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# Angiotensin Converting Enzyme (ACE) Inhibition Activity by Syzygium polyanthum Wight (Walp.) Leaves: Mechanism and Specificity

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## Abstract

**Introduction:** One of the potential antihypertensive mechanisms include angiotensin converting enzyme (ACE) inhibition. So far, there is no in-depth study on the ACE inhibition activity of *S. polyanthum*, an ethnomedicinal plant used in treating hypertension. Thus, we aimed to study the ACE inhibition activity of *S. polyanthum* leaves by evaluating its potency, mechanism, and specificity.

**Methods:** *S. polyanthum* leaves were macerated in a bath-sonicator with either water, methanol, ethyl acetate, and hexane producing aqueous (ASP), methanolic (MSP), ethyl acetate (EASP) and hexane (HSP) extracts. Each extract (100 µg/mL) were initially screened for ACE inhibition activity and then compared with standard drug, captopril (2.06 ng/mL), then the most active extract was further tested at 1 to 1000 µg/mL. Inhibition mechanism was studied using zinc chloride and bovine serum albumin (BSA), while inhibition specificity was determined upon screening for α-chymotrypsin and trypsin inhibition activity. Results: ASP at 100 µg/mL exhibited the highest inhibition activity ( $69.43 \pm 0.60$  %) compared to MSP ( $41.63 \pm 0.15$  %), EASP ( $9.62 \pm 1.60$  %), and HSP ( $45.40 \pm 0.15$  %). ASP showed dose-dependent ACE inhibition activity with  $IC_{50}$  of 41 µg/mL. ASP's ACE inhibition activity was significantly reduced in the presence of BSA, but not upon the presence of zinc chloride. ASP did not significantly inhibit α-chymotrypsin and trypsin.

**Conclusion:** This study showed that the enzyme inhibition activity by *S. polyanthum* leaves was specific towards ACE. The ACE inhibition possibly occurs via protein precipitation and was non-dependent to the chelation with zinc at ACE active site. © 2022 Phcogj.Com. This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International license.

## Author keywords

ACE; Angiotensin converting enzyme; Antihypertensive; Hypertension; Syzygium polyanthum

## Indexed keywords

### EMTREE drug terms

acetic acid ethyl ester; angiotensin converting enzyme 2; bovine serum albumin; captopril; chymotrypsin A; flavonoid; heat shock protein; methanol; phytochemical; plant extract; Syzygium polyanthum extract; trypsin inhibitor; unclassified drug

### EMTREE medical terms

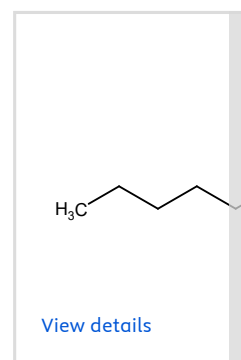
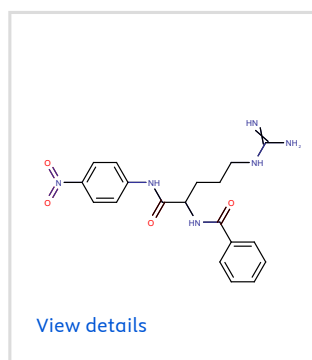
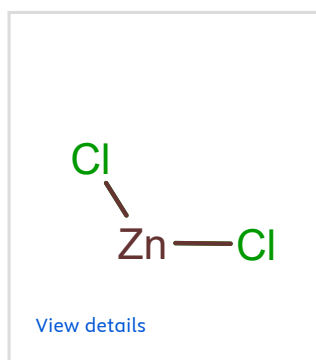
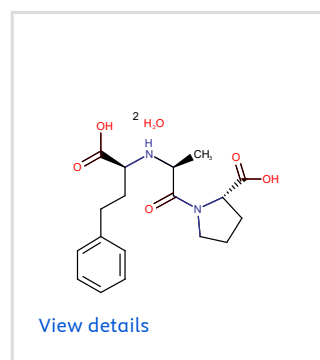
antioxidant activity; Article; chelation; Chinese medicine; DNA extraction; DPPH radical scavenging assay; enzyme inhibition assay; human; hypertension; phytochemistry; plant leaf; solvent extraction; spectrophotometry; Syzygium polyanthum; traditional medicine

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acetic acid ethyl ester	141-78-6
captopril	62571-86-2
chymotrypsin A	
methanol	67-56-1
trypsin inhibitor	9035-81-8

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