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MINIMUM INHIBITORY CONCENTRATION OF INDIAN CURRENCY COINS

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ABSTRACT

Coins are the solid metal form of currency. They are generally the medium of exchange with the less value. Upon the regular handling of the coins in the hand can lead to the microbial contamination on the coin. Due to the presence of the various kinds of the microbes on air, skin and our hands. They are attached upon the regular habits such as handling of the mobile phones, handles, lock, keys, washroom, doors, floor, etc. The coins are made up of various metals and metal alloys. Each metal has its own efficacy of inhibiting the microbial growth. So, presently it gives a look at the various metals i.e. coins which has the maximum inhibitory effect on the microbial growth and suggest using the metal of choice for the safer living.

Key Words: Petri plates, Microbial Growth, Nutrient Agar, and Autoclave.

INTRODUCTION

Microbial contamination is the common word we hear in the field of the biotechnology along with a pact in the regular terminology. Currency is also acting as the medium of exchange and transfer of the various micro organisms. The currency is termed to be an important route in the outbreak of diseases. The coins have a character of inhibiting the microbial growth depending upon the material of the coin (Anonymous 1; Bhimrao Ramji Ambedkar, 1923).

MATERIALS AND METHODS

Nutrient agar medium, Petri plates, Analytical weighing balance, Double distilled water, Autoclave, Incubator, Compound microscope, Inoculum, Metallic coins.

All the currently using and recently issued coins are been selected for the study. They include the following coins R1, R2, R5, and R10.

They are made up of the metals in following table.

Methodology

A nutrient agar medium is prepared and its pH is adjusted to the neutral pH of 7. Then it is sterilized in an autoclave at 121°C at 15lbs pressure for 15 minutes. Then it is slightly cooled and poured in the petridishes and allowed to cool completely (Prescott & Dunn, 1987**;** *Chandrakanth Kokate***,** 2008). After cooling, E.coli, Bacillus and streptococcus bacteria are inoculated in the medium. Similar amount of the inoculum is inoculated in the six petridishes by the pour plate method (Ananthanarayan & Paniker, 1994.) The amount of the inoculum is 0.5 ml. Then each coin is kept in each petridish separately and a petridish is kept without the metal coin, which is kept as a controlled one (Casida LE Jr, 2001; Bhatt DC and Asgar Ali, 2008).

Then they are kept in the incubator for 24-48 hrs for the growth at 37°c. After completion of the incubation period the petridishes are removed out and then examined for results (Prescott & Dunn, 1987; Bhatt DC and Asgar

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Ali, 2008).

RESULTS

The petridishes are removed out and seen for results. The results were as follows.

The R 1, coin has much growth than the R 5, and R 10 coin, and R 100, R 500.....coin also has much growth than the R 5, R 10 but less than R 1 and R 5 coin has the least growth when compared to all other coins and R10 coin has the second least growth.

This shows that the order of the maximum potential of the inhibition of the microbial growth was in the order of R 5-A, R 10, R 5, R 1, R 2 (Brass > bimetal > cuprous nickel > Ferrite stainless steel).

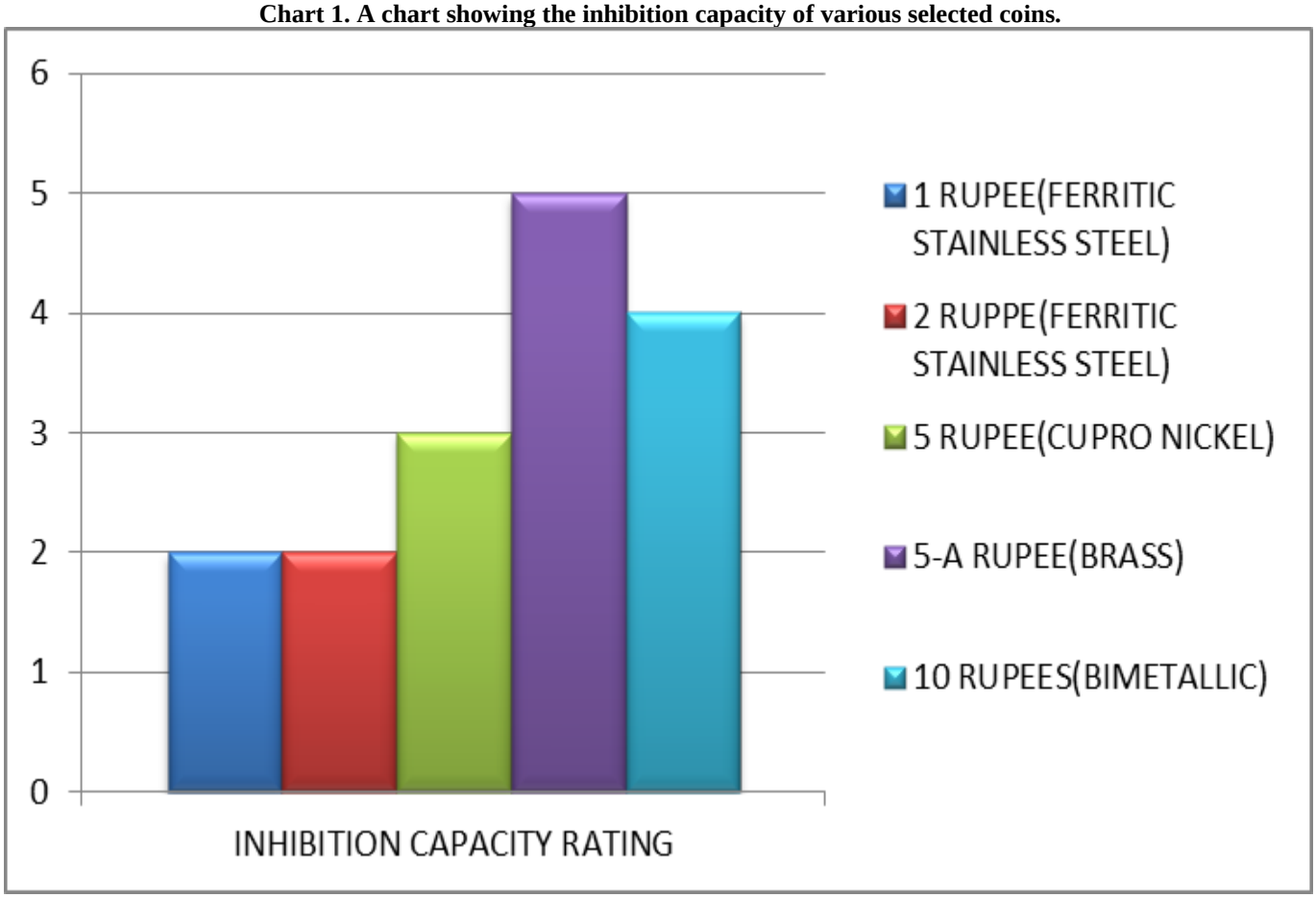
Table 1. Table showing the material used in the coin.

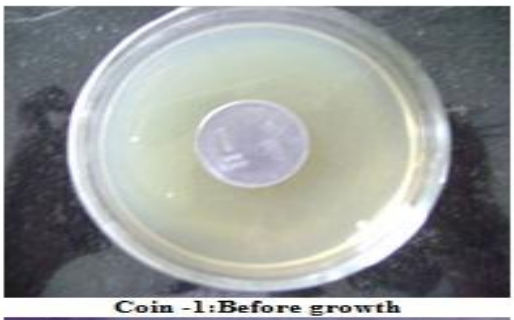
Coin.	Material
1	Ferritic Stainless Steel
2	Ferritic Stainless Steel
5	Cupro-Nickel
5A	Brass
10	Bimetallic

Table 2.A table showing the dimensions and MIC of coins.

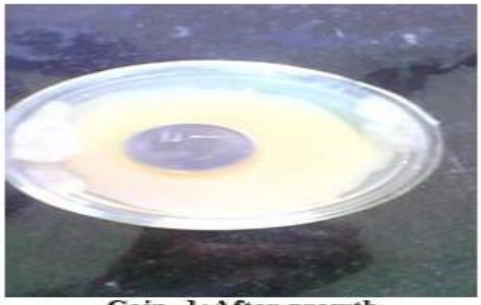
COIN	DIAMETER	WEIGHT	TYPE OF METAL	RATING
1	25mm	4.85gms	Ferritic Stainless Steel	**
2	27mm	5.62gms	Ferritic Stainless Steel	**
5	23mm	9 gms	Cupro Nickel	***
5-A	23mm	6 gms	Brass	*****
10	28 mm	8 gms	Bi Metallic	****

Chart 1. A chart showing the inhibition capacity of various selected coins.





Coin -1:Before growth



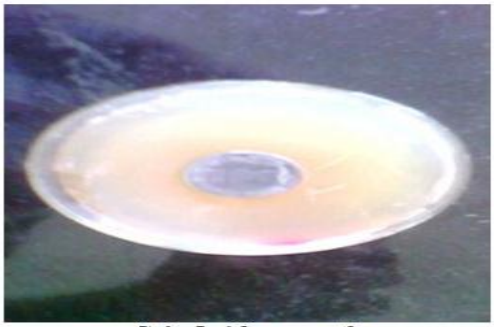
Coin -1:After growth

Coin 2: After growth

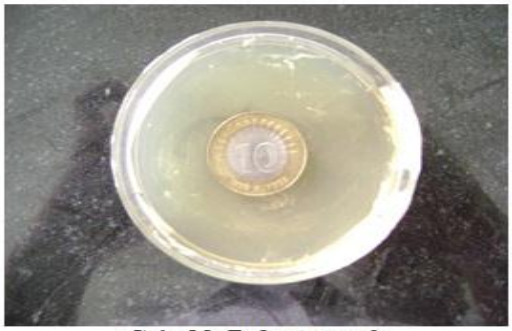
Coin 5A: Before growth

Coin 5A: After growth

Coin 5: Before growth



Coin 5: After growth



Coin 10: Before growth

Coin 10: After growth

DISCUSSION AND CONCLUSION

The 5 coin is made up of brass and 10 are of bimetal and 1&2 is of ferrite stainless steel 5a is made up of cupronickel. From the results obtained, the brass coin has the highest potency among the all currently issued Indian coins, followed by the, other metals.

The use of the brass metal for the coins could decrease the risk of the transfer of the microbes from hand to hand by inhibiting their growth. So, brass metal should be used by the government for the manufacture of the all Indian currency coins such that a less amount of the microbial contamination could be resulted.

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