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INTRODUCTION

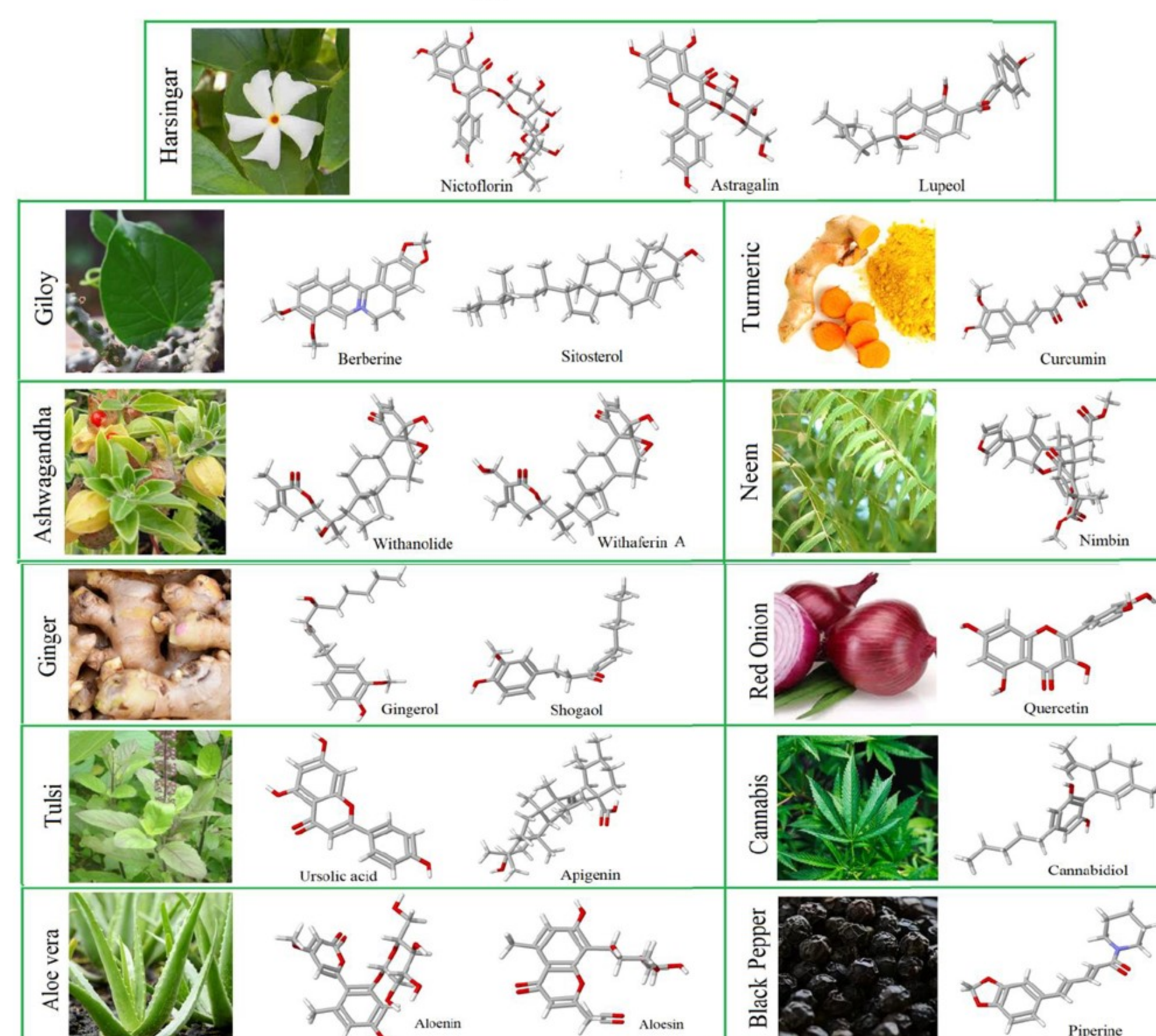
- The international committee on taxonomy of viruses declared the “severe acute respiratory syndrome coronavirus 2” (SARS-CoV-2) as the new virus which has quickly transmitted from human to human and spread expeditiously across the globe causing Coronavirus Disease 2019 (COVID-19) pandemic¹.
- At present, COVID-19 is treated using chloroquine, hydroxylchloroquine, remdesivir etc.; however, these drugs have demonstrated inadequate clinical response while causing serious adverse effects. This facilitates the study of inhibition of COVID-19 protease by traditional herbal plants and dietary therapy.
- India has always been a rich reservoir of medicinal plants because of several agro-climatic zones. Indian herbal plants such as harsingar (night jasmine or parijat), giloy (moonseed plant or guduchi) and aloe vera (ghrit kumari) are particularly interesting in terms of their inhibition potentials. Chinese Herbal medicines (CHM) has been recommended and included in the interim guidelines for the treatment of COVID-19 as Chinese medicine is on the mainstream health care system in China².
- The key functional food plants with immunomodulatory and antiviral; antibacterial; antifungal; anti-inflammatory; antioxidant; anticancer activity included liquorice (*Glycyrrhiza glabra* L.), garlic (*Allium sativum* L.), tea (*Camellia sinensis* [L.] Kuntze), ginger (*Zingiber officinale* Roscoe), turmeric (*Curcuma longa* L.), pomegranate (*Punica granatum* L.), black pepper (*Piper nigrum* L.) etc.¹
- The present study explores the scientific data to provide exclusive analysis and establish the prospects of traditional medicine (TM) and dietary therapy (DT) in the treatment and prevention of Coronavirus Disease 2019 (COVID-19) patients.

METHODS

- The PubMed, Google Scholar, SciFinder, and ScienceDirect were searched using key words COVID 19 and traditional medicine; COVID-19 supportive therapy; diet in COVID-19; allopathic therapy in COVID-19; SARS-CoV-1 and SARS-CoV-2; use of herbs and oils in COVID-19, COVID-19 and Traditional Chinese Medicine; immunity boosters in COVID-19; food and diet therapy in COVID-19; COVID-19 and Traditional Indian Medicine, COVID-19 and Complementary Medicine to collect the data. The articles were chosen, reviewed and interpreted by the authors to establish the prospects regarding the use of TM in COVID-19 patients to collect the scientific data.
- Total 23 articles were chosen, reviewed and analyzed by the authors to establish the prospects regarding the use of TM and DT in COVID-19 patients.

RESULTS

- The molecular structures of the compounds extracted from Indian herbal plants are summarized in **Figure 1**.

Fig. 1. Molecular structures of the compounds extracted from Indian herbal plants³

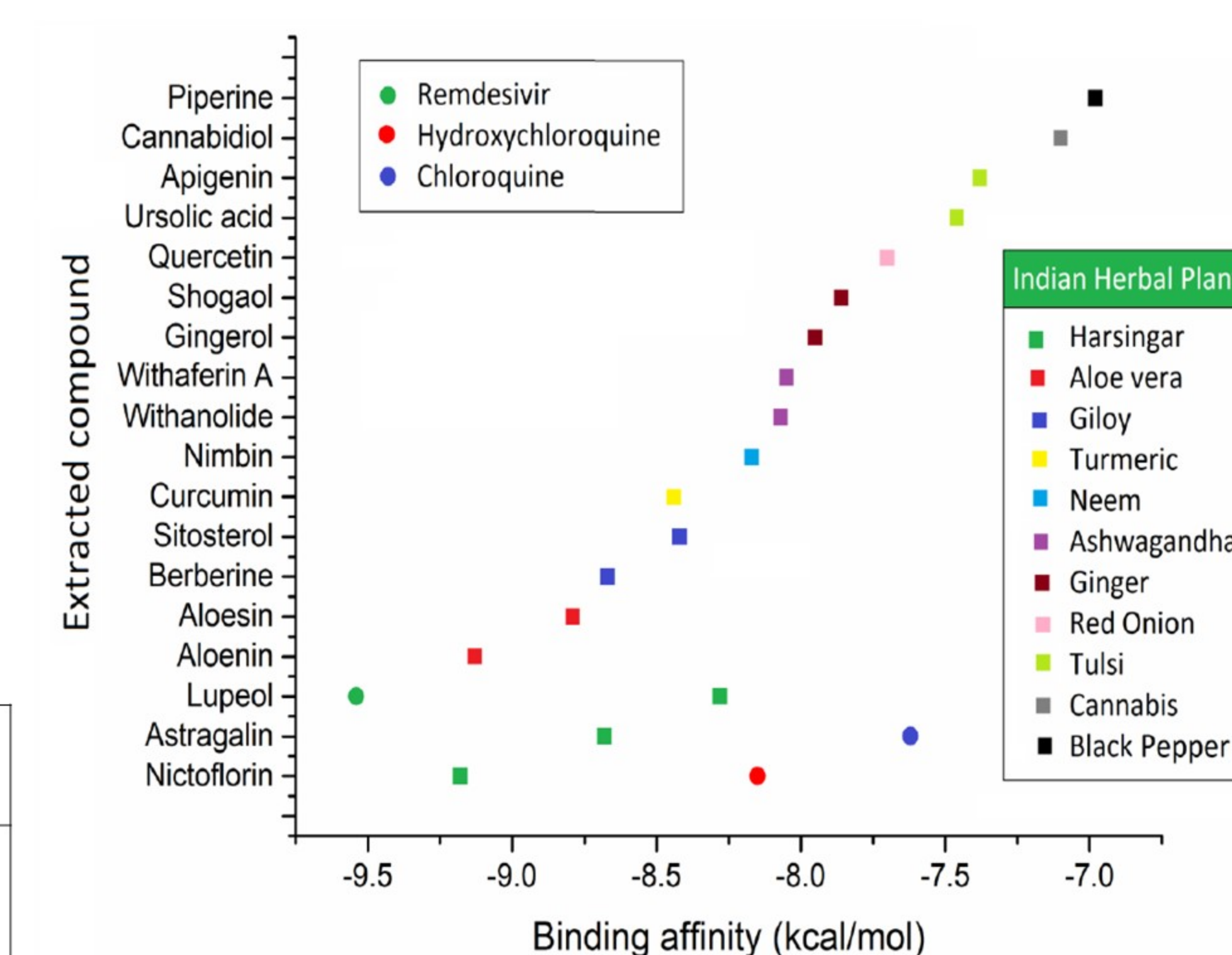
RESULTS (Contd.)

Based on the binding affinity, the inhibition potential of the Indian plants extracts can be ranked as: **harsingar > aloe vera > giloy > turmeric > neem > ashwagandha > red onion > tulsi > cannabis > black pepper**. The highest inhibition potentials are obtained for the extracts of harsingar and aloe vera, namely nictoflorin ($\Delta G = -9.18$) and aloenin ($\Delta G = -9.13$), respectively. The herbals effective in COVID-19 is summarized in **Table 1**.

Table 1. Herbals found effective in COVID-19 treatment²

| Plant/Active Constituent | Activity | Comment |
|--|--|--|
| Utrica dioica (Stinging nettle) Agglutinin (UDA) | Reverts the virus attachment by inhibition of the SARS-CoV spike (S) glycoprotein. | UDA inhibits SARS-CoV infection by targeting early stages of the replication cycle |
| Glycyrrhizin | Potential inhibitor of SARS-Cov2. | Long-established medical use as a relatively safe drug; should be further considered and rapidly evaluated for the treatment of patients with COVID-19 |
| Scutellaria baicalensis (baicalin) | Inhibit the 3CL ^{Pro} activity of the new SARS-Cov2 virus <i>in-vitro</i> . | The ethanol extract inhibits SARS-CoV-2 3CL ^{Pro} activity in vitro and the replication of SARS-CoV-2 in Vero cells |
| Quercetin | Quercetin-3- β -galactoside was shown to have inhibition activity of 3CL ^{Pro} of SARS-Cov. | TM which uses a flavonoid that is abundantly found in the onion and garlic species |
| Jinyinhua (<i>Flos Lonicerae Japonicae</i>); Lianqiao (<i>Fructus Forsythiae</i>); Huangqin (<i>Radix Scutellariae</i>); Shigao (<i>Fibrosus Gypsum</i>) | Antiviral, antibacterial or anti-inflammatory activities. | CHM recommended and included in the interim guidelines for which can be used for the treatment of COVID-19 as Chinese medicine is on the mainstream health care system in China. |
| Mahuang (<i>Herba Ephedrae</i>) and Kuxingren (<i>Semen Armeniacae Amarum</i>) | Relieves respiratory congestion and coughing | CHM recommended in conjunction with conventional medical care. |
| Lianhua Qingwen | Antiviral and anti-inflammatory activity against SARS-CoV-2 and found to decrease inflammatory cytokines. | Capsules and granules are approved for in treatment of Cov pneumonia, for a light, common type of fever, cough, and fatigue |
| <i>Artemisia annua</i> | Artemisinin is originally used as antimalarial | Herbal tea used as for COVID-19 developed in Madagascar |

RESULTS (Contd.)

Fig. 2. Binding affinity plot of herbal plants³

CONCLUSION

- The herbal formulations are mainly used as capsules, granules, decoctions, or patented herbal medicines.
- The herbal medicine and diet can play substantial role to prevent and treat COVID-19 in diverse ways including natural supplement for infection prevention and immunity boosting; antiviral agent on masks (herbal)⁴; air disinfection agent and surface sanitizing agent to afford a disinfected environment.
- However, evidences through controlled clinical trials to support the efficacy and safety of these hypotheses are still inadequate. Therefore, the use of TM and DT in COVID-19 patients is recommended to be exercised with the practitioner's consultation.

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