

# Synergism, Antagonism and Additivism of Binary and Triple Mixtures of Phenolic Antioxidants

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In this study different effects of binary and triple mixtures of various phenolic antioxidants - synthetic and of natural origin were compared and discussed. Binary mixtures with alpha-tocopherol (TOH) of flavonoids[1], standard antioxidants and cinnamic acids[2], simple hydroxy-coumarins[3] and bis-coumarins[4], benzo[*k*]xanthene lignans and dihydrobenzofuran neolignans[5], biphenyls and their monomers and some other new synthesized compounds with different structures were selected for this study. Triple mixtures with TOH and ascorbic acid (AsCH) were created with compounds demonstrated a synergism in binary mixtures with TOH. If two or more antioxidants are added to oxidizing lipid substrates, their combined inhibitory effect can be additive, antagonistic, or synergistic. Synergism – the inhibiting effect of the mixtures ( $IP_{\Sigma}$ ) is higher than the sum of the induction periods of the individual phenolic antioxidants  $\Sigma IP_i$  ( $IP_{\Sigma} > \Sigma IP_i$ ); additivism - ( $IP_{\Sigma} = \Sigma IP_i$ ); antagonism - ( $IP_{\Sigma} < \Sigma IP_i$ ). On the base of results obtained new effective powerful complex bio-antioxidants can be created for the practical purpose.

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