



2020

E4

Report about the

The prevention effect of *Pulicaria jaubertii* E.Gamal-Eldin leaves on high fat diet-induced hyperglycemia and hyperlipidemia in Albino rats.

By Ghanya Al-Naqeb Ph.D

Assistant Professor of Nutritional Sciences

Faculty of Agriculture, Sana`a University, Yemen

Submitted to the

The American Institute for Yemeni Studies

Introduction

The worldwide use of natural products including medicinal plants has become more and more important in primary health care especially in developing countries. Many investigations are carried out to identify new alternative natural product agents for the treatment of human diseases such as obesity, diabetes and cardiovascular disease. In less developing countries and particularly in Yemen, a large segment of the population still relies on folk medicine to treat serious diseases. Herbal medicine represents one of the most important fields of traditional medicine in Yemen especially in rural areas.

Significance and objective of the research

Since a literature search indicated the absence of information regarding biological and investigations of plants from Yemen, the present study was undertaken to examine the prevention effect of *Pulicaria jaubertii* E.Gamal-Eldin leaves extract locally named as Ensif, on high fat diet-induced hyperglycemia and hyperlipidemia in male Albino rats.

Methodology

The experiment was carried out from May 5th 2015 to July 5th 2015 in the Animal House Unit located in Faculty of Agriculture, Sana`a University, Yemen. This experiment uses four groups of animals: (1) normal rat diet, (2) high fat diet (HFD), (3) HFD+1% *PJ* leaves extract, HFD+1% *PJ* leaves powder with six (6) animals per group. Diet formulations is provided in Table 1. Male rats were used at seven weeks of age. They were housed together in plastic tubs and fed powder chow diet for one week for adaption, then the animals were distributed into the four experimental groups (based on body weight) and animals were housed individually in stainless steel cages and remain in the experimental groups for 8 weeks. Body weight, food and water intake were measured weekly. At the end of the experiment week 8, animals were anticipated to be euthanized under fasting conditions at week 8 with collection of blood, adipose depots, and liver. Plasma was analyzed for glucose, Total Cholesterol (TC), Low Density Lipoprotein (LDL) cholesterol, High Density Lipoprotein (HDL) cholesterol and Triglycerides (TG). Liver enzymes, namely alanine aminotransferase (ALT) and Gamma-glutamyltransferase (GGT) were determined using their serum blood. All the blood analysis were carried out in Alulaqi Specials Med. Lab in Sana`a Yemen.

Main Findings

Body weight, food and water intake

HFD administration to the rats for 8 weeks caused a significant increase in the body weight (Table 2). On the another hand, in HFD treated rats the *PJ* at different forms reduced the body weight and produced signs of recovery in body weights to the level of normal control group.

The HFD control rats consumed significantly less food (Table 2) compared to the normal group. Treatment of HFD rats with PJ extract did not apparently affect rats' food or water intake through the 8 weeks of the treatment

Glucose levels

Plasma glucose levels of the experimental period is shown in Table 2. The HFD control rats and normal control rats had comparable levels of blood glucose. The HFD control group had significantly higher of serum glucose level compared to normal group. After 8 weeks of treatment, the HFD that received PJ had significantly reduced blood glucose concentrations compared with HFD control group.

Lipid Profile

As shown in Table 2, HFD rats had higher levels of plasma TC and TG at the end of the experiment (week 8). At week 8 of treatment plasma TG levels of HFD treated rats were significantly lower compared to HFD group. On the other hand, no significant changes in plasma HDL-C and LDL-C levels in treated groups compared to HFD group at week 8.

Alanine transaminase levels (ALT) and Gamma-glutamyltransferase (GGT) levels

The HFD control group showed significant elevations in ALT and GGT levels compared to the normal control group (Table 2). Administration of PJ at different forms to HFD rats caused reversal of the elevations in ALT and GGT were elicited by HFD and the values were the levels shown by normal control group. Creatinine levels were not affected by HFD nor by PJ treatment. Urea levels were significantly higher in HFD group compared to normal control group.

Conclusion

From the above findings it is illustrated that PJ leaves powder and extract showed a prevention effect on high fat, diet-induced hyperglycemia and hyperlipidemia in male Albino rats. Thus, its prevalent effect did not show any toxicity. The non-toxic effect of PJ leaves provide support to the widespread use of the plant and it can be recommended for use as a nutritional supplement, health food and adjuvant in the management of obesity and its related diseases However, the mechanism of action by which *the PJ* leaves exhibited its action is an ongoing study for a thorough phytochemical investigation to identify the constituents responsible for this effect.

Benefit from this research

- New knowledge on the health benefits of the selected Yemeni herbal plants *Pulicaria jaubertii* *E.Gamal-Eldin* as a folk remedy.

- New effective plant from selected Yemeni herbal plants to be used for health supplements, nutraceuticals and/or pharmaceuticals.
- There is a high potential as a commercial product for obesity, antidiabetic and cholesterol lowering agent because many investigations are being carried out worldwide to discover naturally occurring plants for this purpose.

Acknowledgements

The author thank the American Institute for Yemeni Studies for the financial support for the part of this research project and University of Sana`a, Faculty of Agriculture, Department of Food Sciences and Technology for providing the facilities to handle this research.

Ingredient	Normal Diet g/ kgdiet	HFD Diet g/ kgdiet
Casein	148	148
Sucrose	200	100
Starch	482	382
Cellulose	50	50
Fat	100	300
Vitamin Mix	10	10
Mineral Mix	10	10
Total	1000	1000

Table 1: Diet formulation of experimental rats

	NC	HFD	HFD+PJ force feeding	HFD+PJ powder
B.W (g)	159	202	153	145
Food intake (g)	64	41	42	40
Water Intake (ml)	105	100	100	110
Glucose level (mg/dl)	148.33	217.2	81.25	91.50
Total Cholesterol (mg/dl)	69.67	98	80.25	72.50
LDL-C (mg/dl)	20.67	13.8	19.25	15.33

HDL-C (mg/dl)	52.67	54	55	51.33
TG (mg/dl)	61.50	259.2	148.75	208.17
ALT U/L	145.67	472	207	159.17
GGT U/L	145.67	409.4	47.25	40.17
Creatinine (mg/dl)	0.77	0.88	0.7	0.76
Urea (mg/dl)	20.67	32.80	21.17	26.25

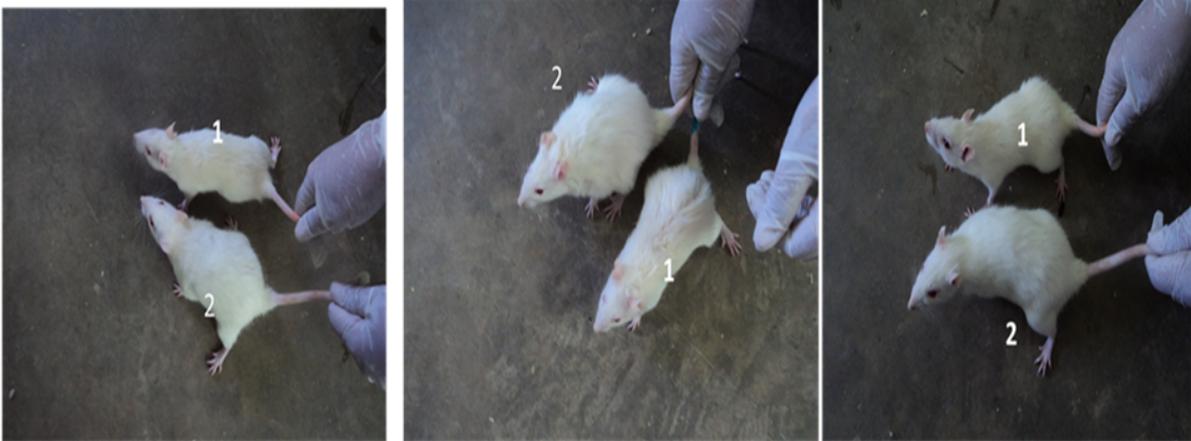
Table 2: Body weight, food and water intake, plasma glucose level TC, LDLC, HDLC, TG, ALT.GGT. Creatinine and urea levels in experimental rats at 8 weeks

Appendix



HFD

HFD +PJ extract



1HFD rat and 2HFD +PJ extract



Force-feeding the animals



Cleaning the cages



Feeding the animals



Weighing the animals



Eye Blood collection



Animal Dissecting