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"GREEN" APPROACH FOR THE SMART AGRO-FOOD WASTE MANAGEMENT TO OBTAIN FUNCTIONAL FOOD ADDITIVES

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With the increase of world population, agricultural and food sectors are facing with the serious problem of generating large amounts of waste or by-products. It was estimated that the amount of agricultural waste reaches up to 3.5 billion tons annually, while in the food industry one third of the produced food is lost from the food chain in the form of waste. The amount of such waste is increasing daily, which not only leads to economic loss but also leads to environmental pollution. Inadequate management of such waste results in its conversion to various contaminants (such as methane and carbon dioxide) that pollute the environmental and contribute to global warming. Thus, there is a justifiable need to properly manage such bio-waste, and one of the strategies is to use it as cheap resources to obtain high-value compounds by technologies that are acceptable regarding modern environmental and health standards. . On this background, "Smart waste management" is considered to be an essential element of any country's long-term economic and environmental plan.

In the frame of this work plant bio-waste generated in food industry during the tea production was used for the isolation of bioactive ingredients, in the first place phenols and flavonoids, by applying high pressure extraction technology and by using green solvents (water and ethanol). During the extraction process the operating temperatures were 120 and 150°C while the pressure was constant (100 bar). Obtained extracts were analyzed spectrophotometrically and content of total phenols and flavonoids was determined. Additionally, bioactivity in terms of antioxidant capacity was measured by using battery of assays.

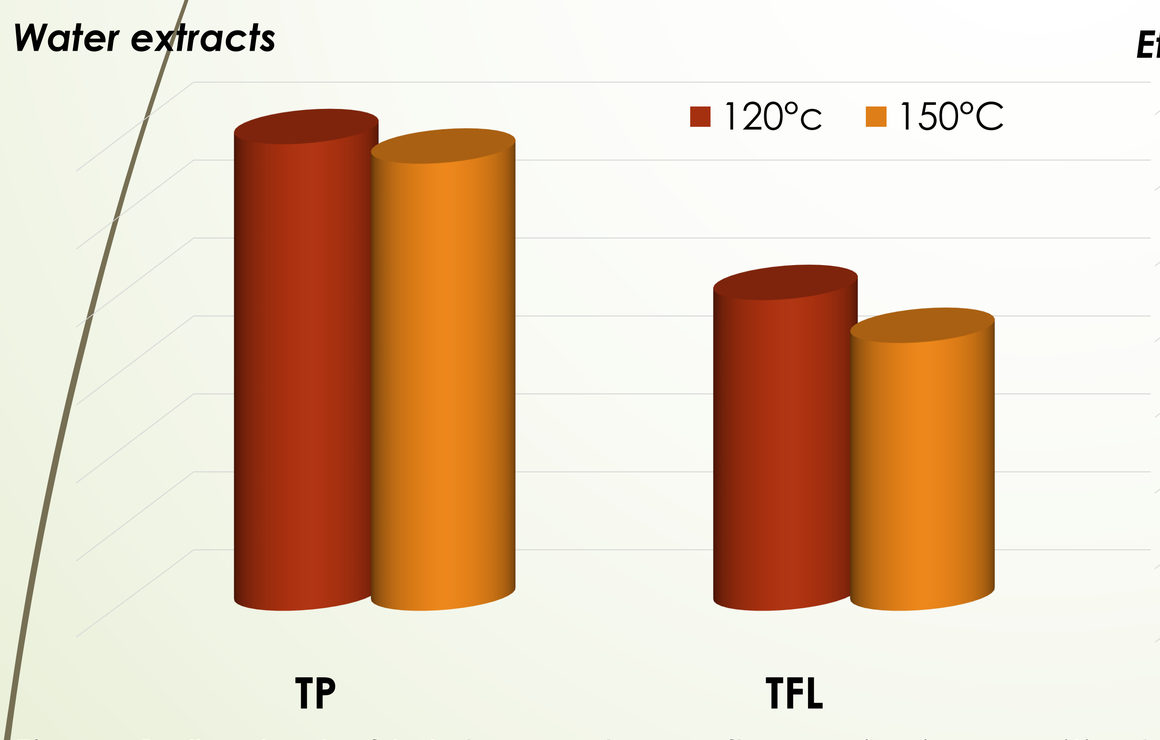

Figure 1: Content of total phenols and flavonoids in subcritical water extracts obtained at 120 and 150°C under the pressure of 100 bar

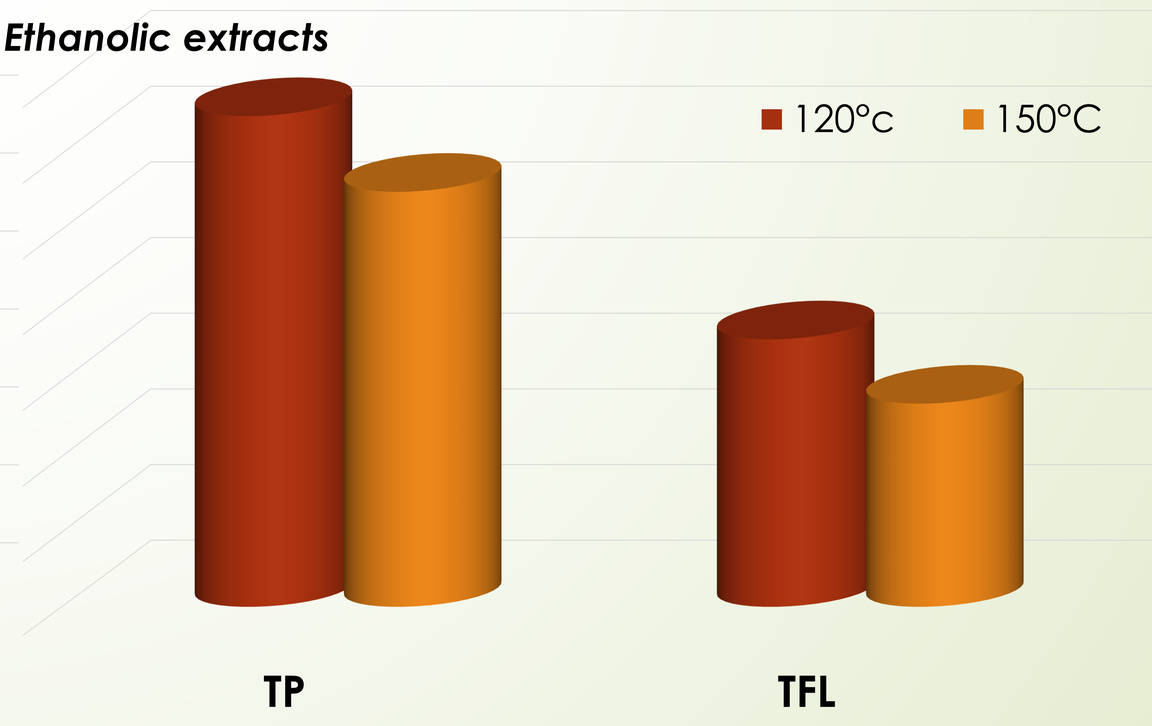

Figure 2: Content of total phenols and flavonoids in ethanolic extracts obtained at 120 and 150°C under the pressure of 100 bar

Table 1. Antioxidant and antiradical activity of examined extracts expressed as IC_{50} values (μg/mL)

Pressurized solvent	DPPH test		Reducin Power test	
	120°C	150°C	120°C	150°C
Water	12.56	13.76	46.35	51.28
Ethanol	14.67	17.48	59.34	71.59

CONCLUSION

According to the presented results it can be concluded that all extracts possess significant amount of bioactive compounds, in the first place phenols and flavonoids as well as considerable biological activity. Subcritical water extracts were proven as slightly better source of observed components than ethanol. In case of both used solvents temperature of 120°C was proven as better, probably because of possible degradation at higher temperature. All obtained extracts can be used for food functionalization.

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