

# Studies on using gamma irradiation and some other technological treatments to improve the properties of some food factories wastes

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This investigation was carried out to study the possibility of using sunflower meal (waste) to produce sausage and cinnamon biscuits because it has a high protein content after using gamma irradiation to remove polyphenolic compounds and phytic acid and to increase the nutritional quality. For that, frozen meat replacement by sunflower meal at substitutes levels 2, 4 and 8% to produce sausage such replacement wheat flour 72% extraction by sunflower meal at substitutes levels 2, 4 and 8% to produce cinnamon biscuits. The obtained results could be summarized as follows: 1-Effect of gamma irradiation on the chemical composition of sunflower meal: 1-1. The results showed that the percentages of crude protein, crude oil, carbohydrate, fibers, and ash contents were 23, 1.66, 37.74, 31 and 6.55 %, respectively. 1-2. Gamma irradiation had no effect on the chemical composition of sunflower meal. 2-Effect of chemical treatments and gamma irradiation on polyphenol: Results indicated that gamma irradiation were used at dose 12 kGy gave the best treatments for removing of total polyphenols. 3-Effect of gamma irradiation on the in-vitro protein digestibility: The in-vitro protein digestibility of sunflower meals increased with increase doses of gamma irradiation. The value were 60.87% in control meal, 68.59, 75.88 and 83.24% of sunflower meals irradiated doses 4, 8 and 12 kGy. 4-Effect of gamma irradiation on the function properties of protein: The results indicated that function properties of sunflower meal increase with increasing gamma irradiation doses (water absorption, fat absorption and emulsifying capacity) while foaming capacity and foaming stability were decreased. 5-Chemical composition of uncooked sausage supplemented by different levels of sunflower meal: Replacement of 2, 4 and 8 % beef meat with sunflower meal reduced the moisture content of the prepared sausage in comparison with the control sample, the ash contents and carbohydrates of sausage samples increased with the increasing of percent replacement with sunflower meal, fat content of control sausage was 28.87%. The addition of sunflower meal at different levels had no effect on fat content of tested samples of sausages, and the energy value of fortified sausage had almost the same calories. 6-Chemical composition of cooked sausage supplemented by different levels of sunflower meal: Cooking caused loss in moisture content of cooked sausage and consequently the decrease in water-holding capacity, the protein content of cooked samples had higher percentage than those of the uncooked, the fat percentage of sausage decreased as a result of cooking in boiling water and the energy value of all tested sausage had almost the same calories. 7-Cooking loss and cooking yields: The results indicated that the sample containing 8% sunflower meal showed maximum cooking yield (81.77%) and lowest cooking loss (18.23%). 8-Organoleptic evaluation of cooking sausages: The sensory evaluation showed that the sausage containing 2% sunflower meal was found to have satisfactory quality grade for color, aroma, taste and texture than the control and the sausage containing 4% and 8% sunflower meal. 9-Chemical composition of cinnamon biscuits supplemented with sunflower meal: The results showed that replacement of wheat flour in cinnamon biscuits with different levels of sunflower meal was found to raise their protein and ash content. The percent increase in protein content was 3, 10 and 20% at 2, 4 and 8% levels, respectively, total carbohydrate contents decrease by increasing level of substitution from 2 to 4 and 8 % and fat content slight increase. 10- Organoleptic evaluation of

cinnamon biscuits :The sensory evaluation of cinnamon biscuits showed that the biscuits produced from wheat flour contain 2% treated sunflower meal was found to have satisfactory quality grade for all evaluated characteristics, which had been reduced when the supplementation ratio was increased more than 2%.Also, this investigation aims to study the possibility of using blended vegetable oils as milk fat substitute in manufacturing soft cheese with low salt content, in addition, to utilize gamma irradiation to prolong the shelf-life of the new manufactured product. Therefore, one hundred (100Kg) from fresh buffaloes' milk containing 5 % milk fat and 3 % salt were divided into two parts, the first part was used for manufacturing control soft cheese sample (containing milk fat), while the second part was skimmed, blended with mixed vegetable oils and homogenized. The skim homogenized milk containing 5% mixed vegetable oils used for manufacturing soft cheese (new product filled). The obtained soft cheese was subjected to  $\gamma$ -irradiation with 1 , 2 and 3 kGy, and stored at refrigerator temperature. During cold storage, the sensory evaluation, microbial and chemical properties of control soft cheese and treated one were evaluated. The obtained results could be summarized as follow :1-The replacement of milk fat by mixed vegetable oils in the manufacturing soft cheese had no effect on chemical composition.2-The replacement of milk fat by mixed vegetable oils in the manufacturing soft cheese had no effect on sensory properties except white color and slight oily flavor which have been noticed in treated filled cheese.3-Gamma irradiation at dose 3 kGy prolonged the shelf-life of treated filled cheese to 48 days compared to 20 days for control sample storage at refrigerator.4-Gamma irradiation at dose 3 kGy prolonged the shelf-life of treated filled cheese to 48 days compared to 20 days for control sample storage at room temperature.It could be concluded that the irradiated sunflower meal at dose 12 kGy may be used to as a replacer (at level 2%) of frozen meat and wheat flour in sausage and biscuits products.Also, it could be concluded that, the new product high percentage of unsaturated fatty acid and no cholesterol compared with cheese made from natural milk and can be recommended as a healthy food especially for those who need to low or free cholesterol foods.