

Effect nanoparticles of emulsions for drinks on their quality and safety

Oksana Lugovska, Vasilij Sidor

National University of Food Technologies, Volodimirska 68, Kiev, Ukraine, tel. 0663057773;

e-mail okšana.lugovska320@gmail.com

Some foods, especially beverages that are made using emulsions containing 1–1000 nm particle size and treated as objects of classical colloid chemistry.

Of great importance for the stability of these products is the size of the particles. In the case where known information about the particle size emulsion, then you can control their stability and quality.

The aim of the study particle size effects on the stability of emulsions during storage and use in the manufacture of beverages and their stability during 180 days. As materials for research received samples of emulsions prepared with various stabilizers (gum arabic, modified starch) under two versions of recipes.

For studies prepared 3 sample emulsions of varying oil phase and a constant number of Gum arabic (Table 1) and 3 samples emulsions of varying oil phase and constant number of starch as stabilizer (Table 2).

Table 1. Formulations of emulsion of varying oil phase and a constant number of Gum arabic

| The composition of the emulsion | Number of emulsion | | |
|---------------------------------|-----------------------|-----------------------|-----------------------|
| | 1 | 2 | 3 |
| | Content ingredient, % | Content ingredient, % | Content ingredient, % |
| Citrus oil | 6 | 6 | 6 |
| Rezynogum (E 445) | 4 | 5 | 6 |
| Gum arabic (E 414) | 5 | 5 | 5 |
| Citric acid (E 330) | 0,2 | 0,2 | 0,2 |
| Sodium benzoate (E 211) | 0,1 | 0,1 | 0,1 |
| Water | 84,7 | 83,7 | 82,7 |
| Total | 100 | 100 | 100 |

Table 2. Formulations of emulsion of varying oil phase and constant number of starch

| The composition of the emulsion | Number of emulsion | | |
|---------------------------------|-----------------------|-----------------------|-----------------------|
| | 4 | 5 | 6 |
| | Content ingredient, % | Content ingredient, % | Content ingredient, % |
| Citrus oil | 50 | 55 | 60 |
| Rezynogum (E 445) | 50 | 55 | 60 |
| Starch (E 1450) | 120 | 120 | 120 |
| Citric acid (E 330) | 5 | 5 | 5 |

| | | | |
|-------------------------|-------|-------|-------|
| Sodium benzoate (E 211) | 2,5 | 2,5 | 2,5 |
| Water | 772,5 | 762,5 | 752,5 |
| Total | 1000 | 1000 | 1000 |

Results and discussion

The results of measurement of each emulsion: Brookfield viscometer - viscosity microscope EASTCOLIGHT 92012 - ES (100x, 250x, 550x, 750h) - particle size , muddy turbidity meter 2100P- displayed in Table 3.

Table 3. The results of measurement of the finished product

| Number of emulsion | Viscosity Brookfield, cP | Turbidity dilution 0.025 %, NTU | The average diameter of the particles of oil D, μm |
|--------------------|--------------------------|---------------------------------|---|
| 1. | 15 | 180 | 0,659 |
| 2. | 16 | 192 | 0,705 |
| 3. | 17 | 216 | 0,903 |
| 4. | 22 | 293 | 0,73 |
| 5. | 23 | 299 | 0,75 |
| 6. | 24 | 335 | 0,84 |

Conclusion

1. The best result of research in emulsions – is to obtain the maximum number of particles of about 1 micron.
2. Technology of preparation of emulsions with gum arabic is different from the technology of emulsifying starch.
3. Dissolve gum arabic is faster and easier than with the dissolution of starch as emulsion obtained using gum arabic, stable in quality and more expensive in value compared with emulsions prepared by using starch.
4. For studies prepared 3 sample emulsions of varying oil phase and a constant number of Gum arabic and 3 samples emulsions of varying oil phase and constant number of starch as stabilizer.
5. The results of measurement of each emulsion: viscosity, particle size, muddy turbidity depends on the ratio of water and oil phases.

Keywords: emulsion, gum arabic, starch, particle size, stability