ROLE OF SOME FOOD PRODUCTS AS MUTAGENIC INDUCERS

By

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B.Sc. Agric. Sci. (Food Technology), Ain Shams University, 2005

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LIST OF ABBREVIATIONS

° C	**:**	Celsius degree
ARC	**:**	Agricultural research centre
CRC	**:**	Colorectal cancer
COP	**:**	Chronic Obstructive Pulmonary
CRS	**:**	Chinese Restaurant Syndrome
gm	**:**	gram
Hr.	**:**	hour
HCAs	**:**	Heterocyclic amines
KGDH	**:**	ketoglutarate dehydrogenase
MetHb	**:**	Methemoglobin
mg	**:**	milligram
ml	**:**	milliliter
MSG	**:**	Monosodium glutamate
NDEA	**:**	*N*-nitrosodiethylamine
NOC	**:**	N-nitroso compounds
NO	**:**	Nitric oxide
O.D.	**:**	Optical density
PAHs	**:**	Polycyclic aromatic hydrocarbons
ppm	**:**	part per million
WHO	**:**	World Health Organization

ABSTRACT

Kariman Mohamed Hassan Mohamed: Role of Some Food Products as Mutagenic Inducers'. Unpublished M.Sc. Department of Food Science, Faculty of Agriculture, Ain Shams University, 2018.

This study was carried out to detect the mutagenicity of certain food additives (sodium nitrite and monosodium glutamate) and some food products treated with such additives (pastirma , luncheon and chicken cubes). The mutagenicity was evaluated by Ames test using mutated bacteria (*Salmonella enterica*) which is already mutated and have grown on the minimal glucose medium .

Samples were prepared as extracts and from every sample, 3 concentrations were prepared (0.1-10-100%) and from every concentration, 3 dosages were prepared (1,1.5 and 2ml). Tested samples extract was exposed to mutated bacteria on minimal glucose medium and incubated at 37° C/24 hr. and the bacterial growth was measured by spectrophotometer.

The obtained results showed that:

- Bacterial reverse growth was increased comparing to negative control and the increment was more obvious at 10% concentration higher than that of 0.1 concentration which gave a slight mutagenicity.
- Bacterial reverse growth was increased at 10% concentration of pastirma extract higher than negative control and 0.1% concentration which gave slight reverse growth and mutagenicity.
- Luncheon extract gave a gradually increase of bacterial reverse growth with higher concentration of samples, the high mutagenicity was more obvious at 100% concentration.
- The mutated bacteria exposed to monosodium glutamate extract gave a reverse mutation and growth increment at 0.1% concentration higher than that of other concentrations and that due

to the high concentration of tested sample that can't afforded by bacterial cells.

- Chicken cubes extract showed reverse bacterial growth at different concentrations of the sample higher with 2 fold than negative control at 10% concentration which indicates the high mutagenic effect of the tested sample.

The effect of the food chemical additives is mutagenic even at low concentration that indicates the high mutagenic effect of the tested samples and the dangerous effect of its accumulative effect on human body.

Keywords: Sodium nitrite – Pastirma – Luncheon – Mutagenicity – Chicken cubes – Monosodium glutamate – Ames test.

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I dedicate this thesis to my father spirit who taught me to trust in Allah and believe in hard work. Also, I dedicate my work and success to my great mother and my small family for their support and encouragement.

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Food preservation was critical to human survival and human knew it thousand centuries ago , sun drying was the first method human used for preserving food before using salting and dry curing to protect food and meat from spoilage specially in hot climate . The word cure stems from the Latin word curare that means " to take care of " and it refers to healing, restoring health and to correct something detrimental.

Food can be classified as fast food, junk food, whole food and organic food, out of these whole food is unprocessed, unrefined, so it has very short shelf life.

Nowadays, mostly all food products have food preservatives. The purpose is generally to preserve the natural characteristics of food, to increase the shelf life, and to inhibit natural ageing and discoloration that can occur during food preparation such as the enzymatic browning reaction in apples after they are cut. Natural methods of preservation usually aim to exclude air, moisture and microorganisms. Natural way of food preservation can be done by boiling, freezing , pasteurizing, dehydrating, smoking and pickling , for example coffee powder and soup are dehydrated, dried for preserving. Artificial ways of food preservation can be done by irradiation, vacuum packing and hypobaric packing. Now, certain synthetic chemicals are used as food preservatives. They are most effective for a longer shelf life and stop or delay the growth of bacteria, suppress the reaction when food comes in contact with oxygen or heat, prevent the loss of some essential amino-acids and some vitamins and enhance the food flavors and colors **(Sharma, 2015).**

Rapid lifestyle transformation, particularly among those living in urban areas, has resulted into a dramatic increase in the demand for processed food, packaged and ready-to-eat food products. (**Atri *et al.* 2013)**.