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The genus *Lycium* as food and medicine: A botanical, ethnobotanical and historical review

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Abstract

Ethnopharmacological relevance: *Lycium* is widely distributed in the arid to semi-arid environments of North and South America, Africa, and Eurasia. In recent years, *Lycium barbarum* and *L. chinense* have been advertised as “superfood” with healthy properties. Despite of its popularity, there is a lack of an integrated and critical appraisal of the existing evidence for the use of *Lycium*.

Aim of the study: There is a need to understand: 1) Which species were used and how the uses of *Lycium* developed spatially and over time, 2) how uses differ among regions with different culture backgrounds, and 3) how traditional and current therapeutic and preventive health claims correlate with pharmacological findings.

Methods: Information was retrieved from floras, taxonomic, botanical, and ethnobotanical databases, research articles, recent editions of historical Chinese herbals over the last 2000 years, and pharmacopoeias.

Results: Of totally 97 species, 31 have recorded uses as food and/or medicine worldwide. Usually the fruits are used. While 85 % of the *Lycium* species occur in the Americas and Africa, 26 % of them are used, but 9 out of 14 species in Eurasia. In China, seven species and two varieties of the genus *Lycium* occur, of which four species have been used by different ethnic groups. Only *L. barbarum* and *L. chinense* have been transformed into globally traded commodities. In China, based on the name “枸杞”, their use can be traced back over the last two millennia. *Lycium* fruits for anti-aging, improving eyesight and nourishment were documented already in 500 C.E. (*Mingyi Bielu*). Recent findings explain the pharmacological foundations of the traditional uses. Especially polysaccharides, zeaxanthin dipalmitate, vitamins, betaine, and mixed extracts were reported to be responsible for anti-aging, improving eyesight, and anti-fatigue effects.

Conclusions: The integration of historical, ethnobotanical, botanical, phytochemical and pharmacological data has enabled a detailed understanding of *Lycium* and its wider potential. It highlights that the focus so far has only been on two

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