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EXTRACTION OF CAFFEINE FROM COFFEE & STUDY IT'S EFFECT ON MICROBIAL GROWTH

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ABSTRACT

The research work presented in this paper is Effect on caffeine on the growth of *Staphylococcus aureus* microorganism. Caffeine is a plant alkaloid which are found in more than 60 plant species just like *Coffia arabica* (Coffee), *Thea sinensis* (Tea plant). It is plant product that is most commonly found in coffee beans, tea, cocoa and chocolates. Caffeine is also found in some prescription and non-prescription drug including cold, allergy and pain relievers. And it is mostly used by human. In this experiment we extract the caffeine from coffee powder using organic solvent (Ethyl acetate). The effect of caffeine was studied on *Staphylococcus aureus*. The caffeine proved the result show as Antibacterial agent.

KEYWORDS: Microbial growth.

INTRODUCTION

Caffeine(1, 3, 7-trimethylxanthine) is a bitter substance found in coffee, tea, soft drinks, chocolates and certain medicines. It has many effects on the body's metabolism including stimulating the central nervous system. This can make the human more alert and give a boost of energy. Caffeine at 150-250mg produces a sense of well being, alertness, beat boredom, allays fatigue. Action of caffeine depends upon the concentration at higher concentration of caffeine shows release of Ca^{2+} from sarcoplasmic reticulum specially in skeletal and cardiac muscle; at the therapeutic range and it shows the blockage of adenosine receptor and increase the level of cAMP. [1].

MATERIAL AND METHODS

Coffee: The branded coffee powder was taken.

Micro-organisms: *Staphylococcus aureus* is a Gram-positive coccal bacterium that is a member of the Firmicutes, and is frequently found in the human respiratory tract and on the skin. It is positive for catalase and nitrate reduction. Although *S. aureus* is not always pathogenic, it is a common cause of skin infections (e.g. boils), respiratory disease (e.g. sinusitis), and food poisoning. Disease-associated strains often promote infections by

producing potent protein toxins, and expressing cell-surface proteins that bind and inactivate antibodies

Experimental: The caffeine was extracted from the coffee powder by using organic solvent Ethyl acetate[2] and prepared 150ml nutrient broth as control only with *Staphylococcus aureus* and another with caffeine. Both were incubated in B.O.D. incubator at 35°C.

RESULT AND DISCUSSION

Results are shown in tables 1 and comparative growth of *Staphylococcus aureus* is shown in figure 1.

OPTICAL DENSITY(O.D.)at 570nm						
sample	0hour	4hours	11hours	15hours	26hours	30hours
1	0	0	0	0	0	0
2	0.01	0.04	0.08	0.08	0.06	0.03
3	0.73	0.78	0.69	0.60	0.60	0.60

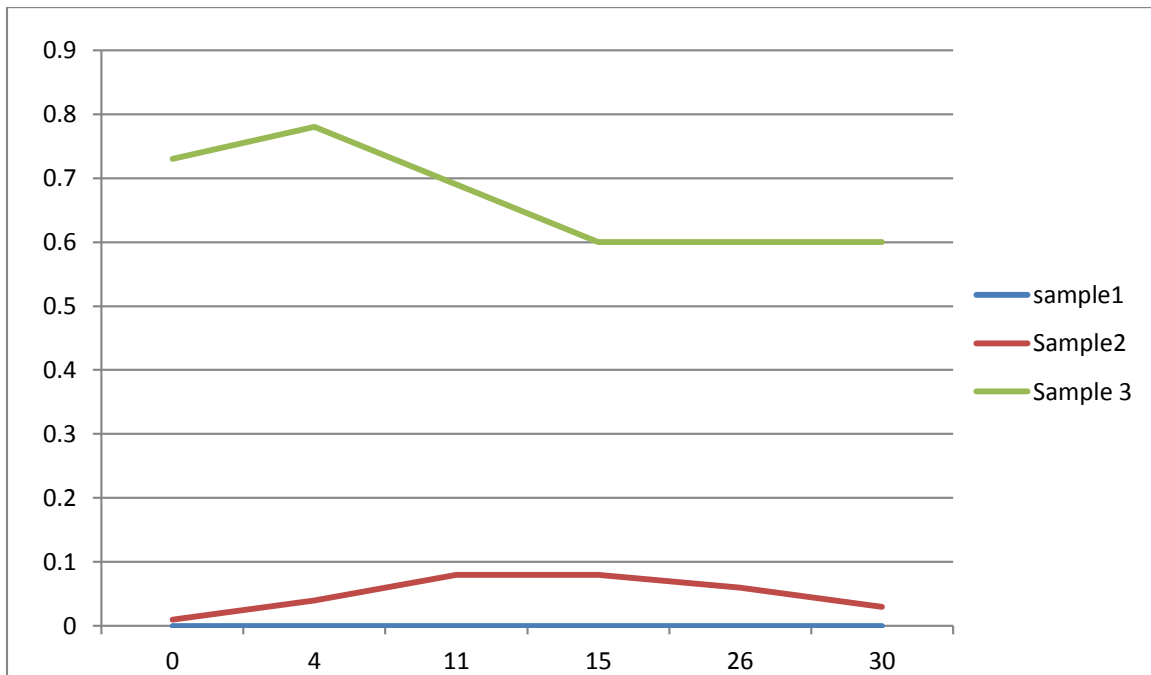


Figure:1 show the growth curve of *Staphylococcus aureus*.

We had extracted **0.65grams Caffeine** from **150grams** Coffee powder. It was studied against (*Staphylococcus aureus*) to see its effects on its growth.

In microorganism *Staphylococcus aureus*, in control sample 2 the O.D. (optical density) was **0.01** at **570nm wavelength** where as the initial O.D. was taken at zero time duration. Many O.D.s were taken at a certain time interval. In graph showed the normal growth of *Staphylococcus aureus* where as in sample 3 containing caffeine the O.D. was **0.73** at **570nm wavelength** at zero hour but after **0.60** had observed. This infers that in the presence of caffeine the growth of *Staphylococcus aureus* was inhibited.

CONCLUSIONS

These observations indicates that the Caffeine act as an **Antimicrobial agent**.

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