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A systematic review of the inhibitory effect of extracts from edible parts of nut on α -amylase activity

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ADMINISTRATIVE INFORMATION

Support - Monash University.

Review Stage at time of this submission - Formal screening of search results against eligibility criteria.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202380030

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 08 August 2023 and was last updated on 08 August 2023.

INTRODUCTION

Review question / Objective The aim of this review is to examine the inhibitory effect of functional components in extracts from edible nuts on α -amylase activity. At the end of this review, the following questions will be addressed by summarizing data of in-vitro studies: which nut extract has the strongest inhibitory effect? Which functional component (e.g. polyphenols) has the strongest inhibitory effect against α -amylase? Are there any differences between the inhibition of α -amylase from different sources (e.g. porcine and human)?

Rationale The present review will summarize the results of in-vitro studies about the inhibitory effect of extracts from edible nut parts on α -amylase activity. Our initial search of the literature identified a few studies with conflicting results, showing that there is still a gap. The present review will examine whether extracts from edible parts of nuts inhibit α -amylase activity.

Condition being studied Any papers looking at inhibition of α -amylase activity (a carbohydrate digestive enzyme; includes salivary α -amylase and pancreatic α -amylase) in vitro by extracts of whole or edible parts of nuts will be included in this review. Papers looking at other parts of nut plants and other enzymes will be excluded.

METHODS

Search strategy Literature search was conducted on 06 June 2023 in 4 different databases: PubMed, Scopus, Cochrane, Web of Science. Searches included keywords: (("inhibit"[Title/Abstract]) AND ("nuts"[Title/Abstract] OR "nut"[Title/Abstract] OR "Almond"[Title/Abstract] OR "Pecan"[Title/Abstract] OR "Pistachio"[Title/Abstract] OR "Pistacia"[Title/Abstract] OR "macadamia"[Title/Abstract] OR "pine"[Title/Abstract] OR "Hazelnut"[Title/Abstract] OR "Walnut"[Title/Abstract] OR "Cashew"[Title/Abstract] OR "Prunus"[Title/Abstract] OR "dulcis"[Title/Abstract] OR "Bertholletia"[Title/Abstract] OR "brazil"[Title/Abstract] OR "Anacardium"[Title/Abstract] OR

"Corylus"[Title/Abstract] OR "Macadamia"[Title/Abstract] OR "Carya"[Title/Abstract] OR "Arachis"[Title/Abstract] OR "Juglans"[Title/Abstract])) AND ("amylase"[Title/Abstract]). There is no restriction on publication period in the literature search.

Participant or population Not applicable, this review includes in-vitro studies, not human studies.

Intervention In the present review intervention includes: nut extract, test inhibitor composition and control details (positive control).

Comparator Eligible comparators in this systematic review: acarbose (inhibitor) as the positive control and no inhibitor samples as the negative control.

Study designs to be included This review will include papers reporting on in-vitro enzyme assay studies. Any papers that are not original research, e.g., review papers, will be excluded.

Eligibility criteria To be included, studies must: 1. be written in English, 2. be original research 3. be looking at whole nut or compounds extracted from edible parts of nuts, and 4. have measured amylase enzymes including salivary and pancreatic. There was no limitation for the source of α -amylase.

Information sources Literature search was conducted on 06 June 2023 in 4 different databases: PubMed, Scopus, Cochrane, Web of Science.

Main outcome(s) The primary outcome of this systematic review is understanding the inhibitory effects of the extracts of edible nut parts on amylase activity.

Quality assessment / Risk of bias analysis Two authors will independently complete a quality assessment for the study based on the Tox Tool. Briefly, the quality of the articles will be evaluated based on five assessment domains: the test substance identification, the test system characterisation, the study design description, the study results documentation, and plausibility of study design and results.

Strategy of data synthesis The main result is reported as IC50 or inhibition percentage. Therefore, IC50 / inhibition% will be compared.

Subgroup analysis In this review differences between the amount of inhibitory effect of nut

extracts on different sources of amylase enzyme will be compared. Also, the inhibitory effects of polyphenols from the edible part of nut extracts and other functional components of nut extracts will be compared.

Sensitivity analysis Currently, we believe that a sensitivity analysis is unnecessary for this review.

Language restriction The literature search was limited to English papers.

Country(ies) involved Australia.

Keywords Enzyme inhibition; carbohydrate digestion; polyphenols; acarbose; glycaemic response.

Contributions of each author

Author 1 - Mena Farazi - MF has conducted the screening of abstracts/titles and the full text of papers. Data extraction and quality assessment will be carried out by MF and verified by MJH. Additionally, the first version of the manuscript will be written by MF.

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Author 2 - Michael Houghton - MJH will contribute to data extraction and quality assessment. He will also contribute to the writing of the manuscript. He was the one who developed the idea for writing this review.

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Author 3 - Barbara Cardoso - BC has conducted screening for both the titles/abstracts and the full text of the papers. Furthermore, her involvement will extend to contributing to the manuscript composition.

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