FOOD SCIENCE

SUBJECT 9194

PAPER 3

GENERAL COMMENTS

Candidate's performance was generally below average. Responses given lacked detail and good understanding of the question. Good interpretation of the question often leads to correct responses.

COMMENTS ON INDIVIDUAL QUESTIONS

QUESTION 1

(a) (i) Candidates were required to make a graphical presentation of the relationship between pH and firmness of pectin gel. Most candidates were able to show that low pH favoured gel formation while high pH was against gel formation.

(ii) The question required candidates to give the role of methylated spirit in gel formation. The majority of candidates failed to give the simple role played by methylated spirits, that of assisting in the gelling of pectin. They thought that methylated spirit increased the pectin acidity.

(iii) Most responses showed the firmness of pectin gel at different pH levels but did not give a conclusion to the observations made.

(iv) The question required candidates to give any other two roles of the stated ingredients used in jam making apart from their use in gel formation. Very few candidates were able to come up with these other roles. Most responses given had something to do with gel formation.

(v) Most candidates knew that a ripe and overripe fruit would not give the same results if used in the same experiment. A good number of candidates showed a good understanding of the poor pectin and acid content of ripe and overripe fruits which does not promote gel formation.

(b) The majority of candidates displayed poor knowledge of the property of pectin that enables it to gel. No candidate was able to explain that pectin possesses hydrophilic – OH (hydroxyl) groups that link together in aqueous solution to form a three-dimensional framework which gives the gel its stability.

(c) Candidates were required to give specific methods of minimizing nutrient loss during commercial production of jam. Very few candidates were able to specify methods applicable to commercial production of jam. Most methods identified were applicable to jam making in the home.

QUESTION 2

(a) (i) Candidates were expected to observe and describe the texture of different dough samples in relation to gluten formation. Most candidates used wrong and irrelevant words to describe the dough, e.g. fluffy. Comparison of dough sizes was wrong in most cases.

(ii) Most candidates failed to realize that the three samples, A, B & C were capable of forming gluten from the hydration of gliadin and glutenin in wheat flour. The gluten was capable of stretching and bring about the expansion of the mixture from the heated CO_2 formed as a result of the biological action of zymase on glucose from flour starch. A few candidates realized the role of salt in Sample B, that of assisting the development of gluten, but others thought its presence kills the yeast. In Sample C, most candidates correctly indicated the role of sugar in increasing the production of CO_2 but overlooked its interference with gluten formation since it competes with wheat proteins for water.

(iii) Most responses for this question failed to address the fault noted in the finished yeast product but always referred to the yeast dough. Most reasons highlighted were too much or too little of the basic ingredients in bread making. Reasons were often not matched with the fault.

(b) This question was generally well answered. The comparison was clearly stated. Candidates clearly stated the presence of gliadin and glutenin in wheat flour which form gluten on hydration, capable of stretching in the presence of expanding CO_2. On the other hand candidates showed the presence of the protein zein in maize which lacks the ability to stretch as compared to gluten in flour which makes it unsuitable for bread making.

(c) Most candidates failed to give examples of additives used in bread flour. Instead, ingredients used in bread making were given. The few candidates who were able to give correct examples of additives did not explain their role.

QUESTION 3

(a) (i) The question required candidates to record observations made on mayonnaise made with and without egg yolk. Most candidates were able to record correct observations.

(ii) This question was answered generally correctly by nearly all candidates. Microscopic slide K3 was identified as more even in structure as compared to K6. Candidates were able to explain the effect of egg yolk in the mayonnaise, hence the evenness in structure for K3 slide.

(iii) This question was badly done. Candidates were not able to come up with practical ideas of minimizing negative effects of oil or reducing oil intake when using mayonnaise in the home.

(iv) Some candidates made very good responses to this question. Detailed description of the role of egg yolk was given to show how lecithin emulsifies the oil in water to give a stable and permanent emulsion.

(v) Some clever candidates were able to give the reason for staining the oil before mixing and observing on a microscope slide. Very few candidates could give the stain property that made it possible to be mixed with oil and dissolve in the oil.

(b) Butter and margarine were very popular water-in-oil emulsions identified by candidates. Some of the emulsions identified by candidates such as ice-cream, yoghurt are not w/o but o/w.

(c) The question required candidates to give other emulsifiers besides the one used in the experiment. Most candidates mentioned lecithin in egg yolk used in experiment. No other natural emulsifiers were known to the candidates. The most common commercial emulsifier mentioned by a number of candidates is glycerol monostearate. The other commercial emulsifiers such as gum, pectins and alginates were rarely mentioned.

(d) Most candidates were able to list down functions of lipids in the body. The most common functions listed were energy source, part of cell membrane and protection of vital internal organs.