



SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution Coimbatore – 35

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DEPARTMENT OF FOOD TECHNOLOGY

EFFECT OF COOKING ON NUTRIENTS





INTRODUCTION

- The way we prepare our food can have a profound impact on its nutritional value.
- Whether it's the method of cooking, duration, or even the temperature, these factors can either preserve or deplete essential vitamins, minerals, and other beneficial compounds.
- Delving into the effects of cooking on nutrients helps us appreciate the balance between culinary practices and maintaining a nutritious diet.
- Cooking brings a lot many changes on nutrients, colour, texture and flavor of the food products. The various effects of cooking on the nutrients are discussed below



CHANGES IN PROTEINS

- The principal effect of heat on protein is denaturation. This results in the destruction of micro-organisms and inactivation of microbial and natural enzymes within the food.
- Cooking also destroys the toxic proteins and peptides, enzyme inhibitors, antivitamins and other natural toxicants in food, which can seriously affect their nutritive value.
- Cooking can also result in the interaction of protein with non – protein components of the food system; there can be interaction of protein with carbohydrate or lipid peroxidation products.
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- There is significant loss of Lysine and sulphur containing amino acid- Cysteine after heating proteins.
- On prolonged heating, Tryptophan, Methionine and the basic amino acids are also lost.
- Charring and the presence of off odours during cooking is due to destruction of amino acids and proteins. These changes affect the palatability of the final product
- Interaction between the free amino groups of proteins with reducing sugars or carbonyl groups formed by lipid peroxidation results in non- enzymatic browning (Maillard Browning)
- Egg proteins coagulate on heating. Milk proteins coagulate on addition of acids. Severe heating processes such as roasting, baking and frying have been reported to affect adversely the nutritive value of certain cereals, oilseeds and animal foods.



CHANGES IN CARBOHYDRATES

- Monosaccharides, oligosaccharides and polysaccharides undergo many transformations when cooked in an aqueous medium.
- The sugars are subjected to degradation and epimerization and, over 100 compounds are formed by such transformations.
- These compounds have no adverse effects. Sugar when cooked in water, syrups of various strengths can be formed and also the different balls (soft, hard and brittle) stage can be reached in sugar cookery.
- Starch molecules which are the main source of calories in many diets when heated in an aqueous or moist environment, swell, rupture and burst and starch gets gelatinized and this permits greater enzymatic digestion by enzymes like Amylases.



- Cooking thus increases the digestibility of carbohydrates.
- Starch when subjected to dry heat at a temp. of 200 degree centigrade or higher, breaks down resulting in the formation of brown coloured intermediate compound called dextrin and the process is called Dextrinization. e.g. Toasting of bread.



CHANGES IN LIPIDS

- Lipids, when heated, undergo hydrolytic, oxidative, polymeric and other degradative changes which modify not only the physical properties of the lipids but also their biological properties.
- When heated, the hydrolytic and oxidative changes result in rancidity.
- Hydrolytic rancidity is catalyzed in food at high temp. in an aqueous medium in the presence of acids, alkalies and lipolytic enzymes(lipases).
- Hydrolytic rancidity by itself does not bring about any significant change In the nutritive value of the food.
- Oxidative rancidity is responsible for more losses in the quality and nutritive value of lipids than any other change.



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- In addition to the effect on the biological properties of lipids, thermal effects bring about physical and chemical changes also.
- There is great deal of concern over deep fried foods. If the deep frying is continuous, oxidative changes are small because the fat absorbed by food is constantly replaced.
- Fat should not be heated above 200 centigrade as it causes fat to hydrolyse and form acrolein compounds which have an unpleasant acrid flavour.
- Fat used for deep frying should not be used repeatedly since prolonged use of fat causes polymerization and inter-esterification of the fat resulting in the formation of certain compounds which irritate the GIT and these compounds are suspected to be potential carcinogens.



CHANGES IN VITAMINS AND MINERALS

Vitamins and minerals are lost primarily by leaching, oxidation of water soluble nutrients and thermal destruction.

CHANGES IN VITAMINS

The loss of water soluble vitamins ranges from 0-60% as a result of leaching (drain away), thermal destruction and oxidation. Frying and roasting can cause the loss of fat soluble vitamins ranging from 40- 60 %

Loss of vit. B1 during cooking can occur in the following ways:

- Its destruction by heat during cooking
- Its leaching out in cooking water
- If cooking soda is used, most of this vit. Is lost.



Riboflavin is lost in following different ways:

- Exposure of food to strong light during cooking
- Due to heat
- Due to solubility in water
- Due to soda

MINERALS

- Minerals are also lost on account of leaching and their losses are smaller i.e. 0-35 %
Caicium and Phosphorus are lost in excess of cooking water.
- Iron is lost in excess cooking water. Iron content of the foods can be increased. When vegetables are cut with iron knives or cooked in iron pans, an appreciable amount of iron is incorporated in the foods.
- Sodium, Potassium and Magnesium loss occurs by leaching out in water. NaCl is added to foods as salt which increases the Sodium content of the cooked food.



THANK YOU

