

INPLASY PROTOCOL

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None declared.

Systematic review of the inhibitory effect of extracts from edible parts of nuts on α -glucosidase activity

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Review question / Objective: The aim of this review is to examine inhibitory effect of functional components in extracts from edible nuts on α -glucosidase 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 -glucosidase? Are there any differences between inhibition of α -glucosidase from different sources (e.g. yeast and mammalian)?

Condition being studied: Any papers looking at inhibition of α -glucosidase activity (a carbohydrate digestive enzyme; includes sucrase, maltase and isomaltase activities) by extracts of edible parts of nut will be included in this review. Papers looking at other parts of nut plants and other enzymes will be excluded.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 16 August 2022 and was last updated on 16 August 2022 (registration number INPLASY202280061).

INTRODUCTION

Review question / Objective: The aim of this review is to examine inhibitory effect of functional components in extracts from edible nuts on α -glucosidase 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 -glucosidase? Are there any differences between inhibition of α -glucosidase from different sources (e.g. yeast and mammalian)?

Rationale: The present review will summarize the results of in-vitro studies about the inhibitory effect of extracts from edible nut parts on α -glucosidase activity. From our initial searches of the literature,

some studies showed a significant inhibitory effect; however, some showed no significant inhibition toward α -glucosidase. Therefore, these studies are not conclusive and still there is a gap. The present review will examine whether extracts from edible parts of nuts inhibit α -glucosidase activity. In addition, it will show which functional component(s) from the edible nut parts will have the strongest inhibitory effect and compare the results on yeast and mammalian enzymes.

Condition being studied: Any papers looking at inhibition of α -glucosidase activity (a carbohydrate digestive enzyme; includes sucrase, maltase and isomaltase activities) by extracts of edible parts of nut 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 19 May 2022 in 4 different databases: PubMed, Scopus, Cochrane, Web of Science. Searches included keywords: "inhibit*" AND ("nuts" OR "nut" OR "Almond*" OR "Pecan*" OR "Pistachio*" OR "Hazelnut*" OR "Walnut*" OR "Cashew*") AN ("*glucosidase" OR "Sucrase*" OR "*maltase"). There is no restriction on publication period in the literature search, but searches were limited to English papers.

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 studies of in-vitro enzyme assays. 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 compounds from nuts (edible parts of nut), and 4. have measured glucosidase enzymes such as sucrase and maltase. There was no limitation for the source of α -glucosidase and all studies which examined enzyme activity from yeast or mammals were included.

Information sources: Literature search was conducted on 19 May 2022 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 glucosidase activity.

Additional outcome(s): Differences between the inhibitory effect of nut extracts on mammalian and yeast enzyme. Also, in this review we will compare the effect of polyphenols from edible part of nut extracts with other functional components from nut extracts.

Data management: The literature screening has been completed by three reviewers (MF, MH and MM). Two investigators (MF and MH) will independently extract the data from the eligible studies into a structured data extraction form in Excel. The formal publications of the results, study protocol, online registration record, online supplemental materials, and other relevant materials will be used in the data extraction if necessary. Discrepancy will be resolved through discussion and consulting the original publication. The following data will be extracted from each eligible trial: 1) Basic information of the paper (Author, publication year, funding, location). 2) Intervention (nut extract, test inhibitor composition) and control details (positive control). 3) Outcomes detail and measurements (source of α -glucosidase enzyme, enzyme assay, positive control, IC50 / inhibition%).

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. Based on criteria within each group, in-vitro studies will be given a low, medium or high quality rating, which will then be combined to give an overall quality rating.

Strategy of data synthesis: The main result is reported as IC50 or inhibition percentage. Therefore, IC50 / inhibition% will be compared. A meta-analysis will be performed if possible and will aim to adopt statistical techniques to manage difference in study quality and design.

Subgroup analysis: In this review differences between amount of inhibitory effect of nut extracts on different source of glucosidase enzyme will be compared. Therefore, studies will be divided into two groups, mammalian and yeast enzyme. Also, inhibitory effects of polyphenols from the edible part of nut extracts and other functional components of nut extracts will be compared. For addressing this purpose, studies will be classified into 2 different groups.

Sensitivity analysis: Once the data extraction step is completed, the need for sensitivity analyses will be determined based on the identified data.

Language restriction: The literature search was limited to English papers.

Country(ies) involved: Australia.

Keywords: Nut, α -glucosidase, sucrase, maltase, inhibition.

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