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16/MHS01/175

BCH 408 ASSIGNMENT

QUESTION

Write on the efficacy of commonly used plants in the treatment or management of any three of the following:

* Liver disease
* Sickle cell anaemia
* Malaria
* Diabetes
* Cancer

ANSWER

Medicinal plants, also known as medicinal herbs, have been discovered and used in traditional medicine practices since prehistoric times and they have proved to be the major remedy in traditional system of medicine. Plants synthesize hundreds of chemical compounds for functions including defence against diseases. The compounds isolated from plants are natural and have an advantage over synthetic chemical compounds as they are readily available in nature, since they are natural products so the problem of acquiring resistance against these compounds is minimized to a very great extent.

**EFFICACY OF *Crassocephalum rubens* IN TREATING CANCER**

*Crassocephalum rubens*, also called Yoruba bologi, is an erect [annual](https://en.wikipedia.org/wiki/Annual_plant) [herb](https://en.wikipedia.org/wiki/Herb) growing up to 80 cm tall. It is grown and consumed especially in Southwestern [Nigeria](https://en.wikipedia.org/wiki/Nigeria). It is a water plant that has been used for medicinal purpose. The plant contains biologically active compounds such as tannins, coumarins, mucilage, flavonoids, proanthocyanidin, reducing compounds and steroids in its leaves. The whole plant possesses medicinal properties of which include anticancer effects.

Chemoprevention leverages the ability of natural products to interfere with disease onset and progression. In a recent study, the preventive effect of dietary inclusion with Crassocephalum rubens at 0, 2.5, 5 and 10% levels on colorectal carcinogenesis initiated by N-methyl-N-nitrosourea (MNU) instillations in male Wistar rats was explored following 12 weeks of treatment. Results showed that dietary inclusion with C. rubens particularly at the 10% level significantly lowered lipid peroxidation, systemic inflammation, serum carcinoembryonic antigen (CEA), colon epithelial damage and aberrant expression of the mismatch repair protein MLH-1. The activity of superoxide dismutase and catalase were elevated in C. rubens fed subjects compared with MNU-only treatment controls. These observations correlated at p < 0.05 with polyphenols and flavonoids contents of the plant, suggesting that consumption of C. rubens could be effective in preventing the onset and progression of chemically induced colon carcinogenesis.

**EFFICACY OF *Hibiscus sabdariffa* IN TREATING DIABETES**

Atherogenic dyslipidemia comprises the triad of high LDL-C, high TG and low HDL-C values and is a part of metabolic syndrome. It is well established that hyperlipidemia is a strong risk factor of cardiovascular disease in type 1 and type 2 diabetic patients. Moreover, hyperlipidemia predicts progressive loss of renal function in chronic kidney disease in both type 1 and type 2 diabetes. In a recent study, plasma cholesterol, TG and LDL-C levels were increased significantly in STZ diabetic rats, while plasma HDL-C value is found decreased prominently in diabetic rats. This finding is consistent with previous studies of diabetic rats induced by STZ or alloxan. In the same study, it was discovered that Hibiscus sabdariffa extract (HSE) have the capacity of decreasing TG and LDL-C significantly in STZ diabetic rats. The results are in accordance with previous studies in diabetic or hypercholesterolemic animals. Furthermore, HSE (400 mg kg−1) could increase HDL-C level significantly in experimental animals. It is implied that HSE might possess a promising effect on deceleration of metabolic syndrome in diabetes.

A previous study shows an increasing oxidative stress and reducing anti-oxidative ability in diabetes. Oxidative stress results in glomerular sclerosis, renal tubular injury, proteinuria and leads to gradual loss of renal function. Excessive production of ROS by oxidative stress in hyperglycemic status might result in decline of GSH value. *Hibiscus sabdariffa* L. contained a variety of bioactive compounds with antioxidant properties, such as protocatechuic acid, catechin and (−)-epigallocatechin gallate. They could scavenge harmful free radicals and regenerate other antioxidants to prevent cellular oxidative damages. Protocatechuic acid could attenuate diabetic complications via elevation of GSH and CAT activities in kidney and significant reduction in plasma C-reactive protein, interleukin-6 and other inflammatory cytokines. Previous study also demonstrates that catechin has protective effects on STZ diabetic rats. Catechin treatment significantly reduces albumin excretion rate in diabetic rats and normalizes the interstitial fibrosis completely in diabetic kidney. Previous investigation shows that (−)-epigallocatechin gallate could alleviate renal damage in STZ diabetic rats by suppression of hyperglycemia, proteinuria, and lipid peroxidation. Anthocyanins (including cyanidin and delphinidin) have strong antioxidant activity in a liposomal system and could ameliorate hyperglycemia and insulin sensitivity in diabetic mice. In this study, our data shows HSE could reduce MDA level in kidney tissues significantly, and improve CAT and GSH activities significantly in STZ diabetic rats. The results have shown that HSE possesses potent antioxidant effects on diabetes.

**EFFICACY OF *Nauclea latifolia* IN TREATING MALARIA**

The preliminary phytochemical screening of

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latifolia

, stembark showed the presence of alkaloids,

saponins, flavonoids, cardiac glycosides and tannins.

Alkaloids, saponins and ﬂ avonoids are suggested as being

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The preliminary phytochemical screening of Nauclea latifolia, stembark showed the presence of alkaloids, saponins, flavonoids, cardiac glycosides and tannins. Alkaloids, saponins and flavonoids are suggested as being responsible for the antimalarial activities of the plant. These secondary metabolites could have elicited the observed antiplasmodial activity either singly or in synergy with each other. Alkaloids have been known to show antimalarial properties by blocking protein synthesis in Plasmodium falciparum. Saponin, flavonoids and tannins have been suggested to act as primary antioxidant or free radicals scavengers that can counteract the oxidative damage induced by the malaria parasite. The antioxidant property of this plant may represent yet another mechanism that contributes to its antiplasmodial activity. Flavonoids are known to chelate with nucleic acid base pairing of malarial parasite. Flavonoids have also been known to show significant antiparasitic activities against different strains of malaria, trypanosome and Leishmania.

Aqueous extracts from stems and roots of N. latifolia have been tested in vitro in two Plasmodium falciparum strains, FcB1-Colombia (chloroquine resistant) and a Nigerian strain (chloroquine-resistant) and found to inhibit essentially the final developmental stages of the parasites. Two novel tetrahydro-ß-carboline monoterpene alkaloid glycosides, naucleaorine and epimethoxy-naucleaorine, isolated by chloroform from the dried stem of N. latifolia, strictosidine lactam, and oleanolic acid showed moderate in vitro activities against Plasmodium falciparum. The fact that aqueous fraction showed the highest chemosuppressive effect when compared with others suggests that the active ingredients of this plant responsible for its antimalarial activity may be localized here. The antiplasmodial activities of *Nauclea latifolia* extract and its fractions as observed in this study may, therefore, have resulted from one or more of these mechanisms.

In conclusion, the preliminary phytochemical screening of *N. latifolia* stembark extract showed the presence of alkaloids, saponins, tannins, cardiac glycosides and flavonoids. The antiplasmodial activities of this plant may be ascribed to these constituents and further investigation is necessary to isolate, screen and determine the antiplasmodial compounds as well as their mechanism(s) of action. This study has established that *N. latifolia* stembark extract obtained from South-South Nigeria, possesses antiplasmodial activities.