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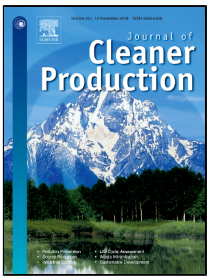

Tannins extraction: a key point for their valorization and cleaner production

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Tannins extraction: a key point for their valorization and cleaner production

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Abstract:

Tannins are phenolic compounds with considerable abundance in nature. They have attracted significant attention lately owing to their huge variety of potential applications. Accordingly, the tannin-related activity in terms of research has undergone a great boost, especially as green feedstock for materials in several fields. Nevertheless, the extraction process remains as the main bottleneck for their valorization, due to their heterogeneous nature. In the present review, a comprehensive study of the main types of tannins extraction techniques was carried out based on the works from the last 20 years. The literature review was carried through analysis of an initial sample of works followed by snowballing process, obtaining the main extraction parameters of each method. Thereby, the different tannins extraction methods were assessed and their major strengths and weaknesses elucidated. Moreover, a direct comparison between the different techniques was done, leading to the main prospectives for the efficient and clean tannins extraction and production.

Keywords: tannin, polyphenols, novel extraction techniques, green production

Abbreviations: GA-gallic acid, HHDP-hexahydroxyphenic acid, EA-ellagic acid, SLE-Solid-liquid extraction, HWE-hot water extraction, SFE-supercritical fluid extraction, PWE-pressurized water extraction, MAE-microwave assisted extraction, UAE-ultrasound assisted extraction.

Highlights:

- The great potential of tannins is hindered by their extraction process
- A literature review was carried out assessing the main tannins extraction methods
- Novel extraction techniques represented a greener option for tannins production
- Combination of novel techniques is an interesting option for industrial scale up