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Impact of different polyphenols on wheat allergic response in *in vitro* and *in vivo* models

Pérot M^{1,2,3}, Lupi R³, Guyot S³, Thébaudin J-Y², Delayre-Orthez C¹,
Gadonna-Widehem P¹, Bodinier M³, Larré C³,

¹Institut Polytechnique UniLaSalle, UP Transformations & Agro-ressources, UP 2018.C103, 19 rue Pierre Waguet, BP 30313 - F-60026 Beauvais Cedex, France

²ABCD NUTRITION 513 rue Robert Estienne 60400 NOYON

³INRA, UR 1268 Biopolymères Interactions Assemblages, Rue de la Géraudière, BP 71627, F-44 316 Nantes Cedex 3, France

Wheat allergy is an IgE-mediated disease increasing in the last years. Currently the only treatment is based on dietary restriction and no effective preventive strategies have been reported. Some polyphenols are known to contribute health-promoting benefits. Some of them are able to interact with proteins via non covalent or covalent interactions. In this study, we screened different polyphenols sources for their capacity to interact with gliadins which represented the major wheat allergens, to mask epitopes and to impact degranulation which is the effector phase in the allergic reaction.

Polyphenols from four plant sources were extracted and their composition was characterized by liquid chromatography coupled to mass spectrometry (MS). Mixed at different ratios with native or pepsic-hydrolysed gliadins they formed complexes that were characterized. The impact of these interactions on the binding of IgE from patients allergic to wheat was analysed by DotBlots. Their effect on the allergic reaction symptoms was tested in a mouse model of food allergy to gliadins and in RBL-2H3 model.

All tested polyphenols were able to interact with native gliadins, leading to the formation of insoluble complexes. A systematic screening revealed that the polyphenols obtained from cranberry extract (flavonoid and A-type of proanthocyanidins compounds) and maritime pine bark (flavanols and B- type of procyanidin) were the more efficient to induce the formation of insoluble complexes with either native or hydrolysed gliadins. These interactions between gliadins and these extracts decreased the IgG- and IgE-binding capacity with gliadins. Using animal model, we showed that gliadins alone or in complexes with maritime pine bark polyphenol were able to induce mice sensitization in the same way. However oral challenge with complexes did not induce any symptoms unlike gliadins alone. Finally, results obtained from the cell model showed the magnitude of effector cells activation depends on the polyphenols type involved.

The complexes formed by interaction between cranberry extract and gliadins showed a decrease in the recognition by antibodies, their effect in an *in vivo* model is more contrasted and need to be further explored.

