$$

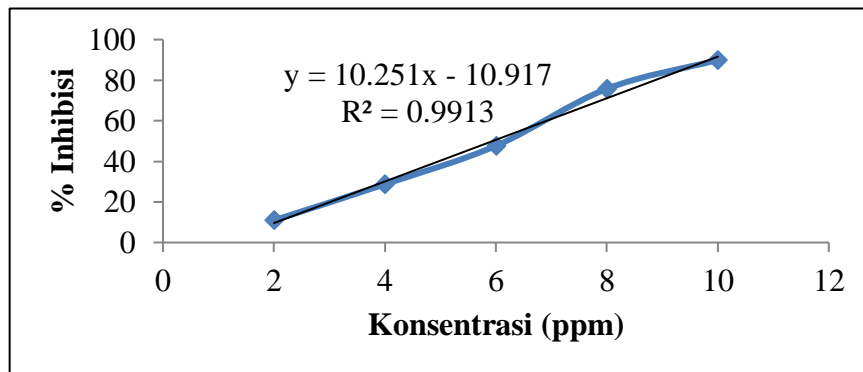
$$2 \text{ ppm} = \frac{0,338 - 0,301}{0,338} \times 100\% = 10,946\%$$

$$4 \text{ ppm} = \frac{0,338 - 0,241}{0,338} \times 100\% = 28,698\%$$

$$6 \text{ ppm} = \frac{0,338 - 0,171}{0,338} \times 100\% = 47,633\%$$

$$8 \text{ ppm} = \frac{0,338 - 0,082}{0,338} \times 100\% = 75,739\%$$

$$10 \text{ ppm} = \frac{0,338 - 0,034}{0,338} \times 100\% = 89,941\%$$



$$y = ax + b$$

$$IC_{50} = \frac{50 - b}{a}$$

**Diketahui:**

$$y = 10,25x - 10,91$$

**Penyelesaian:**

$$\begin{aligned} IC_{50} &= \frac{50 + 10,91}{10,25} \\ &= 6,1327 \end{aligned}$$

**b. Aktivitas antioksidan maserat akuades buah naga merah**

Konsentrasi (ppm)	Absorbansi	Absorbansi Kontrol	% Inhibisi	IC <sub>50</sub> (ppm)
400	0,214	0,266	19,549	1380,967
800	0,178		33,083	
1200	0,141		46,992	
1600	0,116		56,391	
2000	0,084		68,421	

$$\% \text{ Inhibisi} = \frac{\text{Absorbansi kontrol} - \text{Absorbansi sampel}}{\text{Absorbansi kontrol}} \times 100\%$$

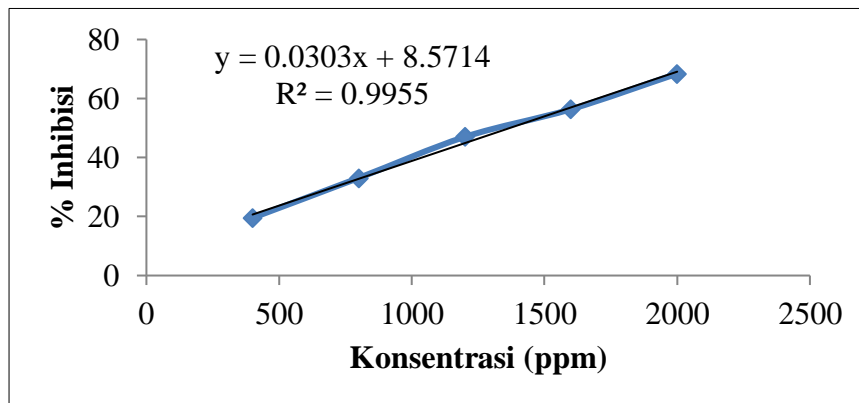
$$400 \text{ ppm} = \frac{0,266 - 0,214}{0,266} \times 100\% = 19,549\%$$

$$800 \text{ ppm} = \frac{0,266 - 0,178}{0,266} \times 100\% = 33,083\%$$

$$1200 \text{ ppm} = \frac{0,266 - 0,141}{0,266} \times 100\% = 46,992\%$$

$$1600 \text{ ppm} = \frac{0,266 - 0,116}{0,266} \times 100\% = 56,391\%$$

$$2000 \text{ ppm} = \frac{0,266 - 0,084}{0,266} \times 100\% = 68,421\%$$



$$y = ax + b$$

$$IC_{50} = \frac{50 - b}{a}$$

**Diketahui:**

$$y = 0,030x + 8,571$$

**Penyelesaian:**

$$IC_{50} = \frac{50 - 0,030}{8,571}$$

$$= 1380,967$$

**c. Aktivitas antioksidan maserat etanol buah naga merah**

Konsentrasi	Absorbansi	Absorbansi	% Inhibisi	IC <sub>50</sub> (ppm)
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(ppm)		Kontrol		
400	0,199		17,769	
800	0,156		35,537	
1200	0,118	0,242	51,239	1201,45
1600	0,087		64,049	
2000	0,037		84,710	

$$\% \text{ Inhibisi} = \frac{\text{Absorbansi kontrol} - \text{Absorbansi sampel}}{\text{Absorbansi kontrol}} \times 100\%$$

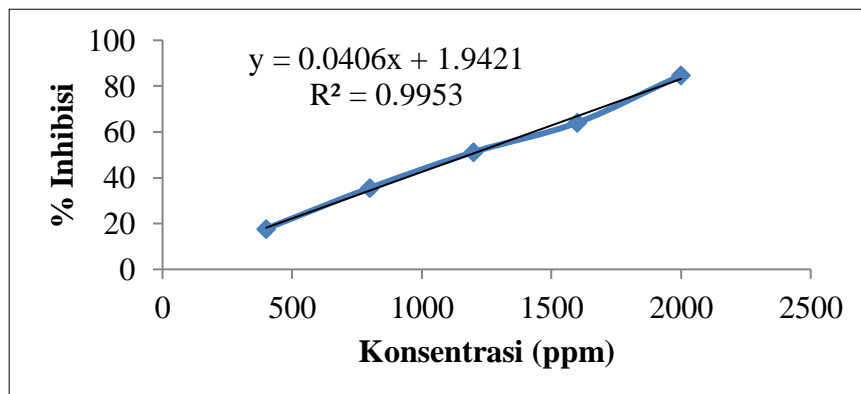
$$400 \text{ ppm} = \frac{0,242 - 0,199}{0,242} \times 100\% = 17,769\%$$

$$800 \text{ ppm} = \frac{0,242 - 0,156}{0,242} \times 100\% = 35,537\%$$

$$1200 \text{ ppm} = \frac{0,242 - 0,118}{0,242} \times 100\% = 51,239\%$$

$$1600 \text{ ppm} = \frac{0,242 - 0,087}{0,242} \times 100\% = 64,049\%$$

$$2000 \text{ ppm} = \frac{0,242 - 0,037}{0,242} \times 100\% = 84,710\%$$



$$y = ax + b$$

$$IC_{50} = \frac{50 - b}{a}$$

**Diketahui:**

$$y = 0,040x + 1,942$$

**Penyelesaian:**

$$IC_{50} = \frac{50 - 1,942}{0,040}$$

$$= 1201,45$$

**d. Aktivitas antioksidan maserat akuades teh-buah naga**

Konsentrasi (ppm)	Absorbansi	Absorbansi Kontrol	% Inhibisi	IC <sub>50</sub> (ppm)
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20	0,231		28,483	
40	0,191		40,867	
60	0,164	0,323	49,226	61,23
80	0,127		60,681	
100	0,100		69,040	
120	0,072		77,709	

$$\% \text{ Inhibisi} = \frac{\text{Absorbansi blanko} - \text{Absorbansi sampel}}{\text{Absorbansi blanko}} \times 100\%$$

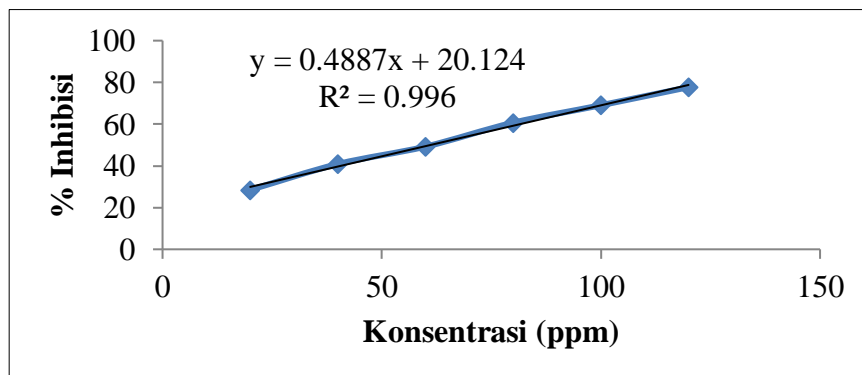
$$20 \text{ ppm} = \frac{0,323 - 0,231}{0,323} \times 100\% = 28,483\%$$

$$40 \text{ ppm} = \frac{0,323 - 0,191}{0,323} \times 100\% = 40,867\%$$

$$60 \text{ ppm} = \frac{0,323 - 0,164}{0,323} \times 100\% = 49,226\%$$

$$80 \text{ ppm} = \frac{0,323 - 0,127}{0,323} \times 100\% = 60,681\%$$

$$100 \text{ ppm} = \frac{0,323 - 0,100}{0,323} \times 100\% = 69,040\%$$



$$y = ax + b$$

$$IC_{50} = \frac{50 - b}{a}$$

**Diketahui:**

$$y = 0,488x + 20,12$$

**Penyelesaian:**

$$\begin{aligned} IC_{50} &= \frac{50 - 20,12}{0,488} \\ &= 61,23 \end{aligned}$$

#### e. Aktivitas antioksidan maserat etanol teh-buah naga

Konsentrasi (ppm)	Absorbansi	Absorbansi Kontrol	% Inhibisi	IC <sub>50</sub> (ppm)
10	0,244	0,274	10,949	38,087

20	0,198		27,737	
40	0,124		54,744	
60	0,063		77,007	

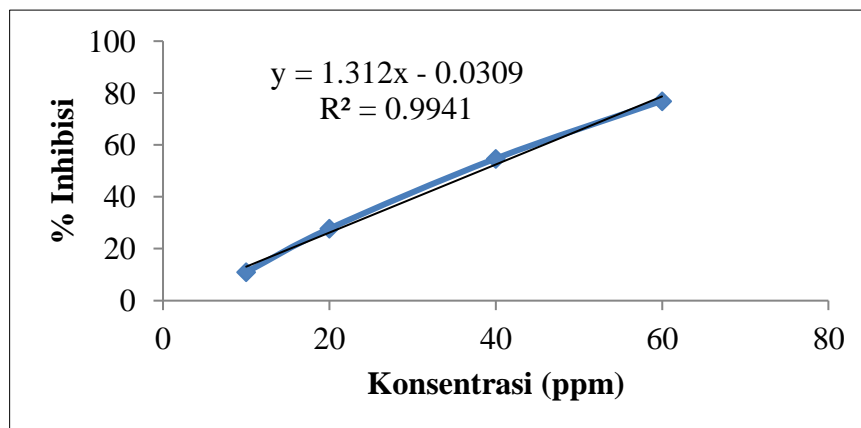
$$\% \text{ Inhibisi} = \frac{\text{Absorbansi kontrol} - \text{Absorbansi sampel}}{\text{Absorbansi kontrol}} \times 100\%$$

$$10 \text{ ppm} = \frac{0,274 - 0,244}{0,274} \times 100\% = 10,949\%$$

$$20 \text{ ppm} = \frac{0,274 - 0,198}{0,274} \times 100\% = 27,737\%$$

$$40 \text{ ppm} = \frac{0,274 - 0,124}{0,274} \times 100\% = 54,744\%$$

$$60 \text{ ppm} = \frac{0,274 - 0,063}{0,274} \times 100\% = 77,007\%$$



$$y = ax + b$$

$$IC_{50} = \frac{50 - b}{a}$$

**Diketahui:**

$$y = 1,312x + 0,030$$

**Penyelesaian:**

$$IC_{50} = \frac{50 - 1,312}{0,030} = 38,087$$

**f. Aktivitas antioksidan masekat akuades teh hijau**

Konsentrasi (ppm)	Absorbansi	Absorbansi Kontrol	% Inhibisi	IC <sub>50</sub> (ppm)
5	0,459	0,492	6,707	35,647
10	0,422		14,228	

20	0,356		27,642	
40	0,208		57,724	
50	0,152		69,106	

$$\% \text{ Inhibisi} = \frac{\text{Absorbansi kontrol} - \text{Absorbansi sampel}}{\text{Absorbansi kontrol}} \times 100\%$$

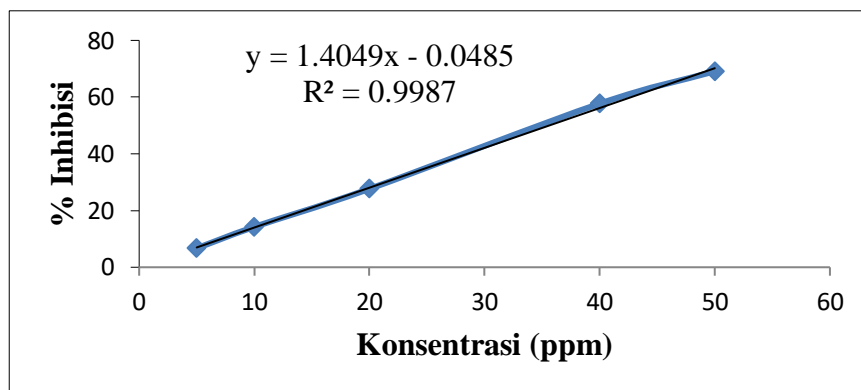
$$5 \text{ ppm} = \frac{0,492 - 0,459}{0,492} \times 100\% = 6,707\%$$

$$10 \text{ ppm} = \frac{0,492 - 0,422}{0,492} \times 100\% = 14,228\%$$

$$20 \text{ ppm} = \frac{0,492 - 0,356}{0,492} \times 100\% = 27,642\%$$

$$40 \text{ ppm} = \frac{0,492 - 0,208}{0,492} \times 100\% = 57,724\%$$

$$50 \text{ ppm} = \frac{0,492 - 0,153}{0,492} \times 100\% = 69,106\%$$



$$y = ax + b$$

$$IC_{50} = \frac{50 - b}{a}$$

**Diketahui:**

$$y = 1,404x - 0,048$$

**Penyelesaian:**

$$IC_{50} = \frac{50 + 0,048}{1,404}$$

$$= 35,647$$

**g. Aktivitas antioksidandan maserat etanol teh hijau**

Konsentrasi (ppm)	Absorbansi	Absorbansi Kontrol	% Inhibisi	IC <sub>50</sub> (ppm)
5	0,227		11,3281	23,3261
10	0,204	0,256	20,3125	

20	0,156		39,0625	
30	0,089		65,2344	
40	0,030		88,2812	

$$\% \text{ Inhibisi} = \frac{\text{Absorbansi kontrol} - \text{Absorbansi sampel}}{\text{Absorbansi kontrol}} \times 100\%$$

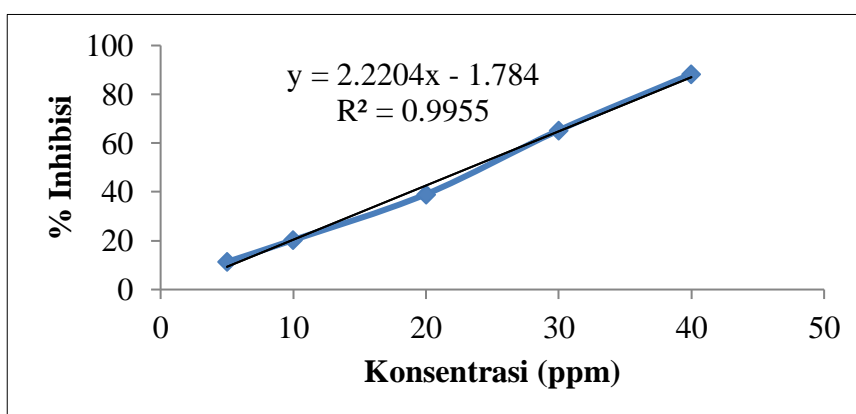
$$5 \text{ ppm} = \frac{0,256 - 0,227}{0,256} \times 100\% = 11,324\%$$

$$10 \text{ ppm} = \frac{0,256 - 0,204}{0,274} \times 100\% = 20,312\%$$

$$20 \text{ ppm} = \frac{0,256 - 0,156}{0,256} \times 100\% = 39,062\%$$

$$30 \text{ ppm} = \frac{0,256 - 0,089}{0,256} \times 100\% = 65,234\%$$

$$40 \text{ ppm} = \frac{0,256 - 0,030}{0,256} \times 100\% = 88,281\%$$



$$y = ax + b$$

$$IC_{50} = \frac{50 - b}{a}$$

**Diketahui:**

$$y = 1,312x + 0,030$$

**Penyelesaian:**

$$IC_{50} = \frac{50 - 1,312}{0,030}$$

$$= 38,087$$

#### **h. Aktivitas antioksidan maserat akuades jeruk manis**

Konsentrasi (ppm)	Absorbansi	Absorbansi Kontrol	% Inhibisi	IC <sub>50</sub> (ppm)
400	0,317		8,116	
800	0,281		18,551	
1200	0,242	0,345	29,855	1892,03
1600	0,207		40	

2000	0,150		56,522	
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$$\% \text{ Inhibisi} = \frac{\text{Absorbansi kontrol} - \text{Absorbansi sampel}}{\text{Absorbansi kontrol}} \times 100\%$$

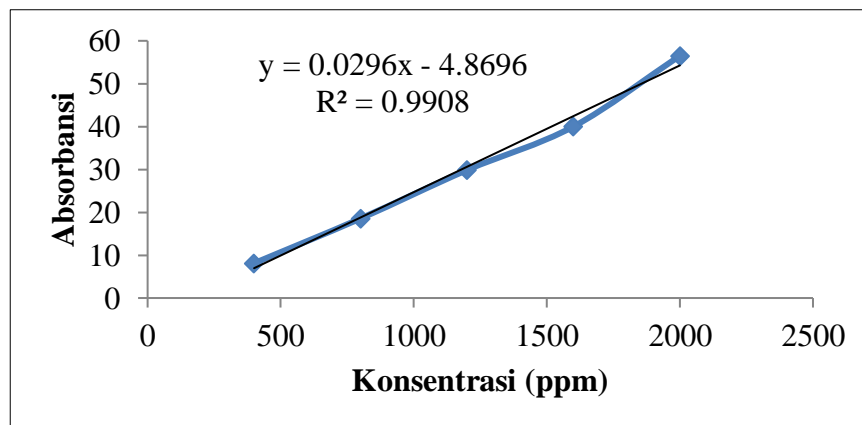
$$400 \text{ ppm} = \frac{0,345 - 0,317}{0,345} \times 100\% = 8,116\%$$

$$800 \text{ ppm} = \frac{0,345 - 0,281}{0,345} \times 100\% = 18,551\%$$

$$1200 \text{ ppm} = \frac{0,345 - 0,242}{0,345} \times 100\% = 29,855\%$$

$$1600 \text{ ppm} = \frac{0,345 - 0,207}{0,345} \times 100\% = 40\%$$

$$2000 \text{ ppm} = \frac{0,345 - 0,150}{0,345} \times 100\% = 56,522\%$$



$$y = ax + b$$

$$IC_{50} = \frac{50 - b}{a}$$

**Diketahui:**

$$y = 0,029x - 4,869$$

**Penyelesaian:**

$$IC_{50} = \frac{50 + 4,869}{0,029} = 1892,03$$

**i. Aktivitas antioksidan maserat etanol jeruk manis**

Konsentrasi (ppm)	Absorbansi	Absorbansi Kontrol	% Inhibisi	IC <sub>50</sub> (ppm)
400	0,294		11,178	
800	0,267		19,335	
1200	0,244	0,331	26,284	1727,24
1600	0,214		35,347	
2000	0,162		51,057	

$$\% \text{ Inhibisi} = \frac{\text{Absorbansi kontrol} - \text{Absorbansi sampel}}{\text{Absorbansi kontrol}} \times 100\%$$

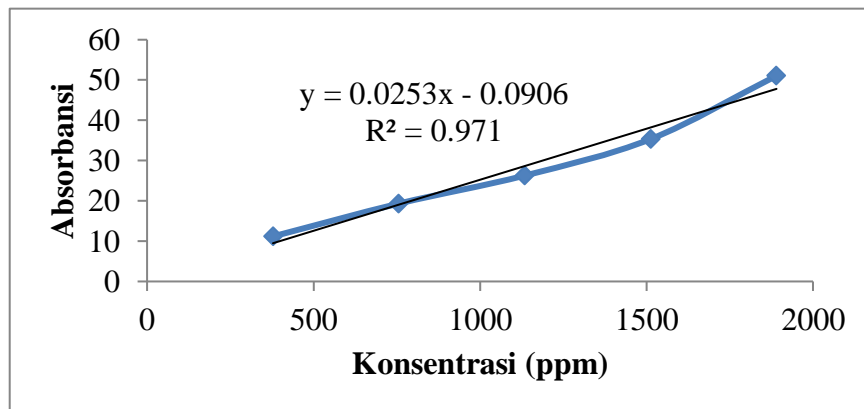
$$400 \text{ ppm} = \frac{0,331 - 0,294}{0,331} \times 100\% = 11,178\%$$

$$800 \text{ ppm} = \frac{0,331 - 0,267}{0,331} \times 100\% = 19,335\%$$

$$1200 \text{ ppm} = \frac{0,331 - 0,244}{0,331} \times 100\% = 26,284\%$$

$$1600 \text{ ppm} = \frac{0,331 - 0,214}{0,311} \times 100\% = 35,347\%$$

$$2000 \text{ ppm} = \frac{0,331 - 0,162}{0,331} \times 100\% = 51,057\%$$



$$y = ax + b$$

$$IC_{50} = \frac{50 - b}{a}$$

**Diketahui:**

$$y = 0,025x - 0,090$$

**Penyelesaian:**

$$IC_{50} = \frac{50 + 0,090}{0,025}$$

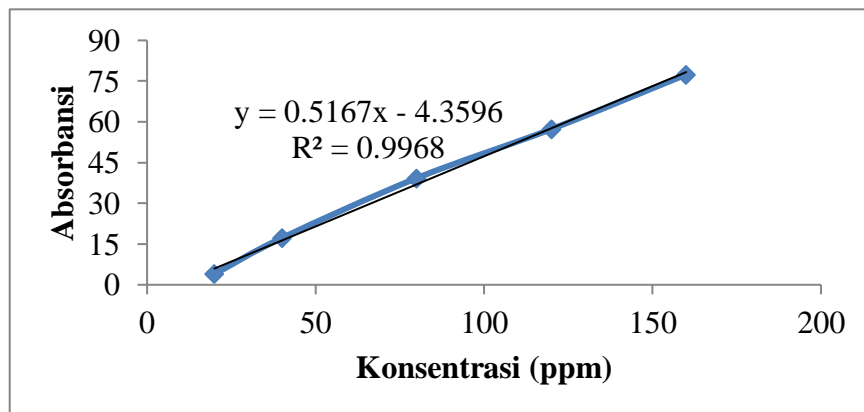
$$= 1727,24$$

**j. Aktivitas antioksidan maserat akuades teh-jeruk**

Konsentrasi (ppm)	Absorbansi	Absorbansi Kontrol	% Inhibisi	IC <sub>50</sub> (ppm)
20	0,340		3,955	
40	0,293		17,232	
80	0,215	0,354	39,265	105,347
120	0,151		57,345	
160	0,080		77,401	

$$\% \text{ Inhibisi} = \frac{\text{Absorbansi kontrol} - \text{Absorbansi sampel}}{\text{Absorbansi kontrol}} \times 100\%$$

$$\begin{aligned} 20 \text{ ppm} &= \frac{0,354 - 0,340}{0,354} \times 100\% = 3,955\% \\ 40 \text{ ppm} &= \frac{0,354 - 0,293}{0,354} \times 100\% = 17,232\% \\ 80 \text{ ppm} &= \frac{0,354 - 0,215}{0,354} \times 100\% = 39,265\% \\ 120 \text{ ppm} &= \frac{0,354 - 0,151}{0,354} \times 100\% = 57,345\% \\ 160 \text{ ppm} &= \frac{0,354 - 0,080}{0,354} \times 100\% = 77,401\% \end{aligned}$$



$$\begin{aligned} y &= ax + b \\ \text{IC}_{50} &= \frac{50 - b}{a} \end{aligned}$$

**Diketahui:**

$$y = 0,516x - 4,359$$

**Penyelesaian:**

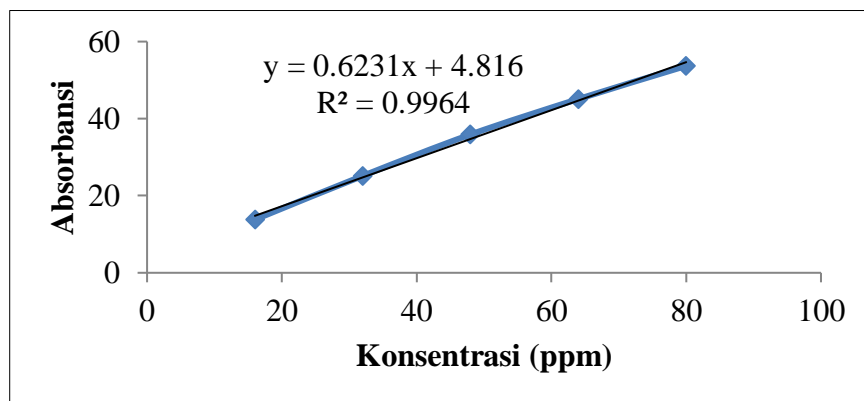
$$\begin{aligned} \text{IC}_{50} &= \frac{50 + 4,359}{0,516} \\ &= 105,347 \end{aligned}$$

**k. Aktivitas antioksidan maserat etanol teh-jeruk**

Konsentrasi (ppm)	Absorbansi	Absorbansi Kontrol	% Inhibisi	IC <sub>50</sub> (ppm)
5	0,227		11,3281	23,3261
10	0,204		20,3125	
20	0,156	0,256	39,0625	
30	0,089		65,2344	
40	0,030		88,2812	

$$\% \text{ Inhibisi} = \frac{\text{Absorbansi kontrol} - \text{Absorbansi sampel}}{\text{Absorbansi kontrol}} \times 100\%$$

$$\begin{aligned} 5 \text{ ppm} &= \frac{0,256 - 0,227}{0,256} \times 100\% = 11,324\% \\ 10 \text{ ppm} &= \frac{0,256 - 0,204}{0,274} \times 100\% = 20,312\% \\ 20 \text{ ppm} &= \frac{0,256 - 0,156}{0,256} \times 100\% = 39,062\% \\ 30 \text{ ppm} &= \frac{0,256 - 0,089}{0,256} \times 100\% = 65,234\% \\ 40 \text{ ppm} &= \frac{0,256 - 0,0,30}{0,256} \times 100\% = 88,281\% \end{aligned}$$



$$\begin{aligned} y &= ax + b \\ \text{IC}_{50} &= \frac{50 - b}{a} \end{aligned}$$

**Diketahui:**

$$y = 1,312x + 0,030$$

**Penyelesaian:**

$$\begin{aligned} \text{IC}_{50} &= \frac{50 - 1,312}{0,030} \\ &= 38,087 \end{aligned}$$

**Lampiran 10. Dokumentasi penelitian tahap pengeringan dan maserasi sampel**



Daging buah naga merah sebelum dan sesudah *freeze drying*



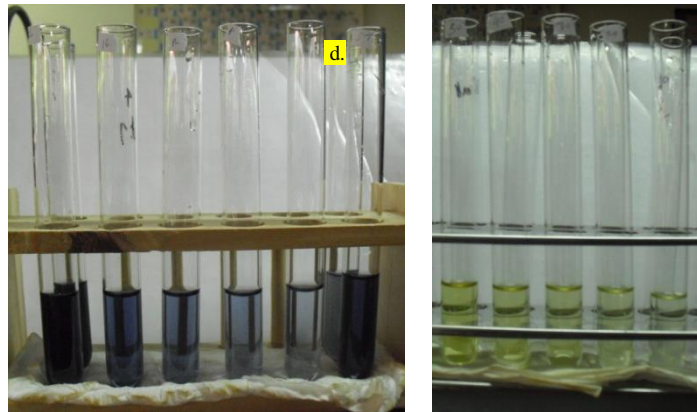


Daging jeruk manis kering

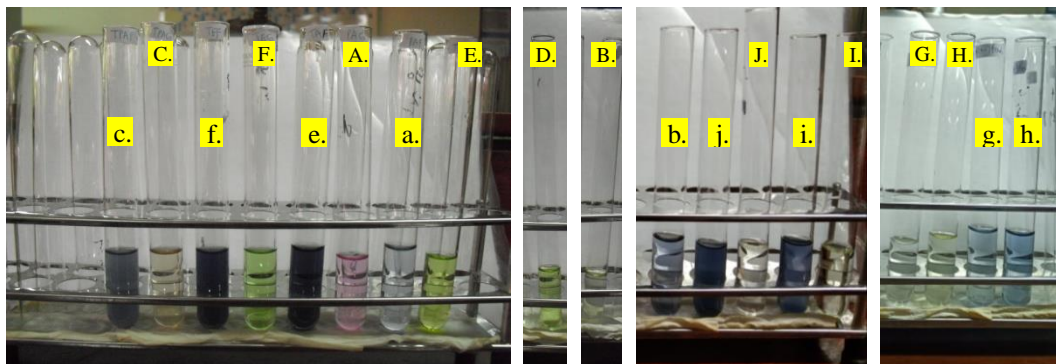


Maserat etanol teh hijau dan buah naga merah

**Lampiran 11. Dokumentasi penelitian tahap uji fenolik total dan uji flavonoid total**



Deret konsentrai larutan standar asam galat dan kuersetin



Hasil penentuan kadar fenolik maserat akuades buah naga (a); maserat etanol buah naga (b); maserat akuades teh-buah naga (c); maserat etanol teh-buah naga (d); maserat akuades teh (e); maserat etanol teh (f); maserat akuades jeruk (g); maserat etanol jeruk (h); maserat akuades teh-jeruk (i); maserat etanol teh-jeruk (j);

Dan hasil penentuan kadar flavonoid total maserat akuades buah naga (A); maserat etanol buah naga (B); maserat akuades teh-buah naga (C); maserat etanol teh-buah naga (D); maserat akuades teh (E); maserat etanol teh (F); maserat akuades jeruk (G); maserat etanol jeruk (H); maserat akuades teh-jeruk (I); maserat etanol teh-jeruk (J)

## Lampiran 12. Dokumentasi penelitian tahap uji antioksidan



Hasil penentuan aktivitas antioksidan kontrol positif asam askorbat (a), maserat akuades buah naga (b), maserat etanol buah naga (c), maserat akuades teh-buah naga (d), maserat etanol teh-buah naga (e), maserat akuades teh (f), maserat etanol teh (g), maserat akuades jeruk (h), maserat etanol jeruk (i), maserat akuades teh-jeruk (j), maserat etanol teh-jeruk (k)