

MODIFYING VISCOSITY OF EGG YOLK

Author: Dr. W.J. Stadelman, Department of Food Science, Purdue University, West Lafayette, IN.

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BACKGROUND

Egg yolk is a pseudoplastic non-Newtonian fluid. Fresh egg yolk has a solids content of over 50 percent. The viscosity of egg yolk is such as to allow free flowing, about 23 poises (units for reporting viscosity). The viscosity can be significantly modified by the addition of small percentages of albumen to decrease viscosity, or the addition of sodium chloride to increase viscosity.

Egg yolk is a common ingredient in many manufactured foods, especially mayonnaise and egg pastas. Easy mixing of ingredients requires that each ingredient blend easily and uniformly with other ingredients. Improper order of incorporation can result in great difficulties in obtaining a uniform blend of all ingredients in the final product.

PROBLEM

In what order should ingredients be incorporated when egg yolk and salt are both used in a product such as mayonnaise?

MATERIALS

Fresh shell eggs
Salt – sodium chloride
Scales accurate to 0.5 g
100 ml glass beakers
Stirring rods
Optional: Viscosimeter

METHODS

1. Break and carefully separate albumen and yolks. Remove all albumen from yolks by rolling the yolk on paper napkins.
2. Weigh out 50 g portions of egg yolk into five beakers.
3. Weigh out 2.5, 5, 10, and 20 g portions of egg albumen and add each portion to a different sample of egg yolk.
4. Using separate stirring rods, mix each of the five egg yolks or egg yolk with additive to get a homogenous mass.
5. Observe the differences in viscosity of the yolk blends by ease of stirring, rate of flow of the liquid or with a viscometer, if available. Rate of flow can be

- measured by placing equal amounts of several mixtures on a slightly tilted pane of glass and measuring the spread during a measured time.
6. Weigh out 0.5, 1.0, 2.0, and 4.0 g portions of salt (sodium chloride) and add to another set of 50 g portions of egg yolk. Repeat steps 4 and 5.

The work can be expanded by using lesser percentages of salt to determine minimum salt level to result in a significant increase in viscosity. Other salts such as potassium chloride or phosphates can also be tested.

REFERENCES

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