

ABSTRACT

Seham Yehia Gebreil Salleh, Production of Dietary Fiber Gel from Some Cereal Wastes For Preparing Reduced Calorie Foods. Unpublished Master of Science Thesis, Department of Food Science, Faculty of Agricultural, Ain Shams University, 2008.

In this study, fiber gel prepared from some cereal wastes (i.e. rice straw, corn bran, corn cobs and barley hulls) were evaluated for using as fat replacer in the production of low-caloric cookies and beef burger. The effect of different replacement levels on physical measurements, chemical composition and sensory evaluation of the resultant low-caloric food products were also studied.

Results showed that different sources of fiber gel had high crude fiber and total carbohydrate content and low fat and protein contents. The caloric values for rice straw, corn bran, corn cobs and barley hulls gels were 175.13, 312.32, 223.76 and 209.09 kcal/100g wet basis respectively.

An increase in total dietary fiber, insoluble dietary fiber, cellulose and hemicellulose and a decrease in soluble dietary fiber and lignin were obtained when prepared fiber gel from cereal wastes. Different fiber gels had higher water holding and oil absorption capacity values than the corresponding cereal wastes. Scanning electron microscope was also used to examine the morphological alteration of different cereal wastes and their fiber gels.

Cookies with fat replaced up to 40 and 60% by weight of different fiber gels possessed overall acceptability similar to that of the control cookie. Meanwhile increasing of fiber gel level caused to decrease in spread ratio and increases in specific volume and hardness of low-caloric cookies. Replacing 60% of fat with different types of fiber gel significantly reduced caloric values of cookies by 23% to that of control

sample. Also, cookies prepared with 60% of fiber gel had crude fiber contents as 2.05 to 2.42 times as much as that of control.

Adding of different sources and levels of fiber gel (1: 1, 1: 2 and 1:3 of fat: fiber gel) was found to significantly effects on certain quality parameters of the beef burger. Fiber gel addition was found to be more effective for improving the reduction of cooking yield, diameter and thickness of beef burger. Also, control sample and beef burgers formulated with 1: 1 and 1:2 of fat to fiber gel had the acceptable products recorded the highest overall acceptability scores.

Therefore, replacing fat with the suitable levels of different fiber gel can be used for production of low-caloric high dietary fiber food products.

Consequently, these low-caloric and high dietary fiber gel food products could be used to reduce the risk of chronic disease such as coronary heart disease, some types of cancer and obesity, and lowering of serum cholesterol.

Key words: Cereal wastes, Dietary fiber, Fiber gel, Rice straw, Corn bran, Corn cobs, Barley hulls, Crude fiber, Water holding capacity, Oil absorption capacity, Scanning Electron Microscopy, fat replacer, Cookies, beef burger, low caloric food products.

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LIST OF APPRIVIATIONS

%	Percentage
°C	Centigrade degree
A.V	Acid value
AACC	American Association of Cereal Chemists
ANOVA	Analysis of Variance
AOAC	Association of Official Agricultural Chemists
a_w	Water activity
CCC	Calorie Control Council
cm	Centimeter
conc	Concentration
Dept	Department
e.g	For example
et al	And others
FAO	Food and Agriculture Organization
Fig.	Figure
g	Gram
i.e	That is (id est)
IFIC	International Food Information Council
InSDF	Insoluble dietary fiber
kcal	Kilocalorie
kg	kilogram
LDL	Low density lipoprotein
MDA	Malonaldehyde acid
mg	Milligram
min	Minute
ml	Milliliter
mm	Millimeter
Mt	Million ton
N	Neutin
nm	Nanometer
OAC	Oil absorption capacity

P.V	Peroxide value
resp	Respectively
rpm	Revaluation per minute
SAS	Statistical Analysis System
Sci	Science
SDF	Soluble dietary fiber
SEM	Scanning electron microscope
TBA	Thiobarbituric acid
TDF	Total dietary fiber
U	Unit
U.S.	United states
V/V	Volume per volume
W/W	Weight per weight
WHC	Water holding capacity
WHO	World Health Organization