



Evaluation of the Antioxidant Activity of Some Medicinal Plants and Myanmar Traditional Medicine Products

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Outline

- ◆ Objectives
- ◆ Introduction
- ◆ Methods
- ◆ Results and Discussion
- ◆ Conclusion

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Objectives

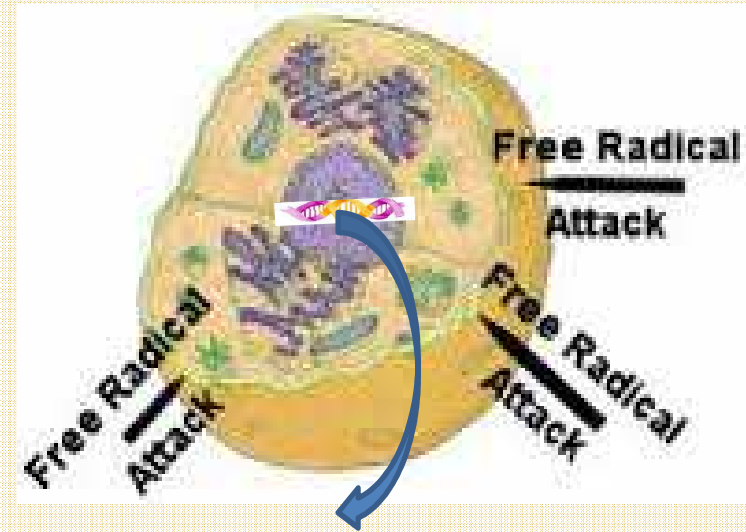
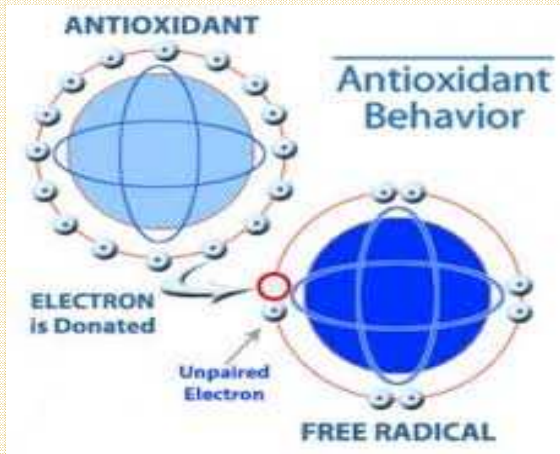
- ❖ To share the scientific data to compounders, traditional medicine practitioners, researchers
- ❖ To promote the herbal medicine with the scientific results
- ❖ To upgrade the traditional medicine production

Introduction

Introduction

- Antioxidants
- Oxidation
- Free Radicals

What are **Free radicals** ?



A -adenosine
T - Thymine
G- Guanine
C- Cytosine

- Disadvantages
 - ◆ If more than normal,
(Aging, stroke, heart attack, diabetes, cancer, etc.)
- Advantages
 - ◆ Regulate the blood circulation
 - ◆ Destroy the bact: & virus
 - ◆ Attack pre-cancer cells)

Garcinia mangostana Linn.



Myanmar name : **Min Gut**

Botanical name : ***Garcinia mangostana* Linn.**

English name : Mangosteen

Family : Guttiferae, Clusiaceae

Medicinal Uses : Antifungal, antibacterial,
Anti-inflammatory,
Antioxidant

Part used : Peel

Chemical Constituents : Epicatechin,
mangostin, Xanthone compounds

***Glycyrrhiza glabra* Linn.**



Myanmar name	:	Nwe cho
Botanical name	:	<i>Glycyrrhiza glabra</i> Linn.
English name	:	Liquorice
Family	:	FABACEAE
Medicinal Uses	:	Antiviral, antimicrobial, Anti-blood-pressure increasing effect, Antiulcer, laxative, Anti-diabetic, anti-inflammatory
Part used	:	Root
Constituents	:	Glycyrrhizin, Isoflavone glabrene, Isoglabin, Phytoestrogens

***Dolichandrone spathacea* (L.f) K.schum**



Myanmar name : Tha-khut

Botanical name : ***Dolichandrone spathacea* (L.f)K.schum**

English name : Mangrove trumpet tree

Family name : Bignoniaceae

Medicinal Uses : Mouth infections, Hepatitis B, C
(local use), Antibacterial activity

Part used : flower

Constituents : Triterpene , saponin compounds

***Curcuma longa* Linn.**



Myanmar name	:	Na-nwin
Botanical name	:	<i>Curcuma longa</i> Linn.
English name	:	Turmeric
Family name	:	Zingiberaceae
Medicinal uses	:	Antioxidant, Anticancerous, Anti-inflammatory, Antiparasitic, Arthritis, Injuries, Blood purifier, Reducing excessive cholesterol
Part used	:	Rhizome
Constituents	:	Alkaloid, Sterol, curcumin

***Andrographis paniculata* Nees.**



Myanmar name	: Say-khar gyi
Botanical name	: <i>Andrographis paniculata</i> Nees.
English name	: King of bitters
Family name	: Acanthaceae
Medicinal Uses	: Common cold and flu, liver disorders, bowel complaints of children, colic pain, stomachic, anthelmintic, Diabetes, liver cancer
Part used	: Leaves
Constituents	: Andrographolide, Diterpene glucosides, andrographiside, neoandrographolide, Bis-andrographolides, Diterpenes and Flavonoids

Carica papaya Linn.



Myanmar name	:	Thinbaw
Botanical name	:	<i>Carica papaya</i> Linn.
English name	:	papaw or papaya tree
Family name	:	CARICACEAE
Medicinal Uses	:	prostate cancer, antioxidant, anaemia, antimalaria, analgesic, antispasmodic and bacterial properties
Part used	:	leaves
constituents	:	Calcium, Magnesium, Iron, sodium, Manganese, vitamins, potassium, riboflavin, thiamine, ascorbic acid

***Cuscuta reflexa* Roxb.**



Myanmar name	: Shwe-nwe
Botanical name	: <i>Cuscuta reflexa</i> Roxb.
English name	: Dodder plant
Family name	: CONVOLVULACEAE
Medicinal Uses	: Antioxidant , reproductive health
Part used	: stem
Constituents	: Alkaloids High level of flavonoid Phenolic compound Cuscutin

Myanmar Traditional Medicine Products from Royal Ruby Manufacturing Co. Ltd.



**Shwe-Kyar-Maung
Rejuvenation Tablet for Men
(Herbal tonic for Men)**



Shar-Zaung-Let-Pat-Chet-Say

***Tribulus alatus* Del.**



Myanmar name	: Su-le
Botanical name	: <i>Tribulus alatus</i> Del.
English name	: Caltrops big
Family name	: Zygophyllaceae
Medicinal Uses	: Antioxidant Activity, eliminate excess cortisol, increase in serum testosterone level,
Part used	: The whole plant
Constituents	: 6 steroidal saponins, glycosides

***Aloe vera* Linn.**



Myanmar name	:	Sha -zaung- let- pat
Botanical name	:	<i>Aloe vera</i> Linn.
English name	:	Barbados Aloe
Family	:	Liliaceae
Medicinal Uses	:	anti-bacterial, anti-viral, and analgesic, cancer and tumor, anti -inflammatory , boosting the immune system, Tuberculosis
Part used	:	Leave
Constituents	:	Aminoacids, anthraquinones, enzymes, minerals, vitamins, lignins, monosaccharide, polysaccharides, salicylic acid, saponins, and sterols

Methods

Preparation of Plant Extract



Drying & pulverizing

- Cleaning.
- Drying at 40-50°C at drying oven
- Grinding

Powder

Soxhlet extraction

- Extraction with MeOH (3 hr)
- Filtration

Extract solution

Evaporation

- Rotary Evaporation- < 50° C
- Evaporation in oven 45-50 ° C



Plant extract

Determination of antioxidant activity by DPPH free radical scavenging method

Preparation of Extract solution

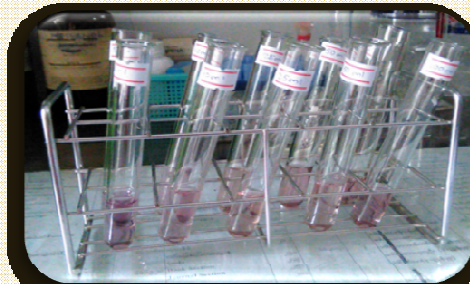


Serial Dilution of extract



- ❖ 100 $\mu\text{g/ml}$
- ❖ 80 $\mu\text{g/ml}$
- ❖ 60 $\mu\text{g/ml}$
- ❖ 40 $\mu\text{g/ml}$
- ❖ 20 $\mu\text{g/ml}$

Adding DPPH solution

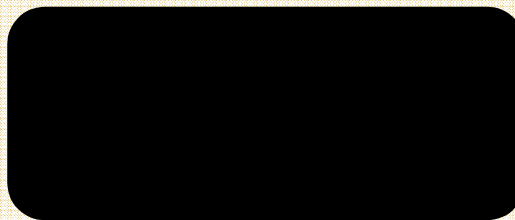


Complete mixing with DPPH solution



Incubation at dark
room for 30 min

Spectroscopic
measurement
UV/VIS/NIR
PerkinElmer at 517nm



Calculation

$$Q = \frac{A_0 - A_c}{A_0} \times 100$$

Where,

Q = DPPH scavenging activity (%)

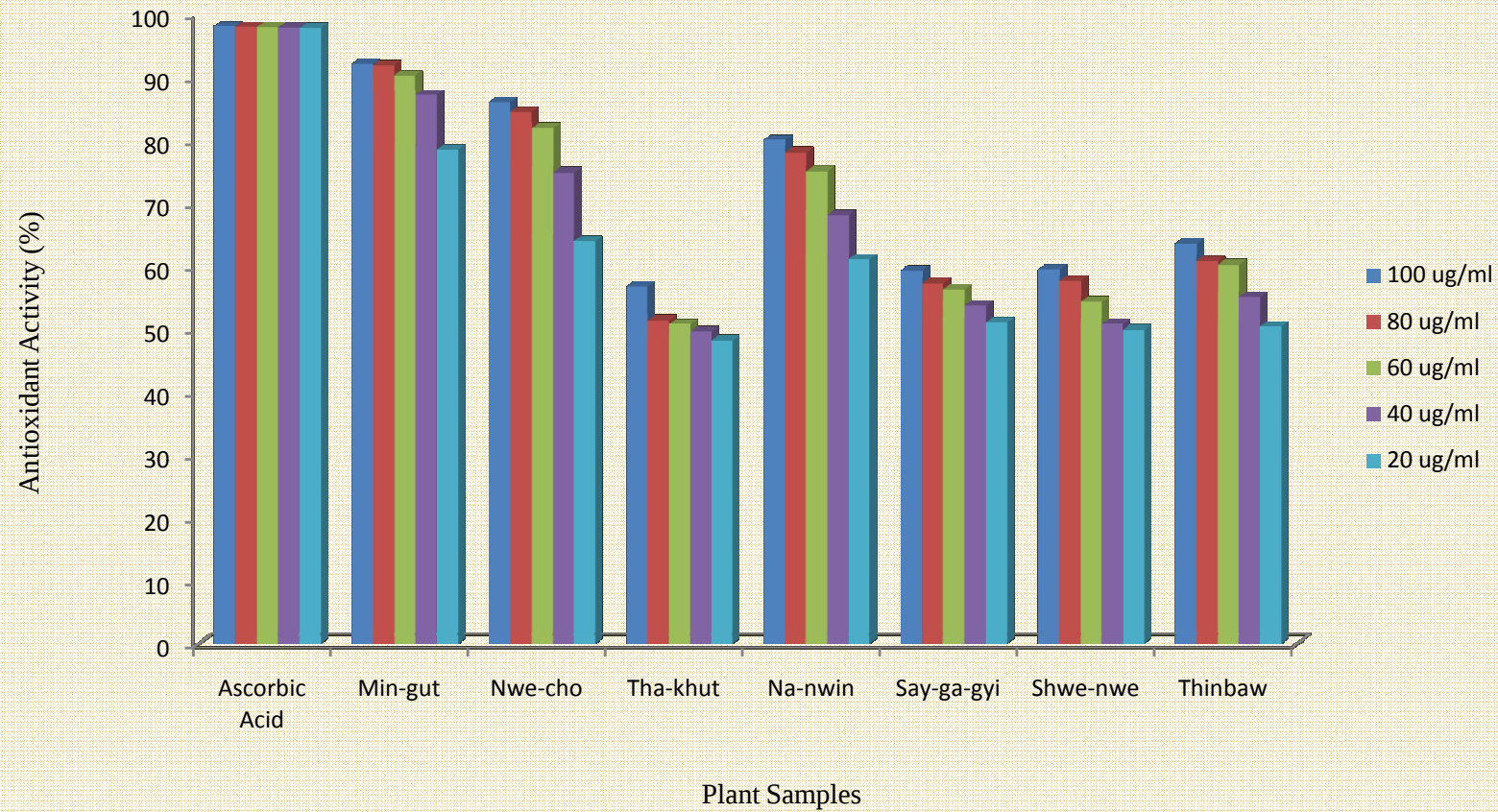
A₀ = The absorbance of the control blank(without extract)

A_c = The absorbance in the presence of the extract sample

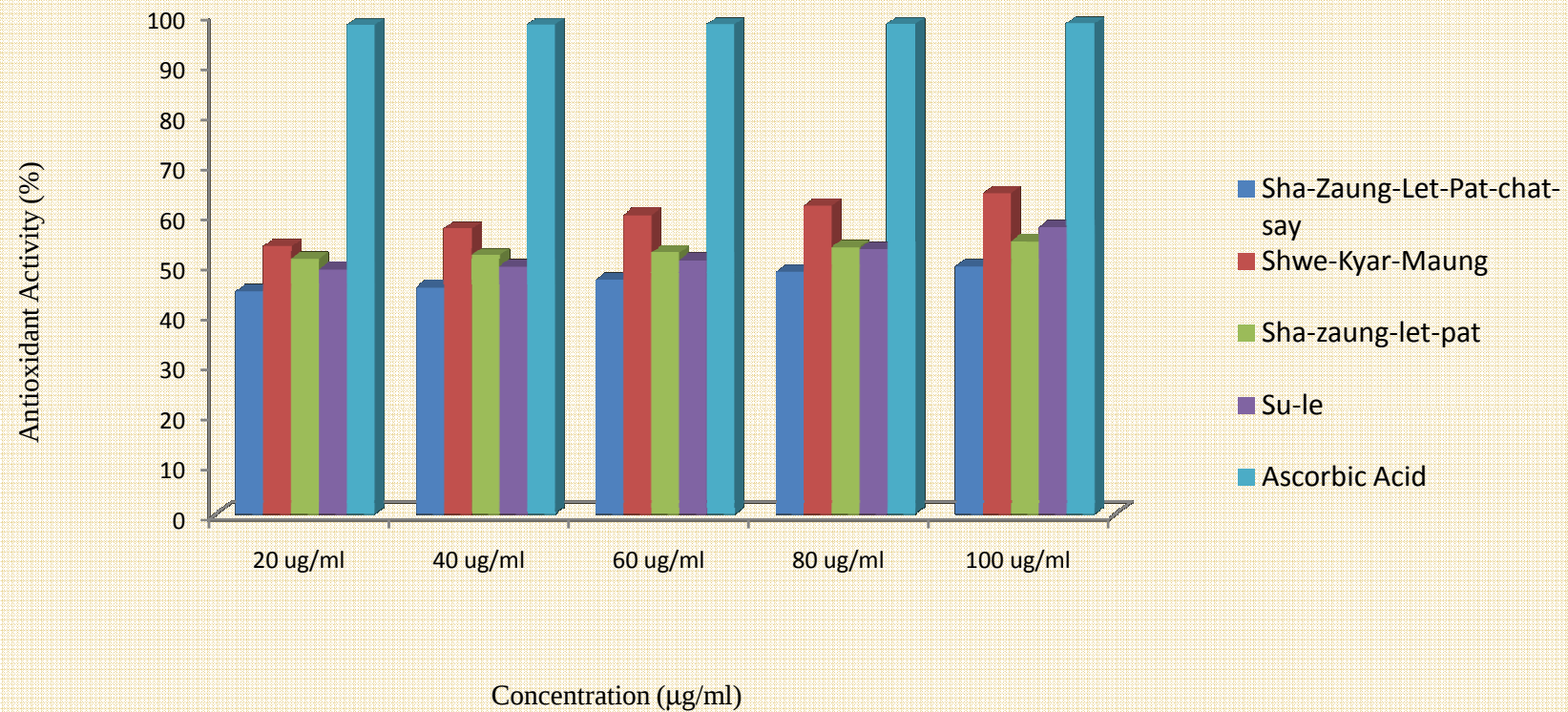
Antioxidant Activity of Some Medicinal Plants and Myanmar Traditional Medicine Products

No	Samples	Scientific Name	Antioxidant Activity (%)				
			100 μg/ml	80 μg/ml	60 μg/ml	40 μg/ml	20 μg/ml
1	Min-gut	<i>G. mangostana</i> L.	92.09	91.86	90.16	87.15	78.43
2	New-Cho	<i>G. glabra</i> L.	85.96	84.46	81.86	74.79	63.90
3	Tha-khut	<i>D. spathacea</i> K.	56.65	51.37	50.73	49.51	48.17
4	Na-nwin	<i>C. longa</i> L.	80.00	78.00	75.00	68.00	61.00
5	Say-khar-gyi	<i>S. angustifolia</i> Nees.	59.24	57.20	56.24	53.62	51.03
6	Shwe-nwe	<i>C. reflexa</i> Roxb.	59.41	57.56	54.29	50.80	49.79
7	Thin-baw	<i>C. papaya</i> L.	63.52	60.73	60.16	55.08	50.34
8	Shar-zaung-let-pat- chet-say		49.55	48.45	46.85	45.34	44.55
9	Shwe-Kyar-Maung rejuvenation tablet for men		64.16	61.66	59.8	57.07	53.63
10	Shar-zaung-let-pat	<i>Aloe vera</i> L.	57.39	53.08	50.74	49.51	49.01
11	Su-le	<i>Tribulus alatus</i> Del.	55.07	54.00	52.78	51.35	49.95
12	Ascorbic Acid (Sigma)		98.02	97.89	97.84	97.77	97.72

Antioxidant Activity of Some Medicinal Plants



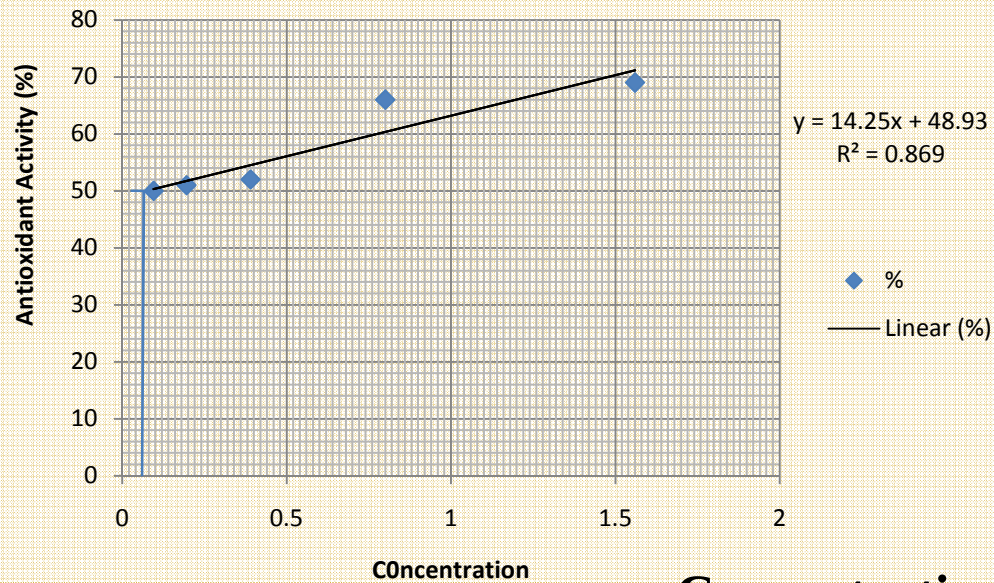
Antioxidant Activity of Myanmar Traditional Medicine Products of Royal Ruby Manufacturing Co. Ltd.



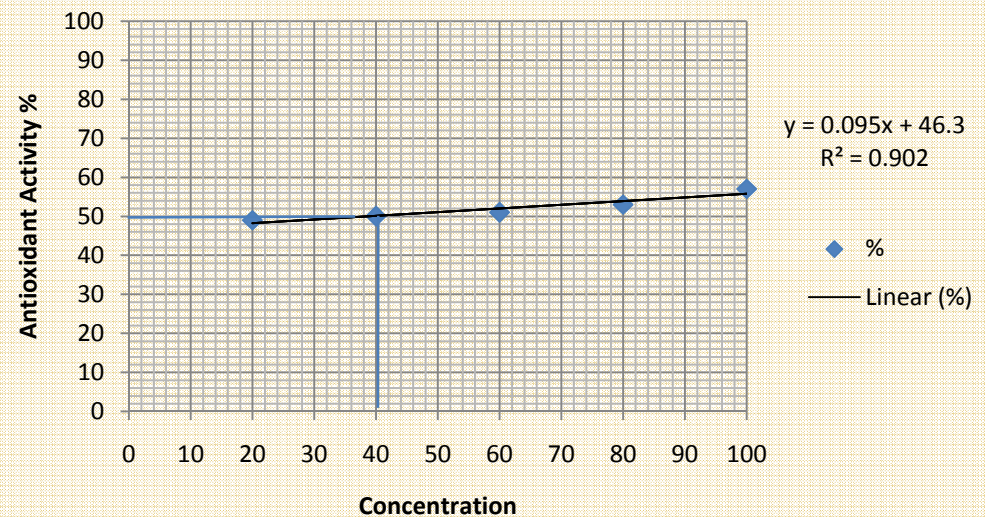
IC₅₀ value of Some Medicinal Plants and Myanmar Traditional Medicine Products

No.	Samples	IC ₅₀ (µg/ml)
1	Min-gut	0.075
2	New-Cho	0.128
3	Tha-khut	51.1
4	Na-nwin	0.1
5	Say-khar-gyi	3.157
6	Shwe-nwe	24.8
7	Thin-baw	12.94
8	Shar-zaung-let-pat-chet-say	100
9	Shwe-Kyar-Maung rejuvenation tablet for men	8
10	Shar-zaung-let-pat	2.2
11	Su-le	39
12	Ascorbic acid (Sigma)	0.02

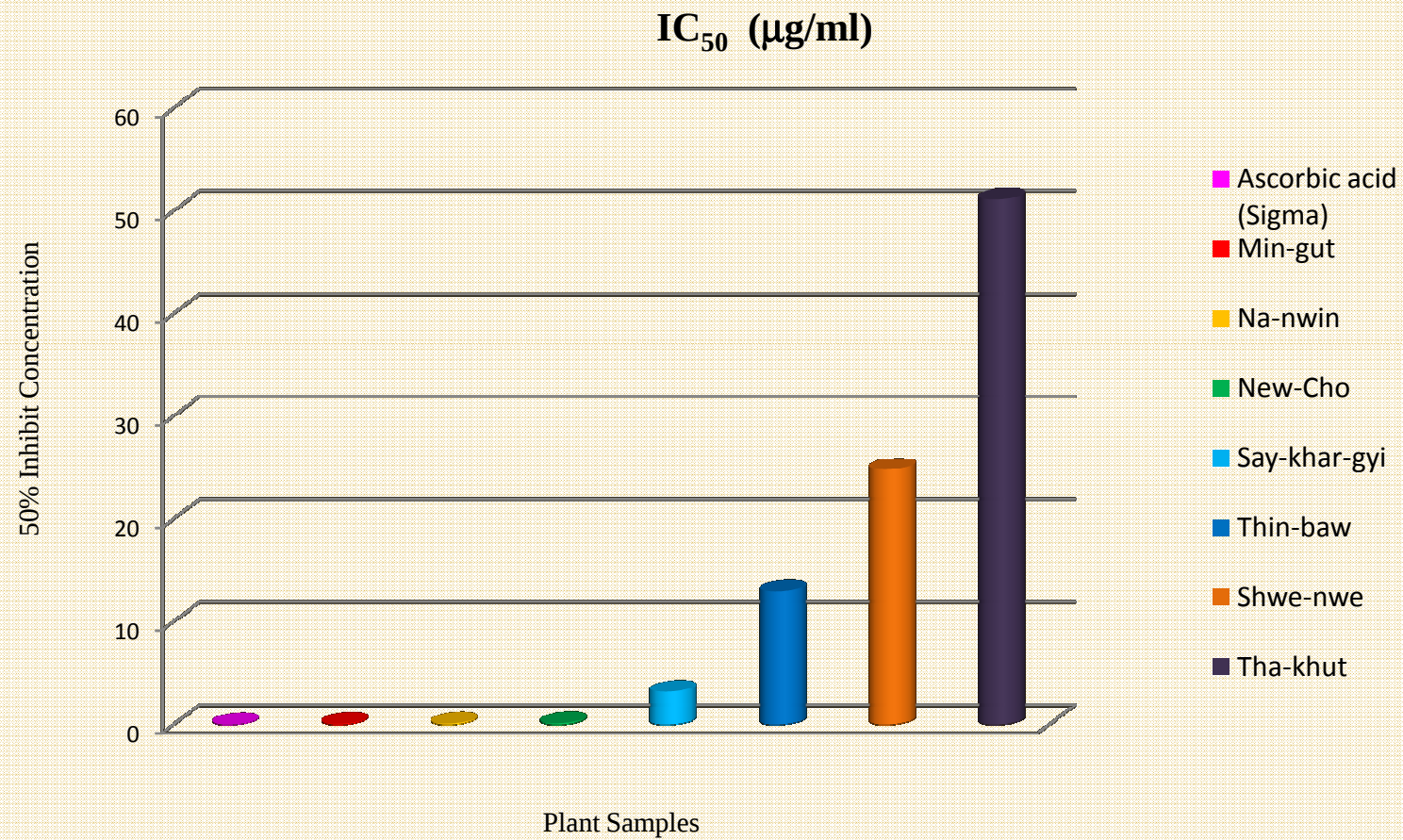
Concentration Vs Antioxidant Activity (%) of Min-gut



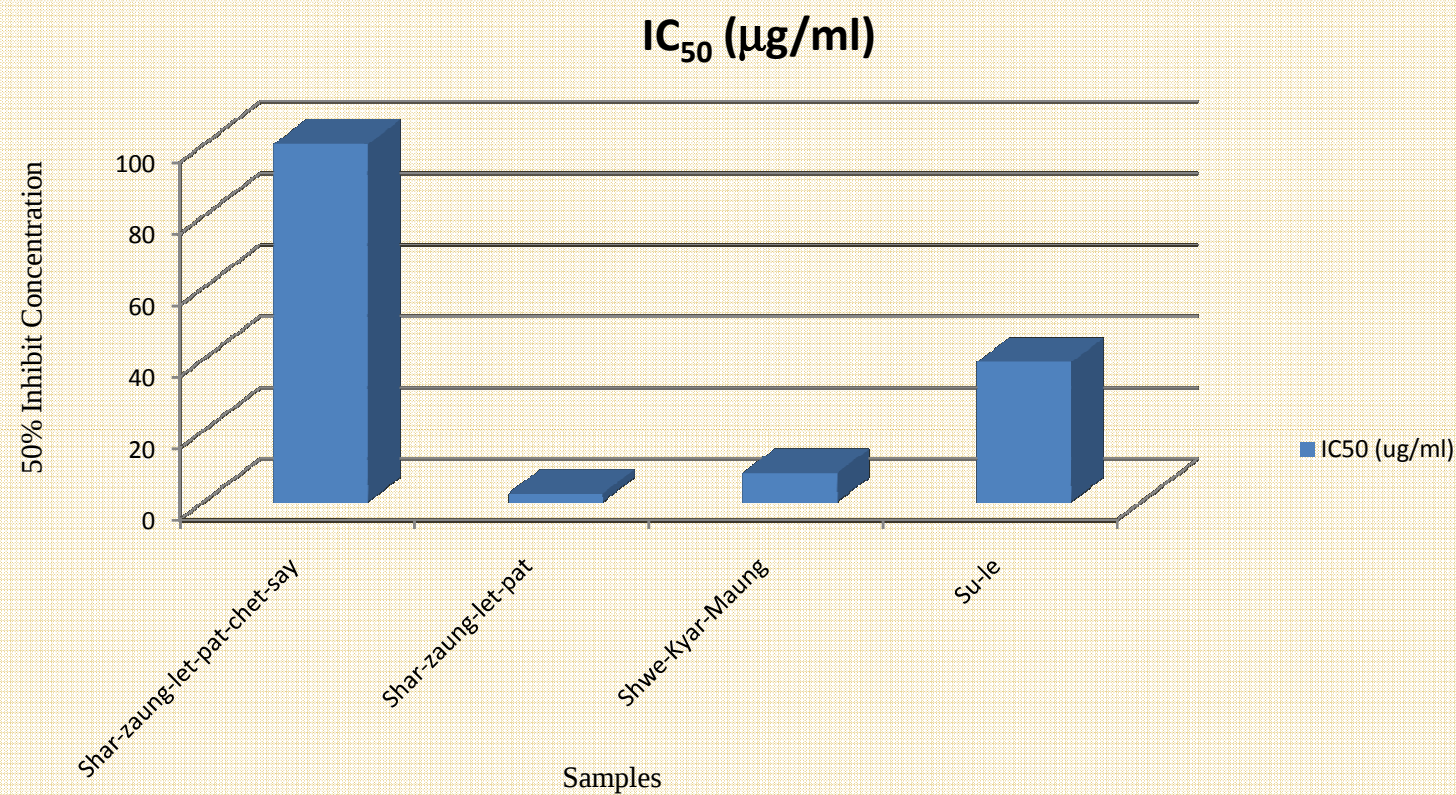
Concentration Vs Antioxidant Activity (%) of Su-le



IC₅₀ value of Some Medicinal Plants



IC₅₀ value of Myanmar Traditional Medicine Products and its Ingredients



	Preliminary Phytochemical Test			1	2	3	4	5	6	7
1	Alkaloid	1.Mayer's reagent 2.Sodium picrate 3.Wagner's reagent	White ppt Yellow ppt Brown ppt	+	+	+	+	+	+	+
2	Glycoside	10 % lead acetate	White ppt	+	+	+	+	+	+	+
3	Reducing sugar	Benedict's solution	Brick red	+	+	+	+	+	+	+
4	Saponin glycoside	Distilled water	bubble	+	+	+	+	+	+	+
5	Cyanogenic glycoside	Sodium picrate + (conc;)H ₂ SO ₄	Yellow colour	–	–	–	–	–	–	–
6	steroid	Acetic anhydride + H ₂ SO ₄ (conc;)	Green colour	+	+	+	+	+	+	+
7	Phenolic comp:	FeCl ₃	Brown colour	+	+	+	+	+	+	+
8	α -amino acid	Ninhydrin	Purple colour	+	+	+	+	+	+	+
9	Acid /Base/Neutral	Bromocresol	Blue- Base Green- Acidic No colour- neutral	N	N	N	N	B	N	N
10	Tannin	1.FeCl ₃ 2. H ₂ SO ₄	Yellowish brown	+	+	+	+	+	+	+
11	Carbohydrate	10% α - Naphthol+ H ₂ SO ₄	Brown ring	+	+	+	+	+	+	+
12	Flavonoid	HCl, Mg turning	Pink colour	+	+	+	+	+	+	+

1. Min-gut 2. New-Cho 3. Tha-khut 4. Na-nwin 5. Say-khar-gyi 6. Shwe-new 7. Thin-baw

Mineral Content of the Plant Samples

N0.	Samples	Na (ppm)	Zn (ppm)	Cu (ppm)	Mn (ppm)	Pb (ppm)
1	Min-gut	0.0079	0.0013	0.0009	0.0012	0.0002
2	New-Cho	0.2198	0.0014	0.0013	0.0009	0.0005
3	Tha-khut	0.0122	0.0016	0.0015	0.0007	0.0005
4	Na-nwin	535.33	ND	ND	94.78	ND
5	Say-khar-gyi	545.06	107.65	12.38	31.55	11.54
6	Shwe-nwe	495.20	6.97	13.03	3.28	2.67
7	Thin-baw	377.30	0.54	ND	33.25	ND

Mineral Content of the Plant Samples

N0.	Samples	Mg (%)	Fe (%)	Moisture (%)	Ash (%)	K (%)	As (%)	Ca (%)	Vitamin-C (%)
1	Min-gut	0.03	0.05	0.12	2.78	0.95	ND	0.25	0.029
2	New-Cho	0.25	0.10	0.14	7.00	0.74	ND	0.30	0.045
3	Tha-khut	0.07	0.04	0.14	3.85	0.84	ND	0.32	0.031
4	Na-nwin	1.40	ND	12.29	2.00	2.89	ND	0.44	0.019
5	Say-khar-gyi	0.44	0.02	8.50	16.91	2.53	ND	3.45	0.10
6	Shwe-nwe	0.03	0.02	6.68	6.63	2.15	ND	0.08	0.14
7	Thin-baw	7.48	ND	8.95	11.61	1.99	ND	1.92	0.13

Results and Discussion

❖ No cyanogenic glycosides

Strongest antioxidant activity

Min-gut (*G. magostana*),
New-cho (*G. glabra*),
Na-nwin (*C. longa*)

Strong antioxidant activity

❖ Say-khar-gyi (*S. angustifolia*)
❖ Shwe-new (*C. reflexa*)
❖ Thin-baw (*C. papaya*)

Moderate antioxidant activity

❖ Tha-khut (*D. spathacea*)

Very strong antioxidant activity

❖ Su le (*Tribulus alatus*)
❖ Shar zaung Let Pat (*Aloe vera*)
❖ Shwe-kyar-maung

Strong antioxidant activity

❖ Shar-zaung-let- pat-chat-say

Conclusion

- ❖ **A fundamental work for further research**
- ❖ **Isolation of major compound from individual plant**
- ❖ **Determination of the antioxidant activity of major compound**
- ❖ **Determination of the antioxidant activity using other Assays**
 - **FRAP (Ferric Reducing Antioxidant Power) Assay**
 - **FTC (Ferric Thiocyanate) Assay**
 - **TEAC (Trolox Equivalent Antioxidant Capacity) Assay**
 - **ABTS (2,2-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid) Assay**
 - **Hydrogen peroxide activity to**
- ❖ **Determination of the Total phenol content and flavonoid content related with antioxidant activity**
- ❖ **Selection of potential plant for antioxidant medicine**

References

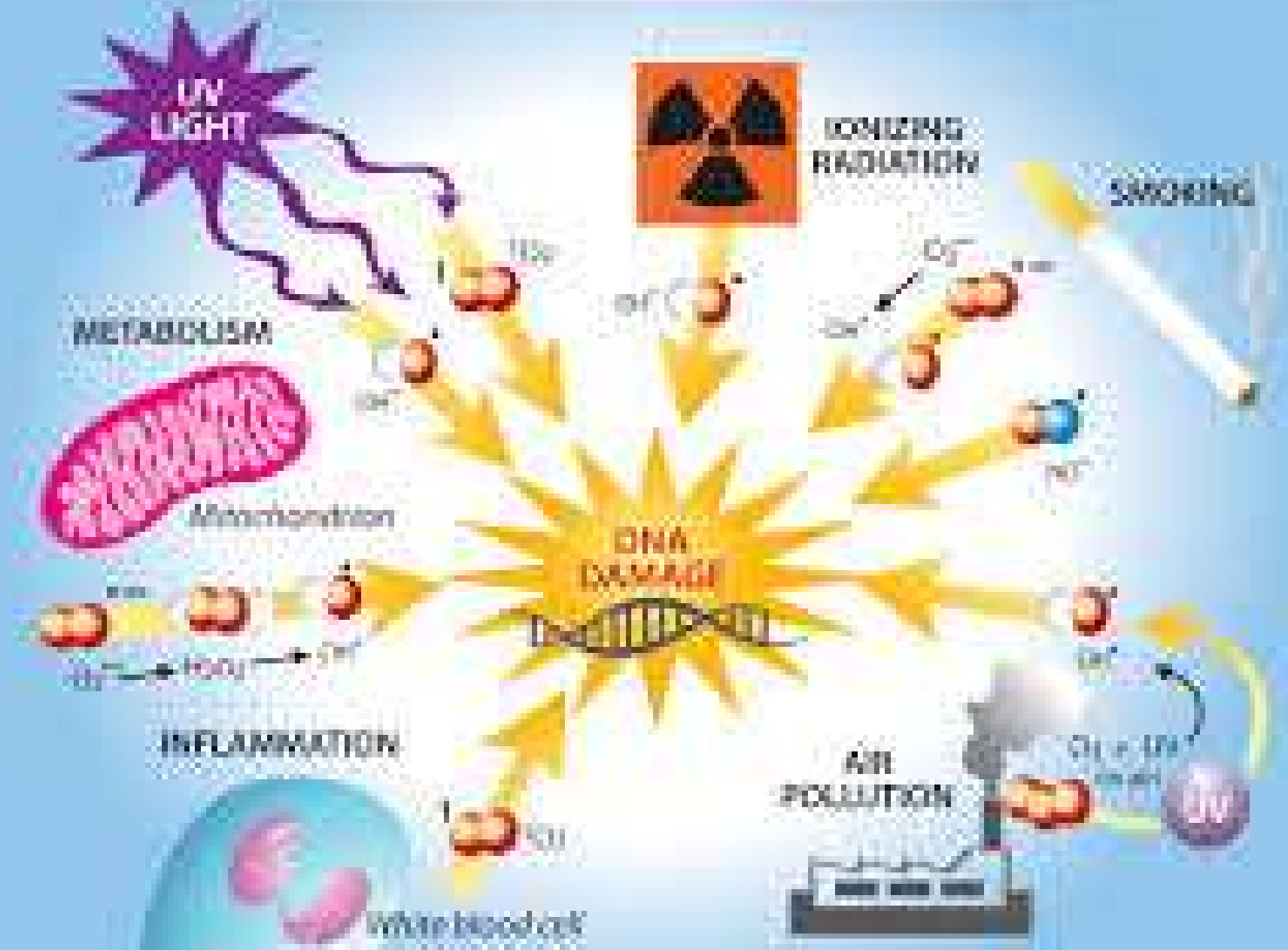
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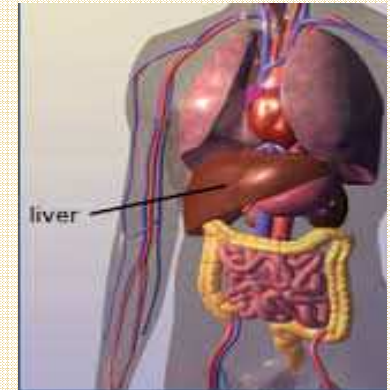
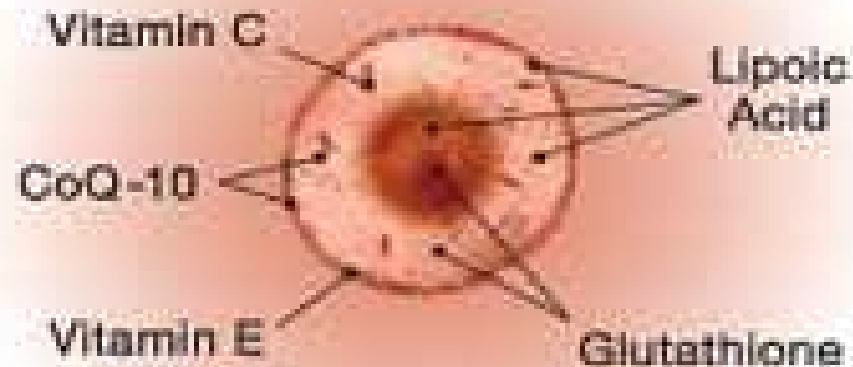
FORMATION OF FREE RADICALS



Antioxidant activities reduce Free Radicals



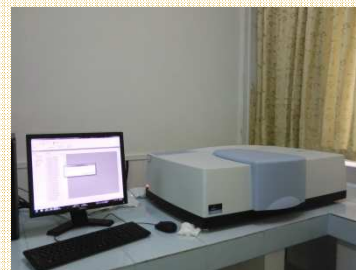
The Network Antioxidants in the Human Cell



Non-network Antioxidants

- ◆ Chlorophyll
- ◆ Carotenoid
- ◆ Selenium
- ◆ Amino Acid





Aldehyde

