CHAPTER V
RESULTS

5.1 Phytochemical contents

5.1.1 Carotenoid contents

The carotenoid contents in different colored sweet pepper were showed in Table 5.1. Capsanthin content of red sweet pepper (178.20 μg/g) was significantly higher than orange, yellow and green sweet peppers, respectively. On the other hand, yellow sweet pepper contained the highest level of lutein (115.16 μg/g), followed by green and orange sweet peppers, respectively. Interestingly, lutein was not detected in red sweet pepper. Zeaxanthin content of orange sweet pepper (191.76 μg/g) was significantly higher than red sweet peppers (70.71 μg/g), while it was not detected in green and yellow sweet peppers. Likewise, β-cryptoxanthin was not detected in green sweet pepper, while red sweet pepper contained the most β-cryptoxanthin content (40.49 μg/g), followed by orange and yellow sweet pepper (19.45 and 7.55 μg/g), respectively. The α-carotene was not detected in red sweet peppers, while green, orange and yellow sweet peppers contained low amounts (3.56 to 9.02 μg/g). The trans-β-carotene was higher in red sweet pepper (41.72 μg/g), followed by orange, green (17.74 and 13.09 μg/g), and yellow sweet peppers had the smallest amount of β-carotene (8.32 μg/g). Similarly, cis-β-carotene was higher in red sweet pepper (34.28 μg/g), followed by green, orange and yellow sweet pepper (6.81 to 9.64 μg/g), respectively. Red sweet pepper contained the highest content of total carotenoids (365.40 μg/g), followed by orange, yellow and green sweet peppers (102.48 to 336.95 μg/g), respectively.

Table 5.1 The carotenoid contents of different colored sweet pepper (based on dry weight)

Sweet peppers	Carotenoid contents (µg/g)							Total carotenoids
	Capsanthin	**Lutein**	**Zeaxanthin**	**β-cryptoxanthin**	**α-carotene**	**trans-β-carotene**	**cis-β-carotene**	
Green	16.13±1.03^{a}	60.04±5.63^{a}	ND	ND	3.56±0.23^{a}	13.09±1.27^{a}	9.64±0.73^{a}	102.48±9.17^{a}
Red	178.20±5.24^{b}	ND	70.71±0.94^{a}	40.49±1.66^{a}	ND	41.72±2.17^{b}	34.28±1.77^{b}	365.40±9.78^{b}
Orange	45.48±0.01^{c}	45.16±0.58^{b}	191.76±1.24^{b}	19.45±0.19^{b}	9.02±0.07^{b}	17.74±1.86^{c}	8.32±0.03^{ac}	336.95±0.98^{c}
Yellow	22.46±1.04^{d}	115.16±8.77^{c}	ND	7.55±0.53^{c}	4.22±0.23^{c}	8.32±0.41^{d}	6.81±0.28^{c}	164.53±9.83^{d}

All analytical data were mean values of three independent sample (n=3) ± standard deviation.
Values with different letter (a–d) within column of each colored sweet pepper extracted were significantly different with $p < 0.05$.
ND = Not detected

5.1.2 Flavonoid and phenolic acid contents

Flavonoid and phenolic acid contents of each colored sweet pepper are different (Table 5.2). Green sweet pepper contained the highest content of *p*-coumaric acid (19.62 ug/g), followed by yellow, red and orange sweet peppers (9.53 to 10.67 ug/g). Ferulic acid content of red sweet pepper (27.67 ug/g) was higher than yellow, green and orange sweet peppers (13.45 to 24.75 ug/g), respectively. On the contrary, yellow sweet pepper showed the highest quercetin content (102.33 ug/g), followed by orange, red and green sweet peppers (71.71 to 92.00 ug/g). Similarly, luteolin content of yellow sweet pepper (95.89 ug/g) was higher than red, green and orange (56.34 to 68.43 ug/g), respectively. In addition, total phenolic acid contents of green sweet pepper were the highest (43.21 ug/g), followed by red, yellow and orange (22.98 to 37.63 ug/g), respectively. Total flavonoid contents of yellow sweet pepper (198.22 ug/g) was higher than red, orange and green (137.02 to 160.41 ug/g), respectively. Moreover, the results showed that sweet peppers contain more flavonoids than phenolic acid.

Table 5.2 The flavonoid and phenolic acid contents of different colored sweet pepper (based on dry weight)

Sweet peppers	Phenolic acids		Total phenolic acids	Flavonoids (µg/g)		Total flavonoids
	***p*-coumaric acid**	**Ferulic acid**		**Quercetin**	**Luteolin**	
Green	19.62 ± 0.68^{a}	23.59 ± 0.01^{a}	43.21 ± 0.69^{a}	71.71 ± 1.57^{a}	62.31 ± 5.02^{a}	137.02 ± 6.59^{b}
Red	9.96 ± 0.08^{b}	27.67 ± 0.13^{b}	37.63 ± 0.21^{b}	91.98 ± 2.05^{b}	68.43 ± 0.98^{b}	160.41 ± 3.03^{b}
Orange	9.53 ± 0.25^{b}	13.45 ± 0.05^{c}	22.98 ± 0.30^{d}	92.00 ± 0.64^{b}	56.34 ± 0.65^{a}	148.33 ± 1.29^{b}
Yellow	10.67 ± 0.20^{b}	24.75 ± 0.15^{d}	35.42 ± 0.35^{c}	102.33 ± 1.95^{c}	95.89 ± 2.19^{c}	198.22 ± 1.41^{a}

All analytical data were mean values of three independent sample (n=3) ± standard deviation.
Values with different letter (a–d) within column of each colored sweet pepper extracted were significantly different with $p < 0.05$.

5.1.3 Volatile compounds

The volatile compounds of four colored sweet peppers were analyzed using GC-MS. The results were shown as percentage of area under curve (Table 5.4). The volatile compounds that were found in all colors of sweet peppers were copaene and n-nonyl-cyclopropane / 1-dodecanol (0.70 to 8.09 % peak area). Some compounds were only found in green sweet pepper, including benzhydryl alcohol, benzophenone and β-cis-ocimene (0.58 to 2.21 % peak area). Besides, 9,10-dehydro-isolongifolene, β-elemene, β-selinene and γ-selinene (2.20 to 3.99 % peak area) were only found in orange sweet pepper. In addition, 2-methoxy-3-(2-methylpropyl)pyrazine, 2-mercapto-4-phenylthiazole and thiocyanic acid carbazol-3,6-diyl ester (0.71 to 4.28 % peak area) were found in green and red sweet peppers, while alloaromadendrene was found in orange and yellow sweet peppers (0.89 to 1.87 % peak area, respectively). Nevertheless, volatile compounds that were found to be contaminants from using DVB/CAR/PDMS fiber were included hexamethylcyclotrisiloxane, octamethylcyclotetrasiloxane, decamethylcyclopentasiloxane, methoxy-phenyl-oxime tetradecamethylcycloheptasiloxane, and butylated hydroxytoluene.

Table 5.4 The volatile compounds of different colored sweet pepper

Volatile compounds	Green	Red	Orange	Yellow
Selected volatile compounds from sweet pepper				
2-Isobutyl-3-methoxypyrazine	4.28	0.81	ND	ND
2-Mercapto-4-phenylthiazole	1.48	0.71	ND	ND
Alloaromadendrene	ND	ND	0.89	1.87
Benzhydryl alcohol	2.21	ND	ND	ND
Benzophenone	2.40	ND	ND	ND
Copaene	3.43	2.55	2.42	0.70
Heptadecane	ND	0.76	0.71	ND
Hexadecane	0.23	1.15	1.02	ND
9,10-dehydro- isolongifolene	ND	ND	3.64	ND
n-Nonyl-cyclopropane / 1-Dodecanol	8.09	1.32	0.75	6.68
Thiocyanic acid carbazol-3,6-diyl ester	3.36	1.66	ND	ND
β-cis-Ocimene	0.58	ND	ND	ND
β-Elemene	ND	ND	2.20	ND
β-Selinene	ND	ND	3.27	ND
γ-Selinene	ND	ND	3.99	ND
Total	26.06	8.96	18.89	9.25
Detected contaminants from using DVB/CAR/PDMS fiber				
Hexamethylcyclotrisiloxane	3.44	1.88	1.45	3.04
Octamethylcyclotetrasiloxane	2.55	3.39	2.98	3.33
Decamethylcyclopentasiloxane	1.23	2.20	1.59	2.20
Dodecamethylcyclohexasiloxane	1.53	0.92	0.91	0.75
Tetradecamethylcycloheptasiloxane	1.23	2.20	1.59	2.20
Oxime-, methoxy-phenyl-	20.29	26.04	4.34	17.27
Butylated hydroxytoluene (BHT)	0.57	ND	ND	ND
Total	30.84	36.63	12.86	28.79
Others	43.1	54.41	68.25	61.96

ND = not detected

5.2 Anti-enzyme activities

5.2.1 Anti-lipase Activity

The lipase inhibitory activity of different colored sweet peppers (22.92 mg/mL) extracted with hexane, ethyl acetate and 70% (v/v) aqueous ethanol (Table 5.5) suggested that orange sweet pepper exhibited the lowest lipase inhibitory activity in each solvent extraction (48.88 to 58.59 % inhibition). Red sweet peppers extracted under 70% (v/v) aqueous ethanol exhibited significantly higher inhibitory activity (86.18% inhibition, respectively) than green, orange and yellow sweet peppers (81.26, 48.88 and 78.51% inhibition, respectively). Under ethyl acetate extraction, yellow and green sweet peppers exhibited the highest anti-lipase activity (75.12 and 79.19% inhibition, respectively), followed by red and orange sweet peppers, respectively. Similarly, under hexane extraction, yellow sweet peppers exhibited the highest anti-lipase activity (73.26% inhibition), followed by red, green and orange sweet peppers, respectively.

The inhibitory activities of sweet peppers using 70% (v/v) aqueous ethanol ethyl acetate were higher than those extracted with ethyl acetate and hexane (Table 5.5). The half maximal inhibitory concentration (IC_{50} or concentrations of sweet pepper extracts that inhibited enzyme activities by 50%) of these sweet peppers were in a range of 10.68 to 61.96 mg/mL. The IC_{50} values of sweet pepper extracted with 70% (v/v) aqueous ethanol (IC_{50} of 10.68 to 24.68 mg/mL) were the highest, followed by ethyl acetate (IC_{50} of 11.35 to 59.75 mg/mL) and hexane (IC_{50} of 22.24 to 61.96 mg/mL), respectively. The IC_{50} values of each colored sweet pepper in each extraction solvent were in the same pattern as percentage of inhibition.

Lipase inhibition was found to be in a dose dependent manner, in which the inhibition was increased with an increased concentration of sweet pepper extract (Figure 5.1). At low concentration of sweet pepper extract (inhibitor), a linear relation between enzyme and inhibitor was observed. However, when the concentration of sweet pepper extracts was increased, the inhibition rate became slow and was eventually plateau. At this stage, it might be suggested that inhibitors were in excess. Thus, enzyme molecules were covered by sweet pepper extracts and become a limiting factor.

Table 5.5 Lipase inhibitory activities of different colored sweet pepper extracted with 70% (v/v) aqueous ethanol, ethyl acetate and hexane

Sweet peppers*	Solvents	% inhibition of lipase	IC_{50} (mg/mL)
Green	70% EtOH	$81.26 \pm 0.77^{a,x}$	$13.95 \pm 1.85^{a,x}$
Red		$86.18 \pm 1.52^{b,x}$	$10.68 \pm 0.15^{b,x}$
Orange		$58.59 \pm 3.50^{c,x}$	$24.68 \pm 1.27^{c,x}$
Yellow		$78.51 \pm 3.06^{a,x}$	$11.33 \pm 0.30^{a,x}$
Green	Ethyl acetate	$79.19 \pm 3.31^{a,x}$	$11.35 \pm 0.49^{a,x}$
Red		$67.84 \pm 0.36^{b,y}$	$23.82 \pm 0.86^{b,y}$
Orange		$48.88 \pm 1.80^{c,xy}$	$59.75 \pm 0.50^{c,y}$
Yellow		$75.12 \pm 1.95^{a,xy}$	$16.89 \pm 0.68^{c,y}$
Green	Hexane	$65.80 \pm 1.92^{a,y}$	$22.24 \pm 1.69^{a,y}$
Red		$61.76 \pm 1.44^{a,z}$	$24.27 \pm 0.47^{a,y}$
Orange		$50.80 \pm 0.76^{b,y}$	$61.96 \pm 1.81^{b,y}$
Yellow		$73.26 \pm 3.64^{c,y}$	$24.67 \pm 2.32^{a,z}$

The lipase inhibitory activities sweet peppers (green, yellow, orange and red colors) extracted with 70% (v/v) aqueous ethanol, ethyl acetate and hexane.
All analytical data were mean values of three independent sample (n=3) ± standard deviation.
Values with different letter (a–c) and (x-z) within column of each colored sweet pepper and solvent extraction, respectively, were significantly different with $p < 0.05$.
* The final concentration of the extracts was 22.92 mg/mL.

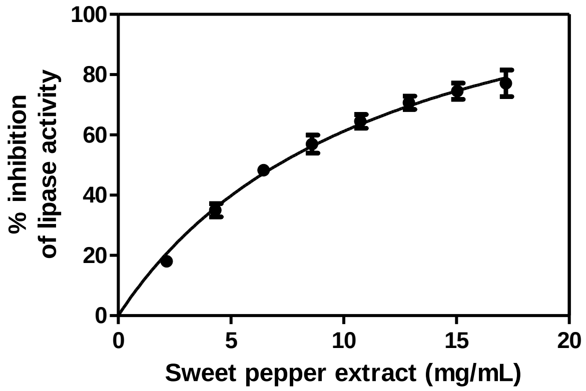

Figure 5.1 The graph that was plot between the concentrations of sweet pepper extract and percentage of lipase inhibition was used for IC_{50} determination. The percentage of lipase inhibition increased with the increase of sweet pepper extract.

5.2.2 Anti-α-amylase Activity

The inhibition of α-amylase activity of sweet peppers (22.92 mg/mL) extracted under different solvents (Table 5.6) suggested that red sweet pepper extracted under 70% (v/v) aqueous ethanol exhibited significantly higher inhibitory activity (28.62% inhibition) than yellow, green and orange sweet peppers, respectively. Nevertheless, all sweet peppers extracted with ethyl acetate exhibited insignificantly different anti-α-amylase activities (35.48 to 38.31% inhibition). Under hexane extraction, yellow sweet pepper exhibited significantly higher inhibitory activity (34.99% inhibition) than green, red and orange sweet peppers, respectively.

The inhibitory activities of sweet peppers using ethyl acetate were higher (35.48 to 38.31% inhibition) than those of sweet peppers extracted under hexane (15.10 to 34.99% inhibition) and 70% (v/v) aqueous ethanol (15.59 to 28.62% inhibition). However, all sweet peppers were incapable of detecting IC_{50} value under experimental conditions.

Table 5.6 The α-amylase inhibitory activities of different colored sweet pepper extracted with 70% (v/v) aqueous ethanol, ethyl acetate and hexane

Sweet peppers*	Solvents	% inhibition of α-amylase	IC_{50} (mg/mL)
Green	70% EtOH	$23.10 \pm 1.39^{a,x}$	NA
Red		$28.62 \pm 0.86^{b,x}$	NA
Orange		$15.59 \pm 1.90^{c,x}$	NA
Yellow		$23.49 \pm 0.91^{a,x}$	NA
Green	Ethyl acetate	$37.45 \pm 2.69^{a,y}$	NA
Red		$38.31 \pm 2.05^{a,y}$	NA
Orange		$36.89 \pm 1.00^{a,y}$	NA
Yellow		$35.48 \pm 1.55^{a,y}$	NA
Green	Hexane	$26.54 \pm 2.21^{a,x}$	NA
Red		$24.46 \pm 1.80^{a,z}$	NA
Orange		$15.10 \pm 1.00^{b,x}$	NA
Yellow		$34.99 \pm 2.29^{c,y}$	NA

The α-amylase inhibitory activities sweet peppers (green, yellow, orange and red colors) extracted with 70% (v/v) aqueous ethanol, ethyl acetate and hexane.
All analytical data were mean values of three independent sample (n=3) ± standard deviation.
Values with different letter (a-c) and (x-z) within column of each colored sweet pepper and solvent extraction, respectively, were significantly different with $p < 0.05$.
*The final concentration of the extracts was 22.92 mg/mL. NA = Not assessable

5.2.3 Anti-α-glucosidase Activity

The α-glucosidase inhibitory activities of sweet peppers (22.92 mg/mL) extracted under different solvents (Table 5.7) suggested that red and orange sweet peppers extracted under 70% (v/v) aqueous ethanol exhibited significantly higher inhibitory activity (74.00 and 73.89 % inhibition, respectively) than yellow and green sweet peppers (68.37 and 64.41% inhibition, respectively). Similarly, under ethyl acetate extraction, red sweet pepper exhibited the highest anti-α-glucosidase activity (17.76% inhibition), followed by green and yellow sweet peppers, respectively. However, the inhibitory activity was not observed in orange sweet pepper extracted under the same extraction condition. Under hexane extraction, the inhibitory activities of sweet peppers were in the same pattern as those extracted with ethyl acetate. Red and green sweet peppers exhibited 9.39 and 4.52% inhibition, respectively, but inhibitory activity of orange and yellow sweet peppers could not be detected under this extraction concentration.

The inhibitory activities of sweet peppers using 70% (v/v) aqueous ethanol were higher than those of sweet peppers extracted with ethyl acetate and hexane, respectively. The comparison of IC_{50} values suggested that red, orange and yellow sweet peppers extracted under 70% (v/v) aqueous ethanol (IC_{50} of 6.46 to 7.67 mg/mL) were more effective toward α-glucosidase inhibitory activities than green sweet pepper (IC_{50} of 13.71 mg/mL). Under ethyl acetate extraction, red and green sweet peppers exhibited IC_{50} values of 210.35 and 243.40 mg/mL, respectively, while orange and yellow sweet peppers were incapable of detecting their IC_{50} values. Under hexane extraction, all sweet peppers could not be evaluated the IC_{50} values under experimental conditions.

The α-glucosidase inhibition was found to be in a dose dependent manner, in which the inhibition increased with the increase concentration of sweet pepper extract (Figure 5.2). Under low concentration of sweet pepper extract (inhibitor), the graph showed in a linear relation between enzyme and inhibitor. However, when sweet pepper extracts increased to high concentration, the rate was slow and stable. At this stage, it might be suggested that inhibitors were in excess. Thus, enzyme molecules were covered by sweet pepper extracts and become a limiting factor

Table 5.7 The α-glucosidase inhibitory activities of different colored sweet pepper extracted with 70% (v/v) aqueous ethanol, ethyl acetate and hexane

Sweet peppers*	Solvents	% inhibition of α-glucosidase	IC_{50} (mg/mL)
Green	70% EtOH	64.41±1.06^{a,x}	13.71±2.14^{a,x}
Red		74.00±2.50^{b,x}	6.46±0.12^{b,x}
Orange		73.89±0.13^{b,x}	7.67±1.34^{b}
Yellow		68.37±1.60^{a,x}	6.59±0.15^{b}
Green	Ethyl acetate	12.69±2.37^{a,y}	243.40±2.60^{a,y}
Red		17.76±0.86^{b,y}	210.35±1.14^{b,y}
Orange		NA	NA
Yellow		4.95±1.60^{c,y}	NA
Green	Hexane	4.52±0.41^{a,z}	NA
Red		9.39±1.06^{b,z}	NA
Orange		NA	NA
Yellow		NA	NA

The α-glucosidase inhibitory activities sweet peppers (green, yellow, orange and red colors) extracted with 70% (v/v) aqueous ethanol, ethyl acetate and hexane.
All analytical data were mean values of three independent sample (n=3) ± standard deviation.
Values with different letter (a–c) and (x-z) within column of each colored sweet pepper and solvent extraction, respectively, were significantly different with $p < 0.05$.
*The final concentration of the extracts was 22.92 mg/mL.
NA = Not assessable

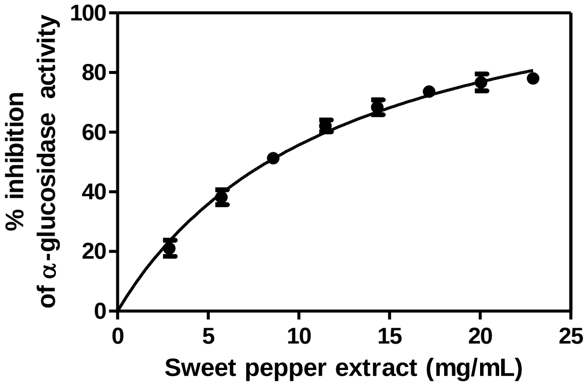

Figure 5.2 The graph that was plotted between the concentrations of sweet pepper extract (X-axis) and percentage of α-glucosidase inhibition (Y-axis) was used for IC_{50} determination. The percentage of α-glucosidase inhibition increased with the increase of sweet pepper extract.

5.2.4 Anti-angiotensin-converting enzyme activity

The inhibition of ACE activity of sweet peppers (22.92 mg/mL) extracted under different solvents (Table 5.8) suggested that red sweet pepper extracted under 70% (v/v) aqueous ethanol exhibited significantly higher inhibitory activity (95.73% inhibition) than green, orange and yellow sweet peppers, respectively. Similarly, under ethyl acetate extraction, red and green sweet peppers exhibited the highest anti-ACE activity (70.90 and 75.28% inhibition, respectively), followed by orange and yellow sweet peppers, respectively. Under hexane extraction, orange sweet peppers exhibited higher anti-ACE activity (54.80% inhibition) than red, green and yellow sweet peppers, respectively.

The inhibitory activities of sweet peppers using 70% (v/v) aqueous ethanol extraction suggested that all colored sweet peppers exhibited high ACE inhibitory activities (>88% inhibition), followed by those under ethyl acetate and hexane extractions, respectively. Likewise, the IC_{50} values of sweet peppers extracted with 70% (v/v) aqueous ethanol were in the range of 2.55 to 5.00 mg/mL, which showed higher anti-ACE activity than those extracted with ethyl acetate (IC_{50} of 8.45 to 68.56 mg/mL) and hexane (IC_{50} of 22.43 to 41.54 mg/mL). The IC_{50} values of each colored sweet pepper in each extraction solvent were in the same pattern as percentage of inhibition. Nevertheless, yellow sweet pepper extracted with hexane was incapable of detecting IC_{50} value under experimental conditions.

The ACE inhibition was found to be in a dose dependent manner, in which the inhibition increased with the increase concentration of sweet pepper extract (Figure 5.3). Under low concentration of sweet pepper extract (inhibitor), the graph showed a linear relation between enzyme inhibitory activity and inhibitor concentration. However, when sweet pepper extracts increased to high concentration, the inhibitory rate became slow and stable. At this stage, it might be suggested that inhibitors were in excess. Thus, enzyme molecules were covered by sweet pepper extracts and become a limiting factor.

Table 5.8 The angiotensin-converting enzyme inhibitory activities of different colored sweet pepper extracted with 70% (v/v) aqueous ethanol, ethyl acetate and hexane

Sweet peppers*	Solvents	% inhibition of ACE	IC_{50} (mg/mL)
Green	70% EtOH	90.92±0.50^{a,x}	3.34±0.03^{a,x}
Red		95.73±1.15^{b,x}	2.55±0.11^{a,x}
Orange		88.36±2.24^{a,x}	4.28±0.09^{b,x}
Yellow		87.63±2.38^{a,x}	5.00±0.62^{b,x}
Green	Ethyl acetate	75.28±0.27^{a,y}	8.45±0.15^{a,y}
Red		70.90±0.88^{ab,y}	8.88±0.10^{a,y}
Orange		67.17±0.53^{b,y}	16.59±0.15^{b,y}
Yellow		38.73±0.75^{c,y}	68.56±4.33 ^{c,y}
Green	Hexane	43.45±1.26^{a,z}	41.54±3.28^{a,z}
Red		48.01±0.71^{b,z}	33.77±3.55^{b,z}
Orange		54.80±0.79^{c,z}	22.43±0.38^{c,z}
Yellow		6.41±0.93^{d,z}	NA

The angiotensin-converting enzyme inhibitory activities sweet peppers (green, yellow, orange and red colors) extracted with 70% (v/v) aqueous ethanol, ethyl acetate and hexane.
All analytical data were mean values of three independent sample (n=3) ± standard deviation.
Values with different letter (a–d) and (x-z) within column of each colored sweet pepper and solvent extraction, respectively, were significantly different with $p < 0.05$.
*The final concentration of the extracts was 22.92 mg/mL.
NA = Not assessable

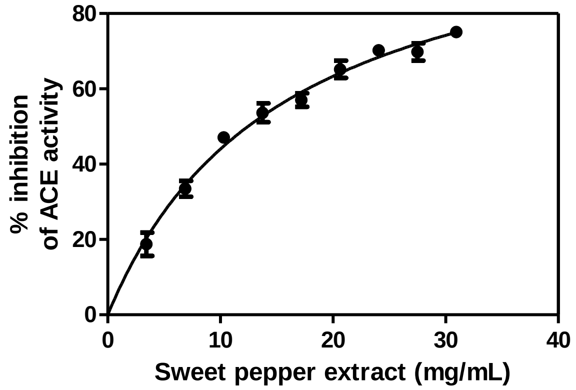

Figure 5.3 The graph that was plotted between the concentrations of sweet pepper extract (X-axis) and percentage of ACE inhibition (Y-axis) was used for IC_{50} determination. The percentage of ACE inhibition increased with the increase of sweet pepper extract.

5.3 The summary of bioactive compounds

The bioactive compounds of sweet peppers were summarized according to their quantities that were detected using HPLC (Table 5.9). Green sweet pepper possessed the highest amount of p-coumaric acid. Red sweet pepper had the highest amounts of capsanthin, β-cryptoxanthin, trans-β-carotene, cis-β-carotene and ferulic acid. Orange sweet pepper had the highest amount of zeaxanthin and α-carotene, while yellow sweet pepper had the highest amount of lutein, quercetin and luteolin. Red, yellow and green sweet peppers had the highest content of total carotenoids, flavomoids and phenolic acids, respectively.

Table 5.9 The summary of bioactive compounds of sweet peppers

Bioactive compounds	**Sweet peppers**			
	Green	Red	Orange	Yellow
Carotenoid contents				
Capsanthin	D	A	B	C
Lutein	B	ND	C	A
Zeaxanthin	ND	B	A	ND
β-cryptoxanthin	ND	A	B	C
α-carotene	C	ND	A	B
trans-β-carotene	C	A	B	D
cis-β-carotene	B	A	C	D
Total	D	A	B	C
Flavonoid contents				
Quercetin	C	B	B	A
Luteolin	C	B	C	A
Total	B	B	B	A
Phenolic acid contents				
p-coumaric acid	A	B	B	B
Ferulic acid	C	A	D	B
Total	A	B	D	C

A = very good; B = good; C = medium; D = low

ND = not detected

5.4 The summary of anti-enzyme activities

The anti-enzyme reactions of sweet peppers were summarized according to their inhibitory activities (Table 5.10). Red sweet pepper extracted with 70% (v/v) aqueous ethanol and ethyl acetate solvents showed the most potent lipase, α-amylase, α-glucosidase and ACE inhibitory activities. Under hexane extraction, yellow sweet pepper exhibited the highest lipase and α-amylase inhibitory activities. Red and orange sweet peppers exhibited the highest anti-α-glucosidase and anti-ACE activities, respectively.

Table 5.10 The summary of enzyme inhibitory activities of sweet peppers extracted with 70% (v/v) aqueous ethanol, ethyl acetate and hexane

Anti-enzyme activities	**Solvents**	**Sweet peppers**			
		Green	Red	Orange	Yellow
Lipase	70% EtOH	B	A	C	B
α-amylase		B	A	C	B
α-glucosidase		B	A	A	B
ACE		B	A	B	B
Lipase	Ethyl acetate	A	B	C	A
α-amylase		A	A	A	A
α-glucosidase		B	A	NA	C
ACE		A	A	B	C
Lipase	Hexane	B	B	C	A
α-amylase		B	B	C	A
α-glucosidase		B	A	NA	NA
ACE		B	B	A	C

A = good; B = medium; C = low

NA = Not assessable