

ABSTRACT

The present study was designed to determine the chemical and biological effects for flavors added to potato chips (cheese, turkey , chili & lemon or kabab) compared with unflavored potato chips (home made) as control. Rats used in the biological study, were fed for 30 days on the chips with the different flavors and the control. The effect of these flavors on the body weight gain, ratio of organs (liver, Kidney , heart, spleen and brain) to body weight were recorded. Blood samples were collected by withdrawing in zero time , 15 day and 30 day from vein plexus eye and the serum was obtained. ALT, AST, alkaline phosphatase, albumin, total protein, total lipids, triglycerides, creatinene, uric acid, , thyroid hormones, superoxide dismutase enzyme and blood picture were determined. Brain, liver, kidney and spleen were carefully separated, weighed and subjected to histopathological examination. The results obtained showed that the flavored chips had badly affected the examined blood serum and the organs compared with the unflavored chips (home made).

Keywords: Potato chips, cheese flavor, turkey flavor, chili & lemon flavor, kabab flavor.

Contents

Item	Page
1- INTRODUCTION AND AIM OF STUDY.....	1
2- REVIEW OF LITERATURE.....	5
2-1. Chemical composition of potato chips.....	5
2-2. Chemical composition of potato chips flavors.....	8
2-3. Effects of potatoes varieties and storage period on volatile compounds and quality potato chips.....	10
2-4. The relationship between oil and quality control of potato chips....	17
2-5. The metabolism of potato chips and flavors.....	22
2-6. Effect of flavors on organs weight, lipid profiles and serum protein.....	24
2-7. The effect of flavors and chips on kidney and liver function.....	27
2-8. Histopathological effect of flavors.....	31
3- MATERIALS AND METHODS.....	33
3.1. Materials.....	33
3.2. Methods.....	33
3.2.1. Chemical analysis.....	33
3.2.2. Fractionation and identification of flavors by Gas chromatography/ Mass spectrometer.....	34
3.2.3. Lipid extraction from potato chips	34

3.2.4. Identification and determination of fatty acid methyl esters by Gas- liquid chromatography (GLC).....	35
3.2.5. Identification and determination of unsaponifiable matter of sunflower oil and lipids extraction from potato chips.....	35
3.2.6. Biological evaluation	37
3.2.6.1. Animal feeding experiments.....	37
3.2.6.2. Analytical methods.....	39
Determination of :	
3.2.6.2.1. Food efficiency (FE).....	39
3.2.6.2.2. Serum total protein.....	39
3.2.6.2.3. Serum uric acid.....	39
3.2.6.2.4. Serum triglyceride (T.G).....	40
3.2.6.2.5. Serum total lipids.....	40
3.2.6.2.6. Serum transaminases.....	41
3.2.6.2.7. Serum creatinine.....	41
3.2.6.2.8. Serum albumin	41
3.2.6.2.9. Alkaline phosphatase	42
3.2.6.2.10. Thyroid gland function.....	42
3.2.6.2.11. Superoxide dismutase (SOD).....	42
3.2.6.2.12. Superoxide dismutase SOD activity in liver cytosols.....	43
3.2.6.2.13. Blood picture.....	43
3.2.6.2.14. Histological examination.....	44
3.2.7. Statistical analysis	44

4. RESULTS AND DISCUSSION.....	45
4.1. Chemical composition of different flavored potato chips	45
4.2. Physical and chemical properties of sunflower oil before and after frying potato chips and that separated from flavored potato chips	47
4.3. Fatty acid composition of sunflower oil and oils extracted from flavored chips after frying.....	49
4.4. Effect of different treatments on the unsaponifiable matter composition after oil extraction.....	51
4.5. Identification and determination of cheese, turkey, chili & lemon and kabab flavors by GC/ MS chromatography.....	53
4.6 Biological evaluation.....	59
4.6.1. Body weight gain, food intake and food efficiency ratio.....	59
4.6.2. Organs weight/ body weight	62
4.6.3. Biochemical parameters.....	65
4.6.3.1. Serum aminotransferase (AST) and alanine aminotransferase (ALT).....	65
4.6.3.2. Alkaline phosphatase:.....	73
4.6.3.3. Serum albumin.....	75
4.6.3.4. Total protein.....	78
4.6.3.5. Total lipids.....	81
4.6.3.6. Triglycerides	84
4.6.3.7. Creatinine.....	85

4.6.3.8. Uric acid.....	89
4.6.3.9. Thyroid hormones.....	90
4.6.3.10. Superoxide dismutase enzyme	94
4.6.3.11. Blood picture.....	97
4.6.3.12. Histopathological results.....	101
SUMMARY.....	123
CONCLUSION & RECOMMENDATION.....	135
REFERENCES.....	139
ARABIC SUMMARY.....	

ABBREVIATION

ALP	Alkaline phosphatase
ALT	Alanine aminotransferase
Approx.	Approximately
AST	Aspartate aminotransferase
ATP	Adenosine triphosphate
°C	Degree of centigrade
ECS	Evaporative cooling storage
EDTA	Ethylene diamine tetra acetic acid
FFA	Free fatty acid
GLC	Gas liquid chromatography
GC/MS	Gas chromatography / Mass spectrometer
h.	Hour
HCT	Heamatocrite
HDL	High density lipoprotein
HGB	Hemoglobin
IR	Infra red spectroscopy
LDL	low density lipoprotein
LSD	Least signification differences
MCH	Mean corpuscular hemoglobin
MCHC	Mean corpuscular hemoglobin in cell
MCV	Mean corpuscular volume
Min.	Minute

mm	Millimeter
PLT	Platelet counts
PPP	Poly phenol peroxidase
PVDC	Poly vinyldine chloride
RBC	Red blood cells
RCS	Refrigerated cold storage
RH	Relative humidity
RI	Refractive index
RRT	Relative retention time
SGOT	Serum glutamate pyruvate transaminase
SGPT	Serum glutamate oxalate transaminase
SOD	Superoxide dismutase enzyme
T ₃	Triiodothyroxine
T ₄	Thyroxine
TBA	Thiobarbeturic acid
TBHQ	Thiobutylated hydroxyl quinone
TG	Triglyceride
VLDL	Very low density lipoprotein
WBC	White blood cells