3.1.3 FRAP Assay

FRAP assay usually measures the ability of antioxidants to reduce ferric complex into blue colour ferrous ion. The result was calculated via the standard curve obtained from Fe (II) sulphate (Table 1). Thus the antioxidant activity of the samples was expressed as equivalence of ferrous sulphate (mM). The FRAP values of the sample used showed high significant differences between one another at ($P < 0.05$), with leaf extract having higher FRAP value compare to the remaining extract 2512.89±13.47 (mM Fe (II)/g), followed by ripe fruit 1505.11±15.12 (mM Fe (II)/g) and lastly unripe fruit extract 1024.00±14.43 (mM Fe (II)/g) (Table 4)

Table 4: Ferric-reducing antioxidant power of leaf and fruit part *Terminalia cattapa* with respect to fruit ripening

Sample	FRAP value (mM Fe (II)/g)
unripe fruit	$1024.00±14.43^{c}$
Ripe fruit	$1505.11±15.12^{b}$
Leaf	$2512.89±13.47^{a}$

a, b & cIndicates a significant Different at ($P < 0.05$)

3.2 Discussion

3.2.1 Total phenolic and total flavonoids content

The result from this experiment revealed high phenolic and flavonoid content from leaf extract compare to the fruit extract. The phenolic and flavonoid content of leaf extract from the current experiment was found to be higher than the reported value of [21] from methanol and ethyl acetate fraction. Total phenolic content of leaf extract from current research was found to be higher than the reported values of [22] using different sonication treatments, where are total flavonoid content of the current study was higher than 20 minutes sonication and control (with 24-hour maceration) treatment, but lower than 40 minutes sonication and 60 minutes sonication treatment of the same sample. However, the result also revealed that phenolic and flavonoid content, progress with maturity, thus ripe fruit extract showed high amount of both phenolic and flavonoid content than unripe fruit, this contrast the finding of [14], [23]whom reported decrease of phenolic and flavonoid content by maturity of guava fruit and date palm fruit respectively. However, [24 - 25] reported declines in phenolic content by maturity of red raspberries fruit and pomegranate fruit respectively. This differences may be related to the environmental factors, differences of chemical content, and fruits species. Thus *Terminalia catappa* test Sweet to bitter (slightly acidic) where are guava raspberries fruit and pomegranate fruit test sweet to sour (highly acidic) especially at unripe stage.

3.2.2 DPPH antioxidant assay

According to [26] percentage inhibition and IC_{50} are the parameters used to characterise the capability of radical scavenging activity. The lower IC_{50} indicate the higher radical scavenging activity. The result of DPPH antioxidant activity of the samples revealed that fruit extract from both ripe and unripe have higher percentage (%) inhibition than leaf extract, which contrast the report of [9] whom discovered higher antioxidant in leaf compare to fruit extract. Nevertheless unripe fruit showed high percentage of inhibition than ripe fruit, this agree to the finding of [23], [14], [25] whom reported decrease in antioxidant activity by maturity of date palm fruit, guava fruit and pomegranate fruit arils respectively. However, in terms of IC_{50} which is the most important parameter to test antioxidant, leaf showed IC_{50} 43.34 (µg/ml) lower than any of the sample used, including control (BHT), followed by ripe fruit with 95.99 (µg/ml), BHT (control) revealed IC_{50} 107.61 lower than unripe fruit. The IC_{50} value obtained from leaf extract of the current experiment was found to be higher than the reported value of [21]. Ripe fruit revealed lower IC_{50} in comparison with unripe fruit. This may be due to increase in vitamin content as the fruit ripening progressed, thus vitamin c also serve as a good antioxidant compounds. However, [27] stated that appropriate management of fruit ripening and control of harvesting time are highly important towards the optimization of antioxidant components as well as nutritional quality of tomatoes.

3.2.3 Ferric-reducing antioxidant Power.

Ferric-reducing antioxidant power assay is established on the basis of reducing of ferric tripyridyl triazine (Fe^{3+} - TPTZ) complex to its ferrous tripyridyl triazine (Fe^{2+} - TPTZ) form and it is a direct assay which measures the quantity of antioxidants from the sample or reducing ability of the sample [22].The result revealed that leaf extract have higher FRAP value than fruit extract. However, ripe fruit showed higher FRAP value than unripe fruit extract. This corresponds to the finding of [23], [14] whom reported decrease of reducing power by maturity of date palm fruit and guava fruit respectively. This may be associated with the high phenolic and flavonoid content in the leaf extract.

4. Conclusion

Fruit has been use as an antioxidant agent. From the result obtained it can be concluded that all the extract are good source of phenolic and flavonoids content, Nevertheless, leaf show better antioxidant activity, thus it can be used to cure many oxidative illnesses.

5. Future Research

Since many researchers focus on finding natural antioxidant that can be used to cure many oxidative related problems, thus there is also need to study toxicity effect of the samples, for safely consumption, and to identify the functional group as well as chemical structures of the compounds responsible for it antioxidant activity.

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