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Role of Enzymes in Honey

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Abstract – Enzymes form integral part and play decisive role in biological metabolism and system. Honey is a sweet and healthy produced by honeybees. (Apics mellifera L.) from flowers nectar.

Honey is an ancient remedy for the treatment of infected wound, which has recently been discovered by the medical profession. Honey have antibacterial activites due to the enzymatic activity.

Honey contains many enzymes like diastase, invertase, catalase, glucose-oxidase, acid phosphates which did in digestion and assimilation. The use of natural honey is associated with nutritional benefits and therapeutic promises.

Beside this honey is used as a mixture with many natural products such as milk, clover, lemon and water for treatment of various ailments and other health disorder. Now a days honey is used in various industries that exploit nature gift.

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INTRODUCTION

Honey have medicinal properties which has been document in the world's oldest medical literature and since the ancient times. Honey also have antimicrobial property as well as wound condition and high viscosity helps to provide a protective barrier to prevent infection.

Honey's main ingredients are simple sugar (monosaccarides) such as glucose, fructose and galactose and complex sugar (oligosaccharides) such as sucrose. The biggest components are glucose and fructose the higher level of simple sugar make honey a good-pre exercise food because these sugar are per-digested and easily absorbed into the blood but that absorption is sustained and gradual, but actually honey's high glucose/fructose level is fairly similar to that synthetically produced inverted sugar syrup which is approximately 47% fructose 47% glucose and 5% sucrose.

Honey has been shown to hamper the growth of food borne pathogens such as E.coli and salmonella.

Honey is a remarkably complex natural liquid that is reported to contain at least 181 substances [1]. The antimicrobial activity in most honey is due to the enzymatic production of hydrogen peroxide. However, another kind of honey called Non-peroxide honey (manuka honey) displays significant antibacterial effects even when the hydrogen peroxide activity is blocked.

Honey naturally contains many enzymes. The predominant enzymes in honey are diastase, invertase (alpha-glucosidase) glucose oxidase.

Honey enzymes content can vary widely by floral source and region.

SIGNIFICANT ROLE OF ENZYMES:-

Enzymes help to maintain body's vital digestive functions, promote metabolism and relieve toxin accumulation the main enzymes in honey are invertase, diastase, glucose- oxidase.

Diastase:- Diastase (amylase) digest starch to simpler compounds but no starch is found in nectar (2) diastase appear to be present in varying amount in nearly all the honey and can be measured. The presence of diastase in honey used as a sweetner in food containing starch. Very few factors may effect diastase value, The natural difference in PH among honey, nectar flow and foraging patterns of the bees. Long storage at moderate temperature and exposure to high temperature will inactivate diastase in honey. Amylase is stable at PH value from 7 to 8 and complete control of amylase activity can be achieved at a PH of less 3.9 (3).

Table

Diastase	This enzymes convert starch into carbohydrates like dextrin, oligosaccharides, monosaccharide.
Glucose Oxidase	This enzyme convert glucose into glucondactone which will convert into gluconic acid and H_2O_2.
Invertase	This enzymes convert sucrose into glucose and fructose.
Acid phosphates	They remove phosphates from organic phosphate
Catalase	This enzyme convert peroxide into water+O_2

GLUCOSE OXIDASE:-

Glucose oxidase is important in its relationship to the antibacterial properties of honey. It catalyses glucose and form gluconic acid in Hydrogen peroxide. The main agent responsible for the antibacterial activity of most honey. The glucose oxidase activity is related to the honey sources.

3. Catalase:-

Catalase is found in some honey and is believed to be present from the nectar of flowers. It decompose hydrogen peroxide the presence of this enzyme will reduce the antibacterial activity of the honey.

Invertase:- Invertase is the enzymes found in honey that convert sucrose in nectar to glucose and fructose, the another name for invertase is sucrose.

Invertase, as diastase is also used as an indicator of honey fresheners because of the same reason that diastase is used because invertase is more susceptible to heat.

ACID PHOSPHATASE:-

Acid phosphatase is an enzymes of honey whose value have been related to honey fermentation. This enzyme mainly prevent in pollen. Honey that ferment more easily have shown higher acid phosphates activities the unfermented honey. The PH of honey has demonstrated to have strong influence on the activity of acid phosphates. The higher the pH the greater the acid phosphates activity (4)

Significant properties of Honey:-

1. **Antibacterial property**:- Honey have important antibacterial properties. The antibacterial property of honey was originally thought due to the high osmotic property of honey (5). Although first termed “inhibine” in the 1930’s by 1966, it was concluded that inhibine was actually H_2O_2 generated by the action of glucose oxidase (6). The antibacterial properties arise from the presence of glucose oxidase which convert glucose to gluconolactone, which in turn, yield gluconic acid and H_2O_2 (7)

Honey can help treat minor acne by attacking the bacterial that cause the outbreaks while moisturizing the skin to aid rejuvenation. Types of honey differ greatly in their antimicrobial potency.

Antioxidant property

Honey contains natural antioxidant property that can destroy biologically destructive chemical agents which have been linked to many disease, such as cancer. Studies also found that dark color honey such as Buckwheat seems to possess more antioxidant than light color varieties. Antioxidants bind dangerous molecules preventing their harmful effects (8)

Hygroscopic property

Honey has the ability to absorb moisture directly from air, a phenomenon is called Hygroscopy. The amount of water, the honey will absorb dependent on the RH of the air because it contain Yeast; this hygroscopic nature require that honey be stored in sealed container to prevent fermentation which usually begin if the honey’s humidity rise much above 25% (9)

CONCLUSION:-

A recent review on the successful usage of honey as a dressing on infected wound. The stimulation of healing may also be due to the acidity of honey. The antimicrobial properties of honey prevent microbial growth. In the moist healing environment created.

Honey can be expected to have a direct nutrients effect on regenerating tissue because it contains a wide range of amino acid, vitamins and trace elements. In addition to large quantity of sugars it is clear that hone have a promising pharmacological agents for preventing cancer, neurological degeneration, wound healing, infection diseases and aging as well as it can be used as food preservative.

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