Lemon Grass (*Cymbopogon schoenanthus*): A targeted therapy for Brain cancer

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Summary (abstract) of this invention:

Ancient India is one of the pioneer of studies of plants as medicine, i.e. Ayurveda. In our social and economic life we hardly take care of our food we are taking. the uses of various pesticides, preservatives, etc. turn the foods into poison. Moreover the side effects of these pesticides and preservatives, etc. is dangerous as because it leads to initiation of different cancer. In these whole world, the number of patients dying from cancer is increasing in a very threatening way. We found Lemon Grass to be a potential drug for cancer in wet lab using different methods like, Fluorescence Spectroscopy, Reactive Oxygen Species (ROS), MTT assay, Circular Dichorism (CD). After getting a good result we further targeted some of the genes responsible for brain cancer (1TUP and 1TSR) and pharmacophores (3OAF and 4RAO) from Lemon grass and did some in silico analysis. In this we have found that these two pharmacophores are having better Mol Doc score from any others. From this we can deduce that these two pharmacophores can be a solution to brain cancer in near future.

The problem solved by invention:

The following problems associated with the growing rate of cancer and the deaths from it and also the natural phenomenon such as anti oxidant property, anti microbes of the Lemon grass lead us and serve as our motivation.

We have firstly studied the effect of lemon grass extract on brain cancer cell line and the observed some significant result in MTT assay (Fig 1) , followed by ROS analysis (Fig 2) and Fluorescence Anisotropy (Fig 3), from which we have decided to target some genes responsible for brain cancer (1TUP and 1YCP) and pharmacophores (30AF and 5HLR) from Lemon grass. After identification of the genes and pharmacophores we did the docking (Fig 4 and Fig 5) and got some positive value. From this analysis report this can be concluded that the some pharmacophores of Lemon grass have an effect on the brain cancer. Some of the animal studies followed by the isolation of the targeted pharmacophore and the effect on gene (*in-vitro and in-vivo analysis*) are on process. Based on this the new drug design is also in the long term future work.

Preparation of Herbal Extract:

Preparation of Herbal Extract: 1) Selection of the plant 2) Collecting the Plant, 3) Preparing the plant extract: It involves steps such as cutting , washing and chopping of the plant and then extraction 4) Keeping it for a period of at least 3-4 weeks before using it 5) Filtration 6) Storage under refrigerated conditions

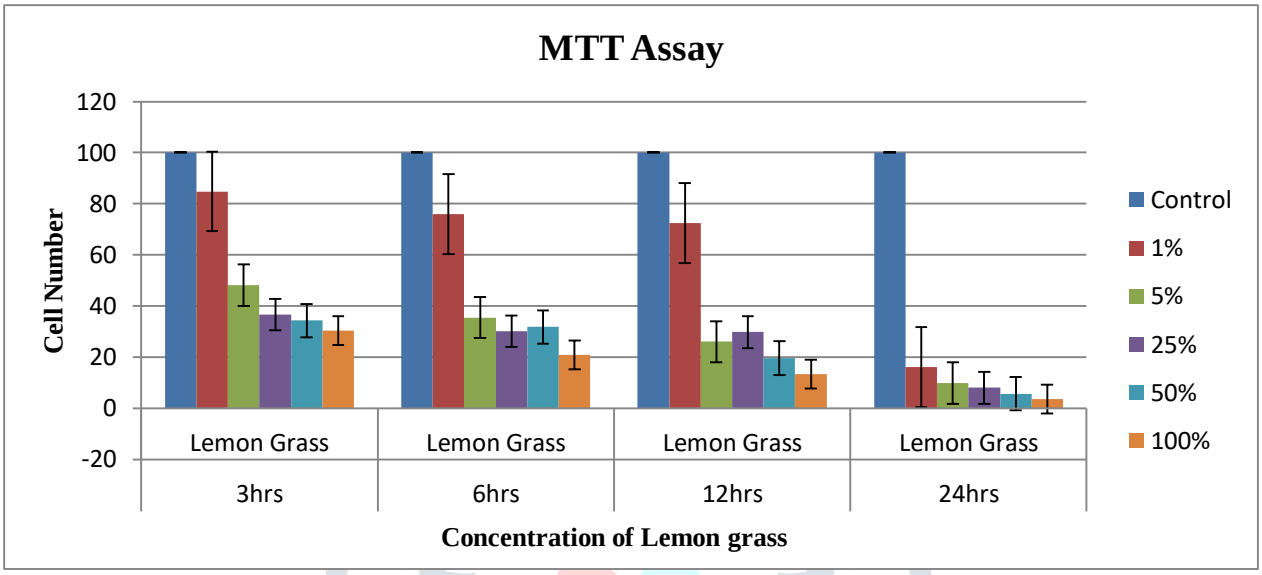

Fig 1: MTT assay of Brain cancer cell line treated with Lemon grass extract with respect to different concentration of Lemon grass extract and time.

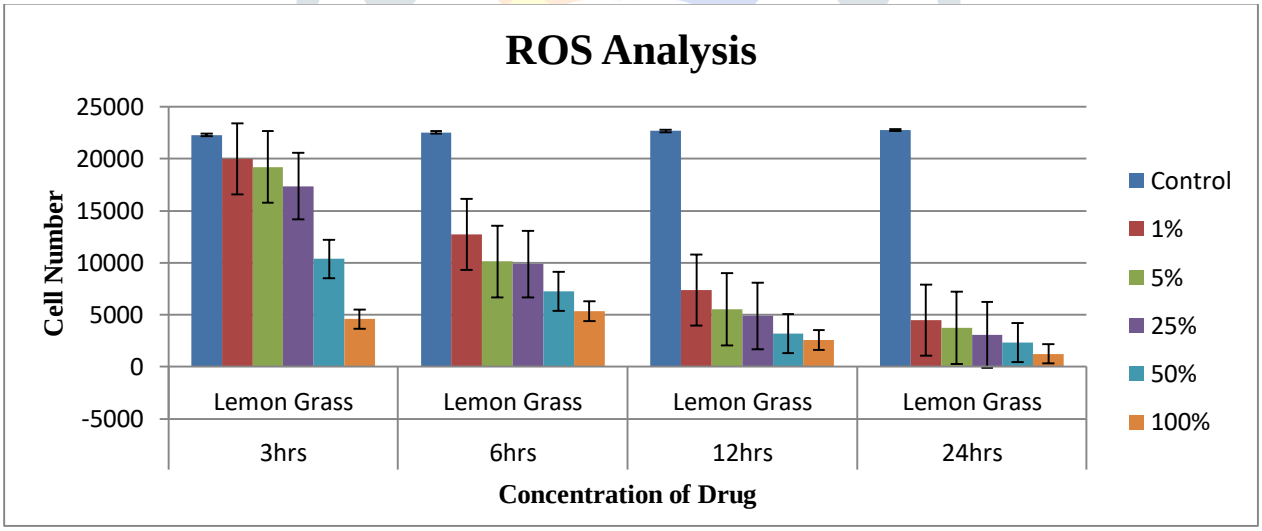

Fig 2: ROS analysis of Brain cancer cell line treated with Lemon grass extract with respect to different concentration of Lemon grass extract and time.

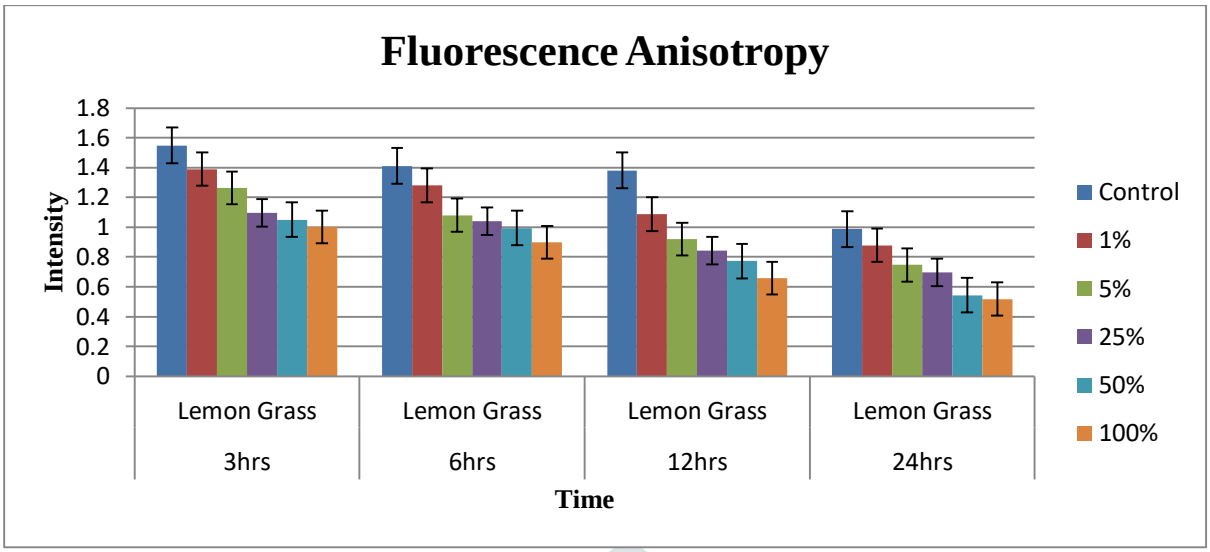

Fig 3: Fluorescence Anisotropy of Brain cancer cell line treated with Lemon grass extract with respect to different concentration of Lemon grass extract and time

Fig 4: Docking result of 1TSR and 4RAO

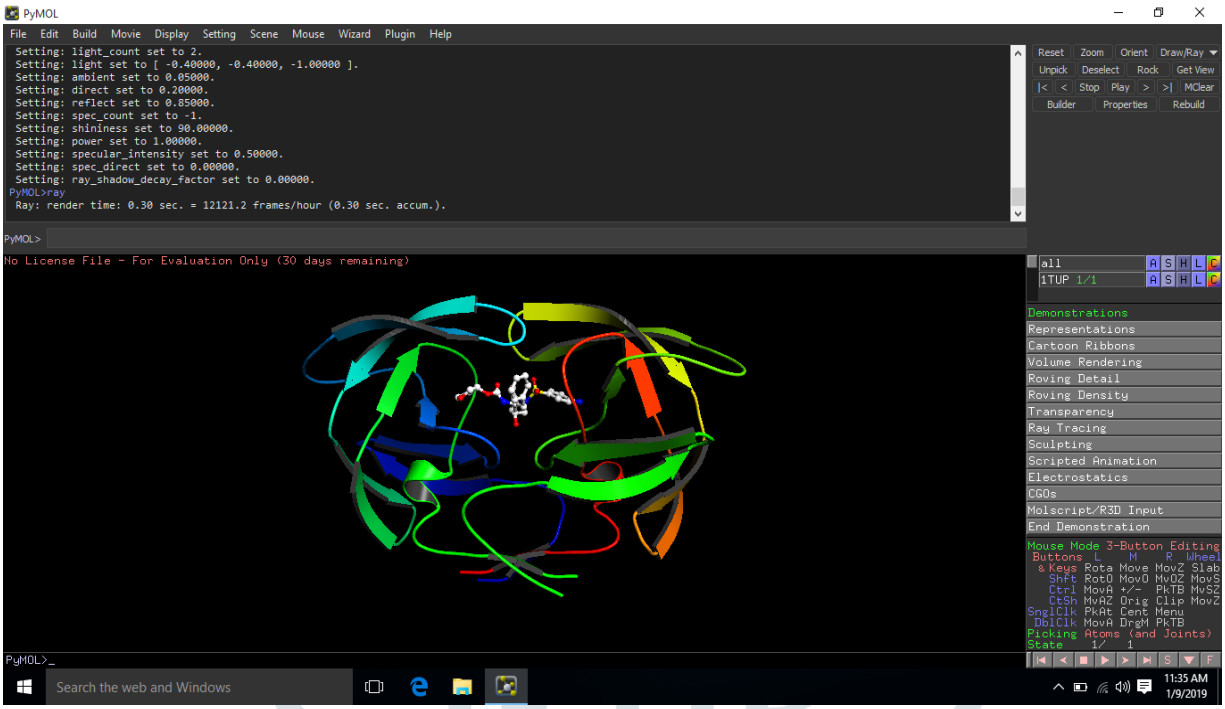

Fig 5: Docking Result of 1TUP and 3OAF

Describe technical and commercial advantages associated with the unique feature of your invention

CSCs typically exhibit three key characteristics, which are not mutually exclusive. Firstly, CSCs are highly tumorigenic and can form tumors in immunodeficient mice through xenotransplantation, which is not possible for non-CSCs. Secondly, CSCs that survive chemotherapy and radiotherapy generate resistance to such therapies through regulating intracellular stress; for example, regulating reactive oxygen species, which non-CSCs cannot. Thirdly, CSCs possess metastatic potential, illustrated by a report that CSCs have the ability to metastasize.

The identified pharmacophores can be isolated from the Lemon grass and can be commercialized as the natural drug for the brain cancer which are having lesser harmful side effect from the chemotherapeutic drug available in the market. This drug will also be very cheaper from the available drugs and this drugs are also not harmful for the normal cells as they are derived from the natural products.

The unique feature of the study is to targeted gene therapy for a particular cancer. This will help our future medicine to be completely allied to the Pharmachophores and the uses of synthetic and carcinogenic drug will reduce.

List and provide technical documents or references (published papers), patents and publications relevant to the invention.

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