

5. SUMMARY AND CONCLUSION

Rice and barley are important nutritional crops in Egypt. These crops are important sources of energy, protein, vitamins and minerals.

There are some by-products produced from rice milling manufacture, that rice bran, rice germ and broken rice. And there are some by-products produced from barley manufacture in El-Ahram company of Beverage, that taflah, radicle and husk, these by-products cause many environmental problems.

This study was conducted on some by-products from rice and barley, that rice bran and radicle to evaluate their chemical and biological effects. Chemical composition for rice bran and radicle were determined, about half of total oil in rice bran was extracted. Rice bran was added relatively 25% and radicle 10% for making Mary biscuit. Rheological properties of dough and sensory evaluation of biscuit were determined. The efficiency of use rice bran and radicle in lowering the hypercholesterolemia and hyperglycemia were carried out.

Chemical analysis conducted in this work included the following points:

- 1- Chemical composition of rice bran was 16.50% protein, 17.68% oil (7.09% after extraction), 7.20% ash, 7.81% crude fiber and 50.81% total carbohydrate (61.40% after extraction). On the other hand, chemical composition of radicle was 22.24% protein, 2.82% oil, 6.37% ash, 14.03% crude fiber and 54.54% total carbohydrate.

- 2- Biscuit was supplemented with addition 20, 25 and 30% of rice bran, also biscuit was fortified with addition 10, 15 and 20% of radicle, favourite relations were the biscuit with 25% rice bran and biscuit with 10% radicle.
- 3- Chemical composition of biscuit with 25% rice bran was 10.39% protein, 12.64% fat, 2.30% ash, 1.88% crude fiber and 72.79% total carbohydrate, while, chemical composition of biscuit with 10% radicle was 9.97% protein, 11.61% fat, 1.40% ash, 1.35% crude fiber and 75.67% total carbohydrate.
- 4- Total, soluble and insoluble dietary fiber were determined, the values for rice bran were 34.80, 3.01 and 31.79%, respectively, while these values for radicle were 43.66, 6.35 and 37.31%, respectively.

Effect of addition rice bran and radicle on rheological parameters of dough could be summarized as follows:

It was noticed that the water absorption of dough was increased if compared with control (53.70%), it was for biscuit with 25% rice bran (BRB) 63.60% and biscuit with 10% radicle (BR) 59.60%. Arrival time was increased for BRB and BR if compared with control (0.5 min), it was 6.5 and 1 min, respectively. Dough development time was increased if compared with control (1 min), it was 9.5 and 1.5 min for BRB and BR, respectively. Dough stability was increased for BRB and BR if compared with control (7 min), it was 9 and 3.5 min, respectively. Degree of dough weakening was increased if compared with control (60 B.U.), it was 90 and 170 B.U. for BRB and BR, respectively. The resistance to extension, the

extensibility and the proportional number were decreased for BRB and BR. Also, energy values of dough were decreased if compared with control.

A nutritional experiment was performed on rats to evaluate the effect of feeding biscuits fortified with 25% rice bran, 10% radicle and 100% rice bran, 100% radicle on serum lipids profiles, serum glucose, liver and kidneys functions.

The most important results could be summarized as follows:

A) Cholesterol experiment:

- 1- Different diets gave a significant increase in body weight gain when compared with hypercholesterolemic diet. Also, feed efficiency followed the same trend.
- 2- Feeding on different diets resulting increase in weight of kidneys, brain, spleen and heart compared to hypercholesterolemic diet.
- 3- A significant decrease was observed in serum total cholesterol, triglycerides and LDL-cholesterol in rats fed on different diets compared with group fed on hypercholesterolemic diet.
- 4- Serum total protein, albumin and globulin values were significantly decreased in groups fed on different diets relative to value of group fed on hypercholesterolemic diet. ALP, AST and ALT followed the same trend.
- 5- In serum urea, uric acid and creatinine values were significantly decreased in groups fed on different diets relative to value of group fed on hypercholesterolemic diet.

B) Glucose experiment:

- 1- Different diets gave a significant increase in body weight gain when compared with alloxan-induced diabetic rats. Also feed efficiency followed the same trend.
- 2- Feeding on different diets resulting increase in weight of kidneys, brain, spleen and heart relative to alloxan-induced diabetic rats.
- 3- A significant decrease was observed in serum glucose, total cholesterol, triglycerides and LDL-cholesterol in rats fed on different diets relative to alloxan-induced diabetic rats.
- 4- Serum total protein, albumin and globulin values were significantly decreased in groups fed on different diets relative to alloxan-induced diabetic rats. ALP, AST and ALT followed the same trend.
- 5- In serum urea, uric acid and creatinine values were significantly decreased in groups fed on different diets compared with alloxan-induced diabetic rats.

Conclusion:

From the present study, it may conclude that:

- 1- Chemical analysis of rice bran resulted that, rice bran can be considered as a rich source of protein, oil and dietary fiber. After extraction about half of total oil, the rice bran can be used in biscuit manufacture.
- 2- Chemical analysis of radicle resulted that, radicle can be considered as a rich source of protein and dietary fiber, consequently radicle can be used in fortifying biscuit.

3- Diet supplemented with 25% rice bran, 10% radicle or 100% rice bran powder, 100% radicle showed a high reduction in serum glucose, total cholesterol, triglycerides and LDL-cholesterol.

So that rice bran and radicle could incorporate in bakery products or taken as it is for hypercholesterolemic and hyperglycemic patients.

