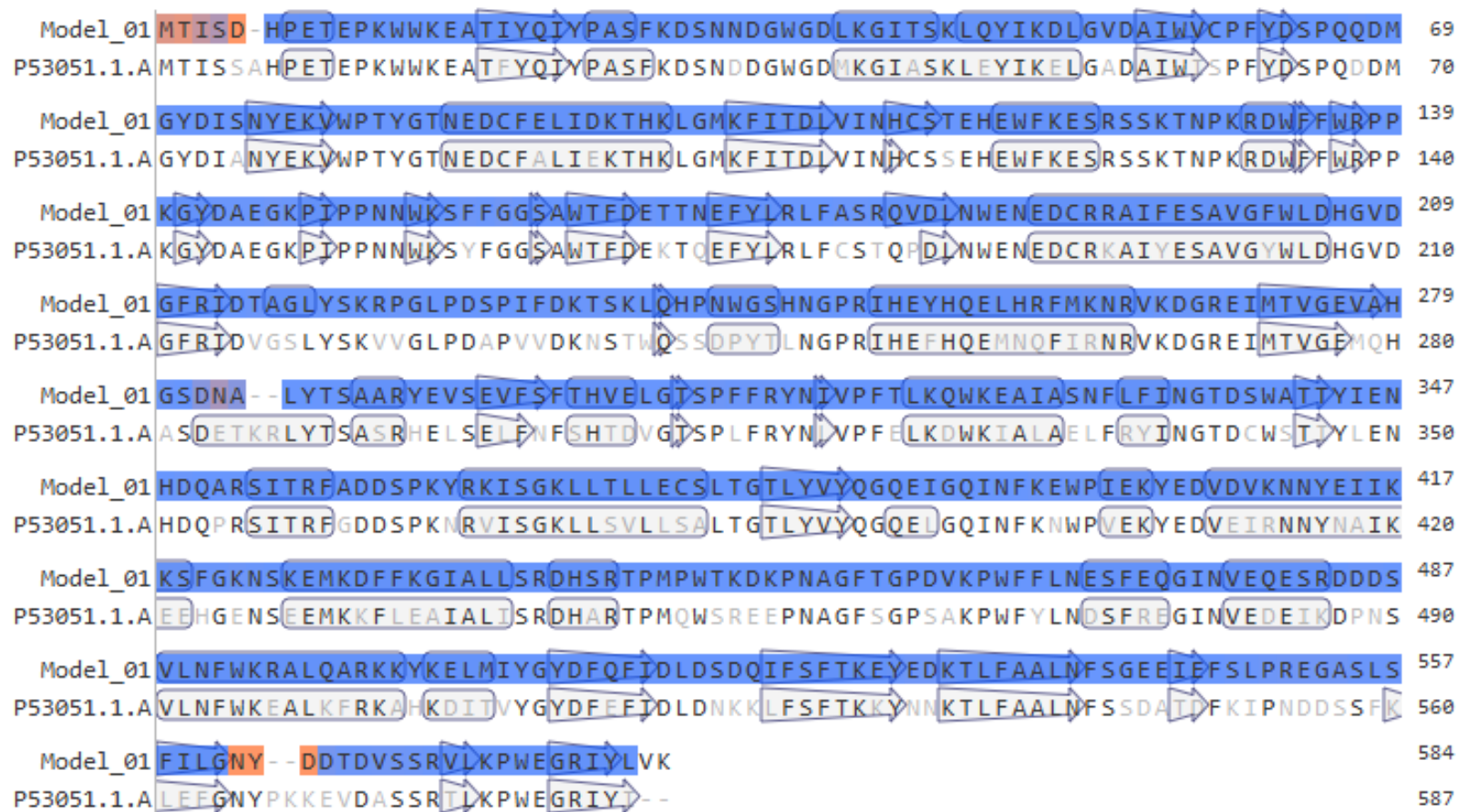
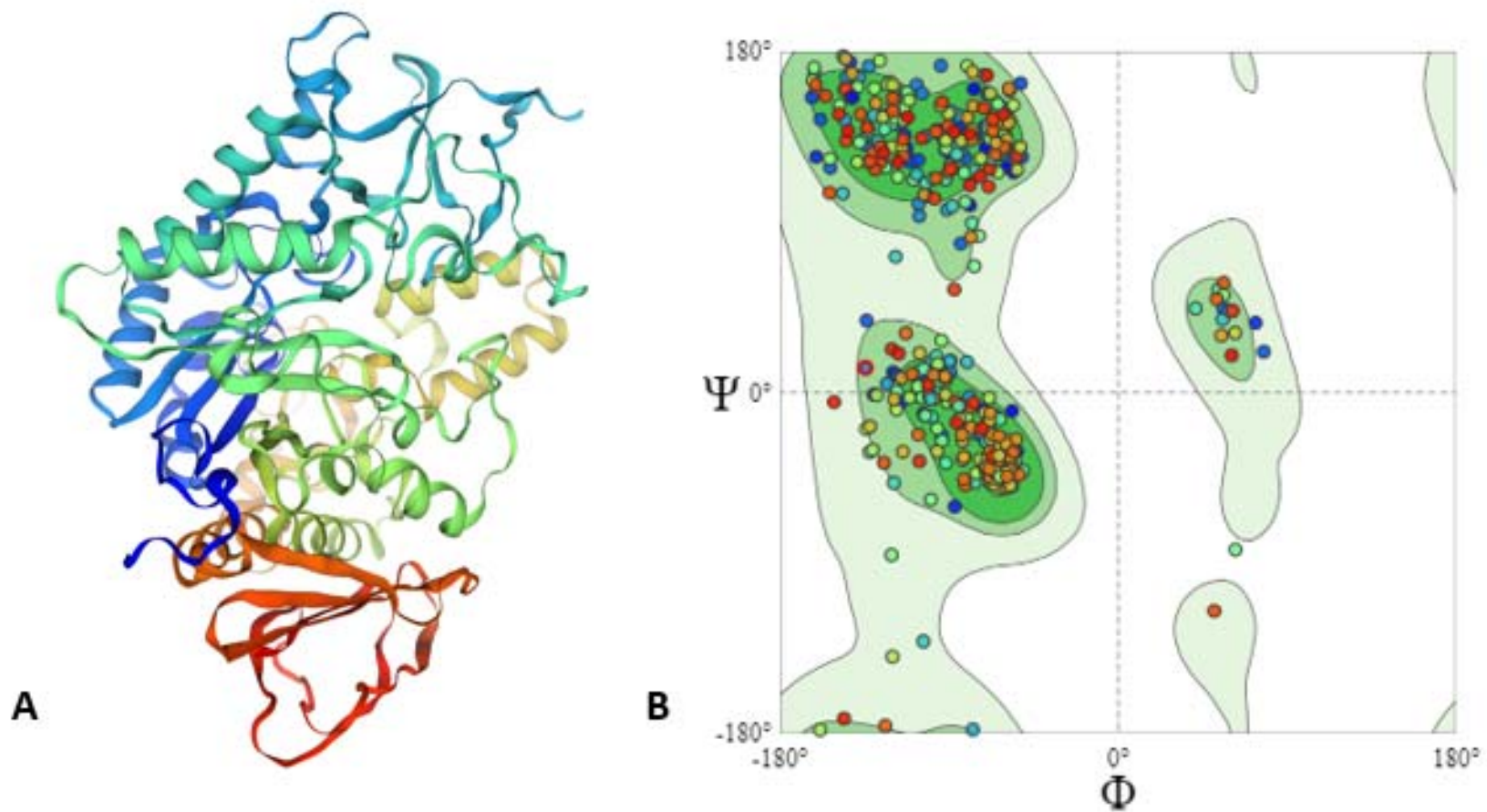


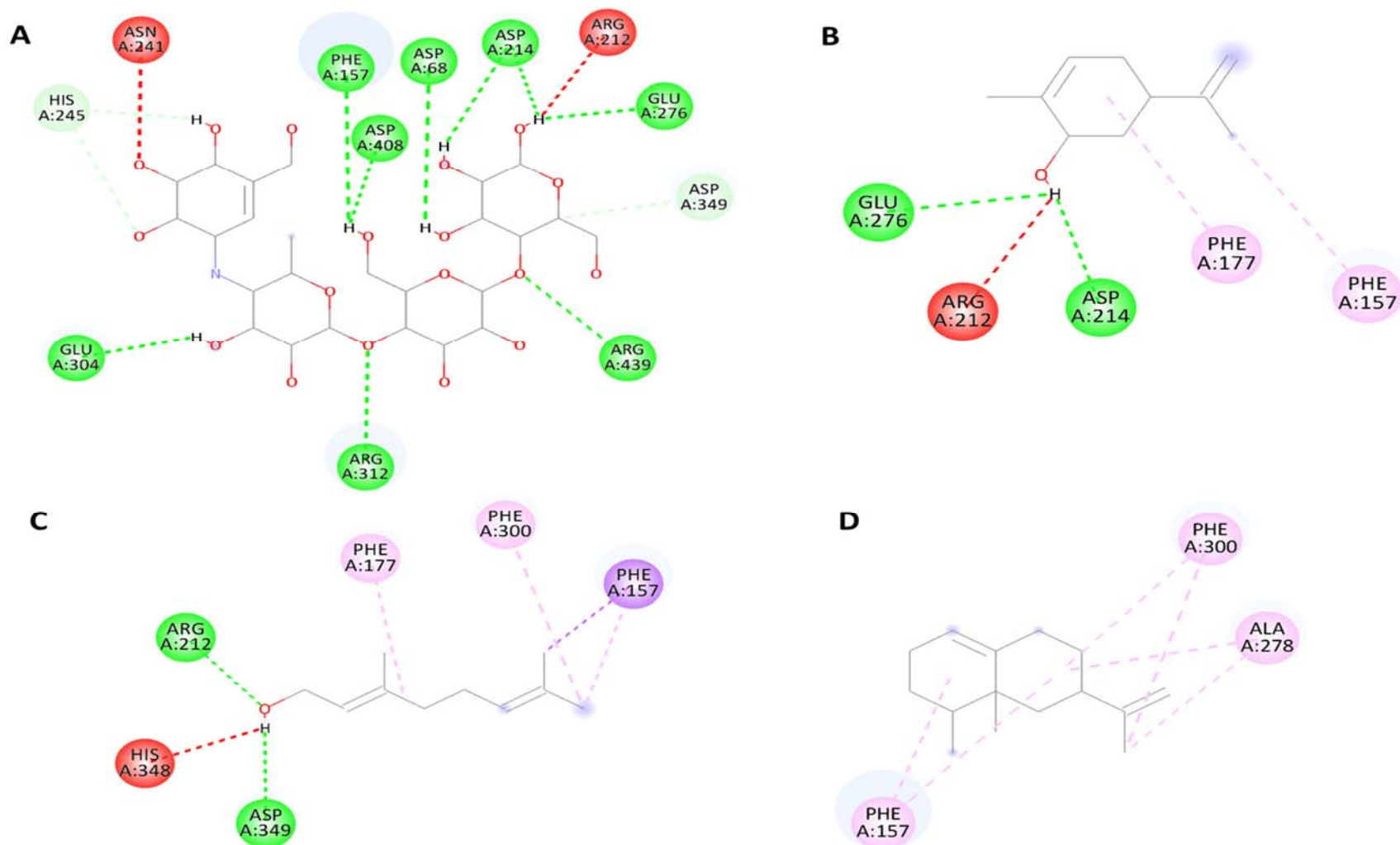
**Figure S1.** Representative total ion chromatograms (TIC) of hexane and ethyl acetate essential oil extracts from *Citrus sinensis* Cs (A) and *Citrus reticulata* Cr (B). The peak annotations are numbers as reported in Table 1.



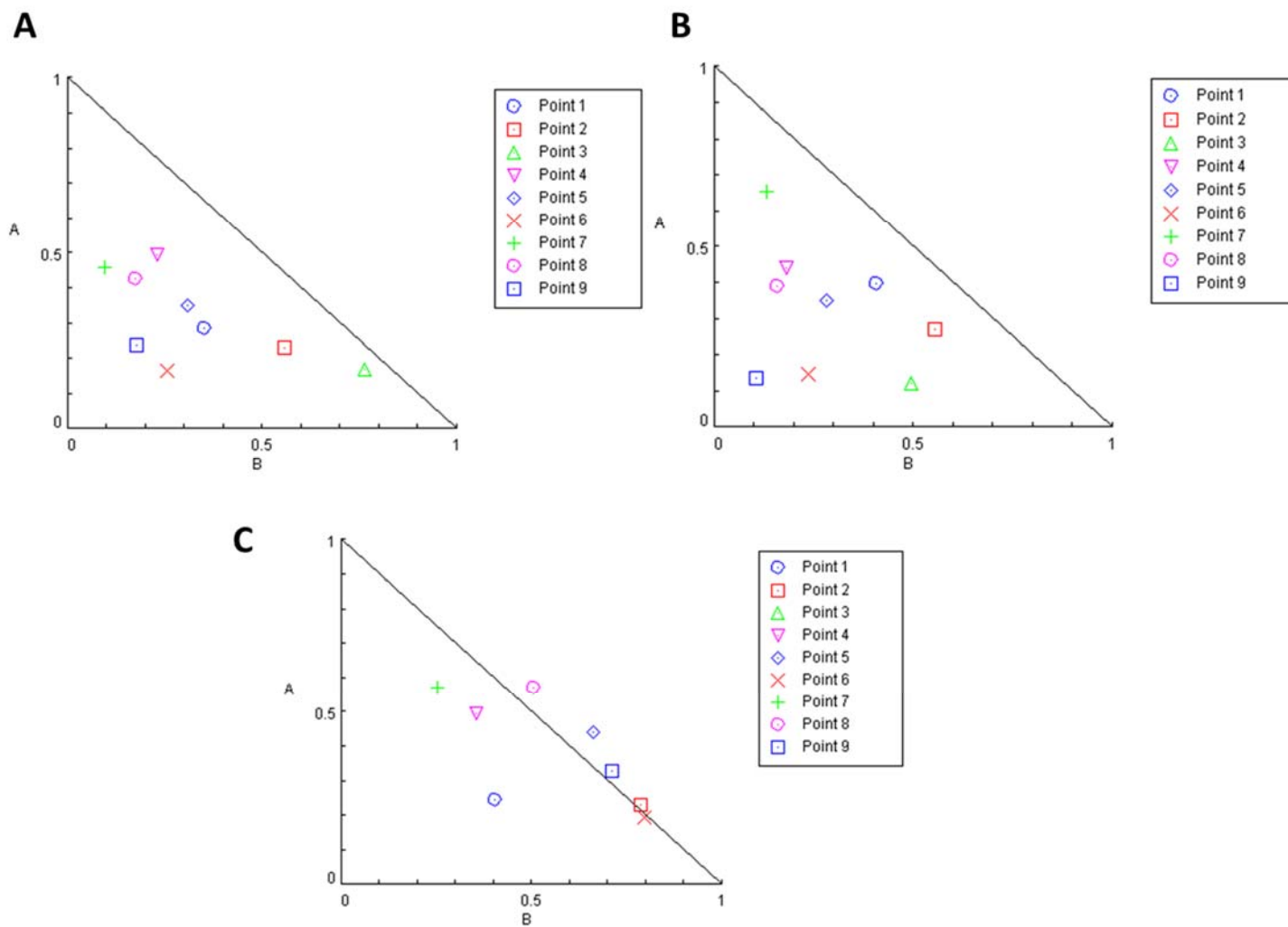
**Figure S2.** Sequence alignment of the  $\alpha$ -glucosidase gene product from *Saccharomyces cerevisiae* (model\_01) and the model template; *Saccharomyces cerevisiae* oligo-1,6-glucosidase IMA1 (P53051.1.A). The different residues are shown as faded while the similar residues are enhanced. The *S. cerevisiae*  $\alpha$ -glucosidase sequence is highlighted in blue and gaps in the alignment are indicated by hyphens (-).



**Figure S3.** Homology modelling results illustrating the (A) 3D structure of the  $\alpha$ -glucosidase, and its corresponding (B) Ramachandran plot, showing the residues in the favoured and unfavoured regions.

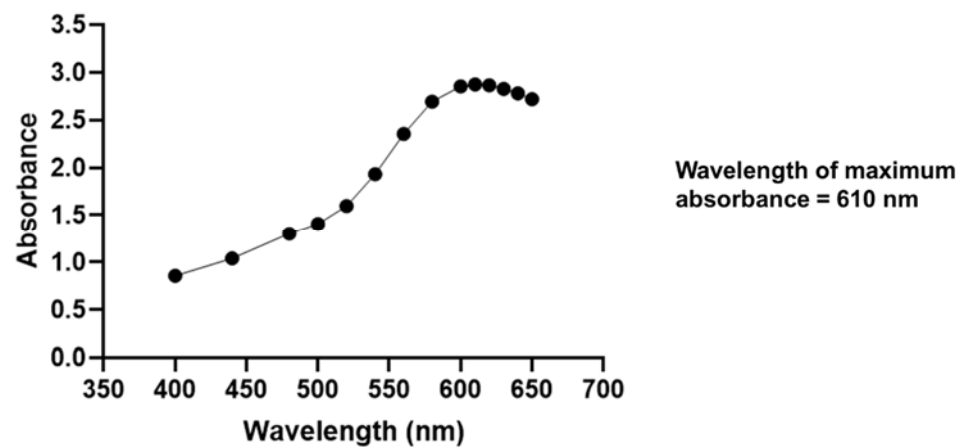


**Figure S4.** Interaction of acarbose (A), carveol (B), geraniol (C) and valencene (D) with amino acid residues in the active site pocket of  $\alpha$ -glucosidase. Dark green and red lines represent hydrogen bonding (HB) with the indicated protein residues. All the other lines represent Van der Waals interactions (VdW).

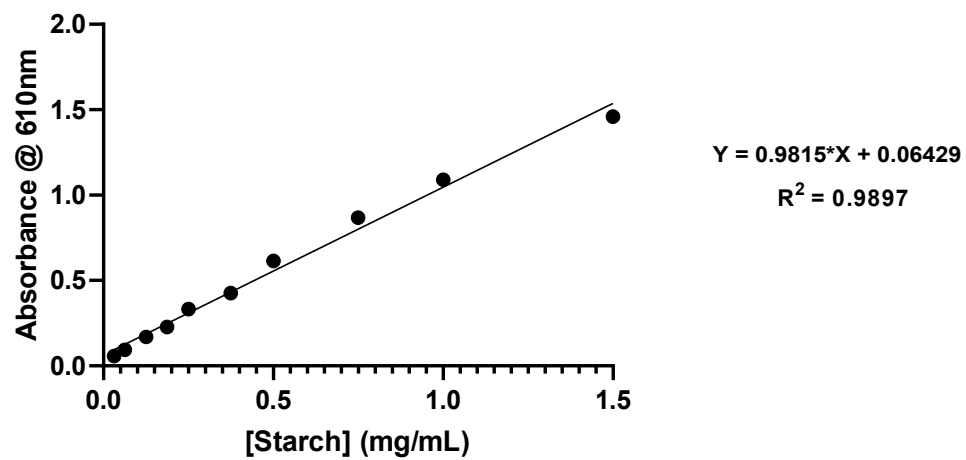


**Figure S5.** CI-Isobologram for the inhibitory effect on glucose released of the binary combinations of acarbose and; (A) carveol, (B) geraniol, or (C) valencene. The isobologram shows the points remaining inside the plot, indicating a predominance of synergism, except for (C), where antagonism and additive effects are observed for most points.

A



B



**Figure S6.** The absorbance of the starch-iodine complexes. (A) Absorbance spectrum of the starch-iodine complex; (B) Standard curve for the starch-iodine assay monitored at  $\lambda_{\text{max}}$  (610 nm).

**Table S1.** Summary of molecular docking and binding interactions.

Compounds	$\alpha$ -Glucosidase			$\alpha$ -Amylase		
	BA	HB	VdW	BA	HB	VdW
Copaene	-7.4	0	6	-6.9	0	7
Valencene	-7.4	0	6	-6.7	0	3
Carveol	-7.2	3	2	-5.7	2	5
Germacrene D	-7.0	0	2	-6.7	0	4
D-Limonene	-6.5	0	5	-5.7	0	4
Sinensal	-6.5	1	12	-5.2	1	4
4-Terpineol	-6.0	2	3	-5.6	1	4
Myrcene	-6.0	0	8	-4.6	0	6
Geraniol	-5.9	3	4	-5.3	1	6
Terpineol	-5.8	2	3	-6.1	1	4
Linalool	-5.8	2	4	-5.5	1	4
Carvone	-5.6	1	3	-5.8	0	2
Nerol	-5.5	2	5	-5.4	1	5
Acarbose	-7.5	13	2	-8.3	10	3

BA: Binding affinity

HB: Hydrogen bond

VdW: Van der Waals interactions

**Table S2.** The  $IC_{50}$  values, kinetic parameters, and mode of inhibition (MOI) of acarbose, carveol, geraniol and valencene upon inhibition of  $\alpha$ -glucosidase.

$IC_{50}$ (mg/mL)	[Inhibitor] (mg/mL)	$K_m$ (mg/mL)	$V_{max}$ ( $\mu$ mol/min)	Docking scores (Kcal/mol)	$K_i$ (mg/mL)	Mode of inhibition
No inhibitor						
	0	0.686	0.1059			
Acarbose						
0.107 $\pm$ 0.005	0.125	3.831	0.0963	-7.5	0.105 $\pm$ 0.011	Competitive
	0.250	5.201	0.1032			
Valencene						
0.648 $\pm$ 0.006	0.50	0.789	0.0905	-7.4	0.335 $\pm$ 0.044	Competitive
	1.00	2.115	0.0922			
Carveol						
0.536 $\pm$ 0.049	0.50	0.951	0.0973	-7.2	0.532 $\pm$ 0.021	Competitive
	1.00	1.061	0.0745			
Geraniol						
0.713 $\pm$ 0.075	0.50	0.750	0.0761	-5.9	0.563 $\pm$ 0.019	Competitive
	1.00	1.066	0.0787			