

PREPARATION OF THE W/O/W EMULSIONS CONTAINING GARLIC EXTRACT INCORPORATED INTO INTERNAL WATER PHASE USING STIRRED CELL MEMBRANE EMULSIFICATION

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Abstract

Stability of double Water-in-Oil-in-Water emulsions (W/O/W) has been a subject of many investigations in recent years due to their complex structure and potential instability during manufacturing and different storage conditions. Application of W/O/W emulsions has enormous potential for food and pharmaceutical industries thanks to their ability to reduce the total fat content, mask unpleasant tastes, encapsulate unstable components and delay the effect of active ingredients. The aim of this work was incorporation of the ethanol extract of garlic, which is used traditionally as a natural medicine to lower blood pressure, into the internal water phase of double emulsions containing pumpkin seed oil as a component of the oil phase.

The usage of pumpkin seed oil contributes to a higher nutritional value of the prepared double emulsions due to the presence of a multitude of essential fatty acids and biologically active micronutrients. In the first step of this investigation, polyglycerol polyricinoleate (PGPR) was chosen as the best emulsifier for preparation of the stable W/O emulsions, prepared by a high-speed homogenizer, with the mean diameter of water droplets (containing ethanol extract) on nanometer scale. The second step was the preparation of W/O/W emulsions using stirred cell membrane emulsification, with a sinter glass membrane (pore size 10-16 μm), and to investigate the influence of the process parameters on droplet size and droplet size distribution of the prepared emulsions.

It was concluded that by adjusting the rotation speed and flux of dispersed phase droplet size and span value of the droplet size distribution can be successfully controlled.

Key words: *Water-in-oil-in-water emulsion, Pumpkin seed oil, Garlic extract, Stirred cell, Membrane emulsification.*