biochemical, immunological and functional characterization. *PhD Thesis-submitted to University of Hyderabad, India*. It has been reported that Mycobacterial protein, the polyketide Pks1 contributes to biofilm formation in *M. tuberculosis* (Pang *et al*, J. Bac. 2012, 194(3):715-21) but inhibitor against this protein is not known. It has also been reported that a chemical, TCA1 reduces the biofilm formation by *M. tuberculosis* (Wang *et al, PNAS,* USA, 2013; 110(27): E2510-7) but its target has not been studied.

[004] The most frequently used diagnostic methods for tuberculosis are the tuberculin skin test, acid-fast stain, and chest radiographs. Treatment of tuberculosis frequently involves multi drug therapy (MDT) treatment. This involves taking a combination of four drugs for a period of 6-9 months, often causing toxicity to the patients. The prolonged treatment is due to the ability of this slow growing bacterium to form the biofilm which makes the bacterium drug tolerant.

[005] The development of drug resistance in this bacterium has led to the development of *M. tuberculosis* variants which show multi-drug resistance (MDR). This is a major issue in the treatment of the disease and there is now a need to identify alternative drugs for the treatment of tuberculosis.

SUMMARY

[006] In an aspect of the present disclosure, there is provided a medicament comprising a drug selected from a group consisting of acarbose, cyclosporine A, its pharmaceutically acceptable salts thereof, and combinations thereof, for use in treatment of diseases caused by biofilm forming microorganisms, wherein the biofilm forming microorganisms is selected from a group consisting of *Mycobacterium smegmatis*, *Mycobacterium tuberculosis*, multidrug resistant *M. tuberculosis*, extensively drug resistant *M. tuberculosis*, totally drug resistant variant of *M. tuberculosis*, *Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus*

intermedius, Streptococcus mutans, Staphylococcus saprophyticus, Streptococcus constellatus, Pseudomonas aeruginosa, and combinations thereof.

[006a] In another aspect, the present disclosure refers to the use of acarbose and its pharmaceutically acceptable salts in the manufacture of a medicament for use in treatment of diseases caused by biofilm forming microorganisms selected from a group consisting of *Mycobacterium smegmatis*, *Mycobacterium tuberculosis*, multidrug resistant *M. tuberculosis*, extensively drug resistant *M. tuberculosis*, totally drug resistant variant of *M. tuberculosis*, *Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus intermedius, Streptococcus mutans, Staphylococcus saprophyticus, Streptococcus constellatus, Pseudomonas aeruginosa,* and combinations thereof.

[006b] In another aspect, the present disclosure refers to the useof acarbose, cyclosporine A, its pharmaceutically acceptable salts thereof, and combinations thereof in the manufacture of a medicament for use in treatment of diseases caused by biofilm forming microorganisms selected from a group consisting of *Mycobacterium smegmatis*, *Mycobacterium tuberculosis*, multidrug resistant *M. tuberculosis*, extensively drug resistant *M. tuberculosis*, totally drug resistant variant of *M. tuberculosis*, *Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus intermedius, Streptococcus mutans, Staphylococcus saprophyticus, Streptococcus constellatus, Pseudomonas aeruginosa,* and combinations thereof.

[007] In an example of the present disclosure, there is provided a method of treatment of diseases caused by biofilm forming microorganisms, said method comprising:

(a) obtaining a drug selected from a group consisting of acarbose and its pharmaceutically acceptable salts; and

(b) administering a therapeutically relevant amount of acarbose.

[0025] Figure 15A and 15B depicts multiple interactions between cyclosporine A and *M. tb* PpiB, in accordance with an embodiment of the present disclosure.

[0026] Figure 16 depicts protein homology of *M.tb* PpiB (Rv2582) with proteins from other biofilm forming bacteria, in accordance with an embodiment of the present disclosure.

[0027] Figure 17 A depicts homology of *M. tb* PpiA or PpiB with *E. coli* Ppiase, and Figure 17 B depicts homology of *M. tb* Ppiase with trigger factor proteins (RopA) expressed in *S. mutans*, in accordance with an embodiment of the present disclosure.

[0028] Figure 18 A depicts SPR analysis of cyclosporine A interaction with *M. tb* PpiB, and Figure 18 B depicts SPR analysis of acarbose interaction with *M. tb* PpiB, in accordance with an embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE INVENTION:

[0029] Those skilled in the art will be aware that the present disclosure is subject to variations and modifications other than those specifically described. It is to be understood that the present disclosure includes all such variations and modifications. The disclosure also includes all such steps, features, compositions and compounds referred to or indicated in this specification, individually or collectively, and any or all combinations of any or more of such steps or features.

Definitions:

[0030] For convenience, before further description of the present disclosure, certain terms employed in the specification, and examples are collected here. These definitions should be read in the light of the remainder of the disclosure and understood as by a person of skill in the art. The terms used herein have the meanings recognized and known to those of skill in the art, however, for convenience and completeness, particular terms and their meanings are set forth below.

biofilm formation per se, that in turn could enhance penetrance of drugs across biofilms, thereby lowering the MIC values of drugs and also survival of the bacteria.

Advantages of the present disclosure:

[00248] The present disclosure provides a medicament comprising a drug selected from a group consisting of acarboase, cyclosporine A, its pharmaceutically acceptable salts thereof, and combinations thereof, for use in treatment of diseases caused by biofilm forming microorganisms. The examples provided clearly depict that the composition of the present disclosure proves efficient enough to bind to PpiB and thus modulates its activity. Thus, the present disclosure provides an answer to problems posed by biofilm forming bacteria.

/We Claim:

1. A medicament comprising a drug selected from a group consisting of acarbose, cyclosporine A, its pharmaceutically acceptable salts thereof, and combinations thereof, for use in treatment of diseases caused by biofilm forming microorganisms, wherein the biofilm forming microorganisms is selected from a group consisting of *Mycobacterium smegmatis*, *Mycobacterium tuberculosis*, multidrug resistant *M. tuberculosis*, extensively drug resistant *M. tuberculosis*, totally drug resistant variant of *M. tuberculosis*, *Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus intermedius, Streptococcus mutans, Staphylococcus saprophyticus, Streptococcus constellatus, Pseudomonas aeruginosa,* and combinations thereof.

2. The medicament for use in treatment of diseases caused by biofilm forming microorganisms as claimed in claim 1, wherein the drug is cyclosporine A.

3. The medicament for use in treatment of diseases caused by biofilm forming microorganisms as claimed in claim 1, wherein the drug is acarbose.

4. The medicament for use in treatment of diseases caused by biofilm forming microorganism as claimed in any one of the claims 1-3, wherein the medicament further comprises at least one compound..

5. The medicament for use in treatment of diseases caused by biofilm forming microorganism as claimed in any one of the claims 1-4, wherein the diseases are selected from a group consisting of tuberculosis, dental caries, and periodontitis.

6. The medicament for use in treatment of diseases caused by biofilm forming microorganism as claimed in claim1, wherein the drug is a pharmaceutically acceptable salt of acarbose.

7. The medicament for use in treatment of diseases caused by biofilm forming microorganism as claimed in claim 1, wherein the drug is a pharmaceutically acceptable salt of cyclosporine A.

8. The medicament for use in treatment of diseases caused by biofilm forming microorganism as claimed in claim 4, wherein said compound is selected from a group consisting of isoniazid,

rifampicin, pyrazinamide, ethambutol, streptomycin, Fe_3O_4 nanocatalyst, clarithromycine, DNase, and pharmaceutically acceptable salts thereof.

9. The medicament for use in treatment of diseases caused by biofilm forming microorganism as claimed in claim 4, wherein said compound is to be administered, before, concurrently, or after administration of the drug selected from a group consisting of acarbose, cyclosporine A, and pharmaceutically acceptable salts thereof.

10. The medicament for use in treatment of diseases caused by biofilm forming microorganism as claimed in claim 10, wherein said administration of said compound, and the drug selected from a group consisting of acarbose, and cyclosporine A, can be in the form of a single dose or multiple doses.

11. Use of acarbose and its pharmaceutically acceptable salts in the manufacture of a medicament for the treatment of diseases caused by biofilm forming microorganisms selected from a group consisting of *Mycobacterium smegmatis*, *Mycobacterium tuberculosis*, multidrug resistant *M. tuberculosis*, extensively drug resistant *M. tuberculosis*, totally drug resistant variant of *M. tuberculosis*, *Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus intermedius, Streptococcus mutans, Staphylococcus saprophyticus, Streptococcus constellatus, Pseudomonas aeruginosa,* and combinations thereof.

12. Use of acarbose, cyclosporine A, its pharmaceutically acceptable salts thereof, and combinations thereof in the manufacture of a medicament for the treatment of diseases caused by biofilm forming microorganisms selected from a group consisting of *Mycobacterium smegmatis*, *Mycobacterium tuberculosis*, multidrug resistant *M. tuberculosis*, extensively drug resistant *M. tuberculosis*, totally drug resistant variant of *M. tuberculosis*, *Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus intermedius, Streptococcus mutans, Staphylococcus saprophyticus, Streptococcus constellatus, Pseudomonas aeruginosa,* and combinations thereof.

13. The use as claimed in any one of the claims 11-12, wherein the medicament further comprises at least one compound for treatment of the disease caused by the biofilm forming microorganisms.

14. The use as claimed in any one of the claims 11-13, wherein said diseases are selected from a group consisting of tuberculosis, dental caries, and periodontitis.

15. The use as claimed in claim 13, wherein the at least one compound is selected from a group consisting of isoniazid, rifampicin, pyrazinamide, ethambutol, streptomycin, Fe_3O_4 nanocatalyst, clarithromycine, DNase, and pharmaceutically acceptable salts.

16. The use as claimed in any one of the claims 13-15, wherein the at least one compound is to be administered before, concurrently or after administration of the drug selected from a group consisting of acarbose, and cyclosporine A.

17. The use as claimed in claim 16, wherein administration of the drug selected from a group consisting of acarbose, and cyclosporine A can be in the form of a single dose or multiple doses.