Possible immunochemical alterations in the plasma levels of TNF- α and IL-10 in the traditional application of *Vernonia amygdalina* (Ewuro) Leaves in the treatment of *Diabetes mellitus.*

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Aim and Objective

This work was designed to determine Possible immunochemical alterations in the plasma levels of TNF- α and IL-10 in the traditional application of *Vernonia amygdalina* (Ewuro) Leaves in the treatment of Diabetes mellitus

Introduction

***Diabetes mellitus* can induce release of free radicals and oxidative stress which can trigger production of cytokines. *Vernonia amygdalina* has anti-diabetic activity due to its phytochemical constituents.**

Materials and Methods:

The study populations include all 33 Diabetes mellitus patients (51 – 67 years; male-21; female - 12) who had not commenced any form of medication or treatment and received herbal treatment in 10 herbal homes of Saki- West local government area in Nigeria. 27 age-matched volunteers who were treated on insulin medication in the hospital almost within the same period were also investigated. Patients who were positive to Acid Fast Bacilli sputum test, *Plasmodium spp.*, identification, HBsAg, anti-HCV and HIV-1 p24 assays were not included. Plasma TNF- α, IL-10, HBsAg, anti-HCV and HIV-1 p24 were determined in the patients by ELISA while identification of Acid Fast Bacilli and Plasmodium spp., were carried out by Ziehl-Neelsen and Giemsa -Thick blood film staining respectively.

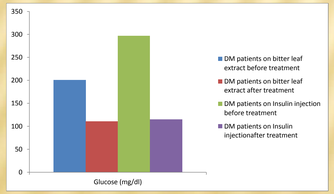


Figure 2: Comparative description of plasma glucose in *Diabetes mellitus* patients before and after the administration of raw liquid extract of *Vernonia amygdalina* and insulin

Results:

There was a significant decrease in the plasma levels of TNF-α , IL-10 and glucose in Diabetes mellitus patients after the administration of raw liquid extract of *Vernonia amygdalina* and insulin compared to their basal samples before the commencement of the treatment(p<0.05)

Table1: Mean and Standard deviation of plasma TNF-α , IL-10 and glucose in *Diabetes mellitus* patients before and after the administration of raw liquid extract of *Vernonia amygdalina* and insulin

Cytokines	DM patients on bitter leaf extract(n=33)		DM patients on Insulin injection(n=27)	
	Before treatment	After treatment	Before treatment	After treatment
TNF-α (pg/ml)	4.1 ± 0.2	2.7 ± 0.1	4.5 ± 0.1	2. 4 ± 0.1
IL-10 (pg/ml)	5.9 ± 0.1	4.4 ± 0.2	6.8 ± 0.2	3.9 ± 0.1
Glucose (mg/dl)	201 ± 2.0	111 ± 3.0	297 ± 5.0	115 ± 2.0

Table 2: Comparative analysis of plasma TNF-α , IL-10 and glucose in *Diabetes mellitus* patients before and after the administration of raw liquid extract of *Vernonia amygdalina* and insulin

Cytokines		DM patients on bitter leaf extract(n=33)	DM patients on Insulin injection(n=27)
		After Vs. Before treatment	After Vs. Before treatment
TNF-α (pg/ml)	‘t’ value	-6.26099.	-14.84924
	‘p’ value	. 0 .012*	0.0023*
IL-10 (pg/ml)	‘t’ value	-6.7082	-12.96919
	‘p’ value	0 .011*	0.003*
Glucose (mg/dl)	‘t’ value	-24.96151	-33.79655
	‘p’ value	0.0008*	0.0004*

Discussion

The result obtained in this work showed a significant decrease in the plasma levels of TNF-α , IL-10 and glucose in Diabetes mellitus patients after the administration of raw liquid extract of *Vernonia amygdalina* and insulin compared to their basal samples before the commencement of the treatment.

These findings could be attributed to the facts discussed in the following paragraphs.

The anti-diabetic bioactivity of *Vernonia amygdalina* has been reported to be due to the ability of the aqueous extract to enhance glucose utilization and uptake which is responsible for the reduction in the high fasting blood glucose after the patients were treated with the raw liquid extract of *Vernonia amygdalina* leaves [2]. This could also be associated with the phytochemical and the phytonutrient constituents which include Vitamin A, Vitamin C ,Vitamin E, Vit.B1, Vit.B2, saponins, flavonoids, alkaloids, terpenes, steroids, coumarins, phenolic acids, lignans, xanthones, anthraquinones, edotides and sesquiterpenes [8- 11] .

High plasma levels of TNF-α and IL-10 in the Diabetic patients before treatment could be related to the fact that oxidative stress is involved in the pathogenesis and development of complications of *Diabetes mellitus* as hyperglycemia can generate free radicals and impairs endogenous antioxidant defence system in patients with *Diabetes mellitus* [19] .

In addition raised plasma TNF-α could be triggered by oxidative stress caused by *Diabetes mellitus* [19] resulting into inflammatory response as TNF-α is a pro-inflammatory cytokine. IL-10 is an anti-inflammatory cytokine that prevent the production of proinflammatory cytokines such as TNF-α, hence the raised plasma level of IL-10 to be able to carry out this physiological role. Furthermore, oxidative stress can induce many inflammatory cytokines. Cytokines can trigger the release of other cytokines which can also increase oxidative stress [15][16].

Decrease in plasma levels of TNF-α , IL-10 and glucose in diabetic patients after the administration of raw liquid extract of *Vernonia amygdalina* and insulin could be linked with the fact that hyperglycaemia can stimulate production of free radicals and cause oxidative stress which can trigger the release of cytokines[15][16] [19], which led to the initial increase of the two cytokines but their levels decreased as a result of decrease in initially raised blood glucose following the administration of raw liquid extract of *Vernonia amygdalina* and insulin. This can also be associated with the possible anti-inflammatory activity of raw liquid extract of *Vernonia amygdalina*[8- 11].

Conclusion: The worked revealed a significant increase in plasma TNF-α , IL-10 and glucose in diabetes patients which returned to normal plasma values after treatment using raw liquid extract of *Vernonia amygdalina* leaves and insulin.

Conclusion:

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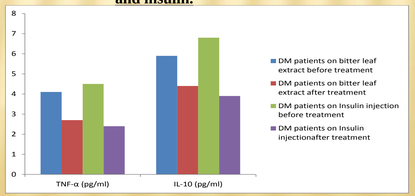


Figure1: Comparative description of plasma TNF-α and IL-10 in *Diabetes mellitus* patients before and after the administration of raw liquid extract of *Vernonia amygdalina* and insulin

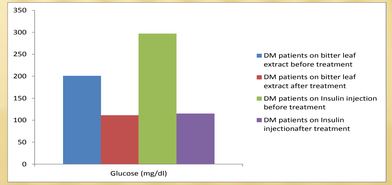


Figure 2: Comparative description of plasma glucose in *Diabetes mellitus* patients before and after the administration of raw liquid extract of *Vernonia amygdalina* and insulin

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