PREPARATION AND EVALUATION OF SOME HEALTHY FOODS FOR ELDERLY

By

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B.Sc.Agric.Sc.(Food Technology), AL-Azhar Univ.(2005)
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ABSTRACT

Mohamed Awad Abd Allah Abd El- Alkawy: Preparation and Evaluation of Some Healthy Foods for Elderly. Unpublished Ph.D. Thesis, Department of Food Science, Faculty of Agriculture, Ain Shams University, 2019.

Osteoporosis is a major health problem in postmenopausal women due to a sharp decrease in estrogen concentration that leads to an increased rate of bone remodeling; which is associated with both decreased bone mineral density and increased risk of fracture. Therefore, this study was necessary designed to developed natural substance acts as alternative to traditional hormone replacement therapy with less undesirable side effects such as phytoestrogens compounds the same as isoflavone and lignans. To put this aim into effect, defatted soy bean (DSB) and defatted flaxseed (DFS) as phytoestrogen sources of isoflavone and lignans, respectively; broccoli (BR) and red cabbage (RC) as sources of antioxidant agents; skimmed milk powder (SMP) as natural sources of calcium, besides of vitamin D were used in this work.

Biological evaluation was carried out on ninety six aged female albino rats to investigate whither supplementation with the aforementioned sources will improve bone health in experimental animals. Consequence of that, eight rats were taken as an initial group, other eight rats were hold as a normal negative control group and fed on a basal diet. The remaining eighty rats were ovariectomized and fed on low calcium diet for 8 weeks to produce osteoporotic rats model, 8 rats were chosen as an onset of experimental group. Also, 8 rats were kept as a positive control group and fed on a standard diet. The reminder of osteoporotic rats were divided into 8 groups, (each of 8 rats) and fed on standard diet supplemented with: DSB (GI), DSB with BR (GII), DSB with RC (GIII), DSB with mixture of BR and RC (GIV), DFS (GV), DFS with BR (GVI), DFS with RC (GVII), DFS with mixture of BR and RC (GVIII). Skimmed milk powder and vitamin D were added to each tested group diet, the feeding period was 60 days.

At the onset and the end of experiment, rats were weighed, blood sample were taken and serum were separated and exposed to their biochemical analysis included minerals content such as total and ionized calcium, magnesium and phosphorus, liver and kidney functions, antioxidant capacity, reduced glutathione, malondialdehyde, estradiol and parathyroid hormones, and alkaline phosphatase activity. Rats were sacrificed and organs were excited and weighed, femur and tibia bones were separated and subjected to their physical and chemical properties.

Osteoporotic rats model rats showed decreases in body weight, an increases in relative weights of kidney and liver and their functions, and decreases in physical and chemical properties of femur and tibia bones, also decreases in serum and bone minerals, estradiol, alkaline phosphatase activity, oxidative stress parameters and an increase in parathyroid hormone as a bone marker were also found.

Feeding osteoporotic rats on the supplemented diets led to improvement in the aforementioned parameters with different values, the best results and the highest recovery in all biochemical analysis of rats serum, in addition to femur and tibia bones physical and chemical parameters were found in group IV followed by group VIII compared to positive and negative control groups, these osteoporotic rat groups which fed on either DSB or DFS with a mixture of BR and RC in addition to SMP and vitamin D. However, group II comes in the third place which fed on DSB with BR.

It could be concluded that the three aforementioned mixtures of diets, may be a promising sources to produce a functional food for prevention and treatment of bone loss and cell damage, therefore supplemented soups were prepared using these recommended mixtures and submitted to sensory evaluation.

Key Words: Bones; Osteoporosis; Defatted soy bean; Defatted flaxseed; Red cabbage; Broccoli; Skimmed milk.

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LIST OF ABBREVIATION

ALA	α-linolenic acid
ALP	Alkaline phosphatase
ALT	Alanine aminotransferase
ARA	Antiradical activity
AST	Aspartate aminotransferase
BD	Bone density
BMD	Bone mineral density
BR	Broccoli
BRAA	Branched chain amino acids
Cm	Centimeter
CO-Q10	Coenzyme Q10
DEXA	Dual energy x-ray absorptiometry
DFS	Defatted flaxseed
dL	deciliter
DM	Dry matter
DPPH	2,2-Diphenyl-2-picryl-hydrazyl
DSB	Defatted soy bean
E_2	Estradiol
EAA	Essential amino acids
ERs	Estrogen receptors
ERα	Estrogen receptor alpha
ERβ	Estrogen receptor beta
FDA	Food and Drug Administration
FRAP	Ferric reducing antioxidant power
FS	Flaxseed
G	Gram
g/dL	gram/ deciliter
GAE	Gallic acid equivalent
GPX	Glutathione peroxidase
GSH	Reduced glutathione
HPLC	High performance liquid chromatography
HRP	Horseraddish peroxidase