



HALAL RESEARCH AND SCIENCE

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UNIVERSITI SAINS ISLAM MALAYSIA

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ISLAMIC SCIENCE UNIVERSITY OF MALAYSIA

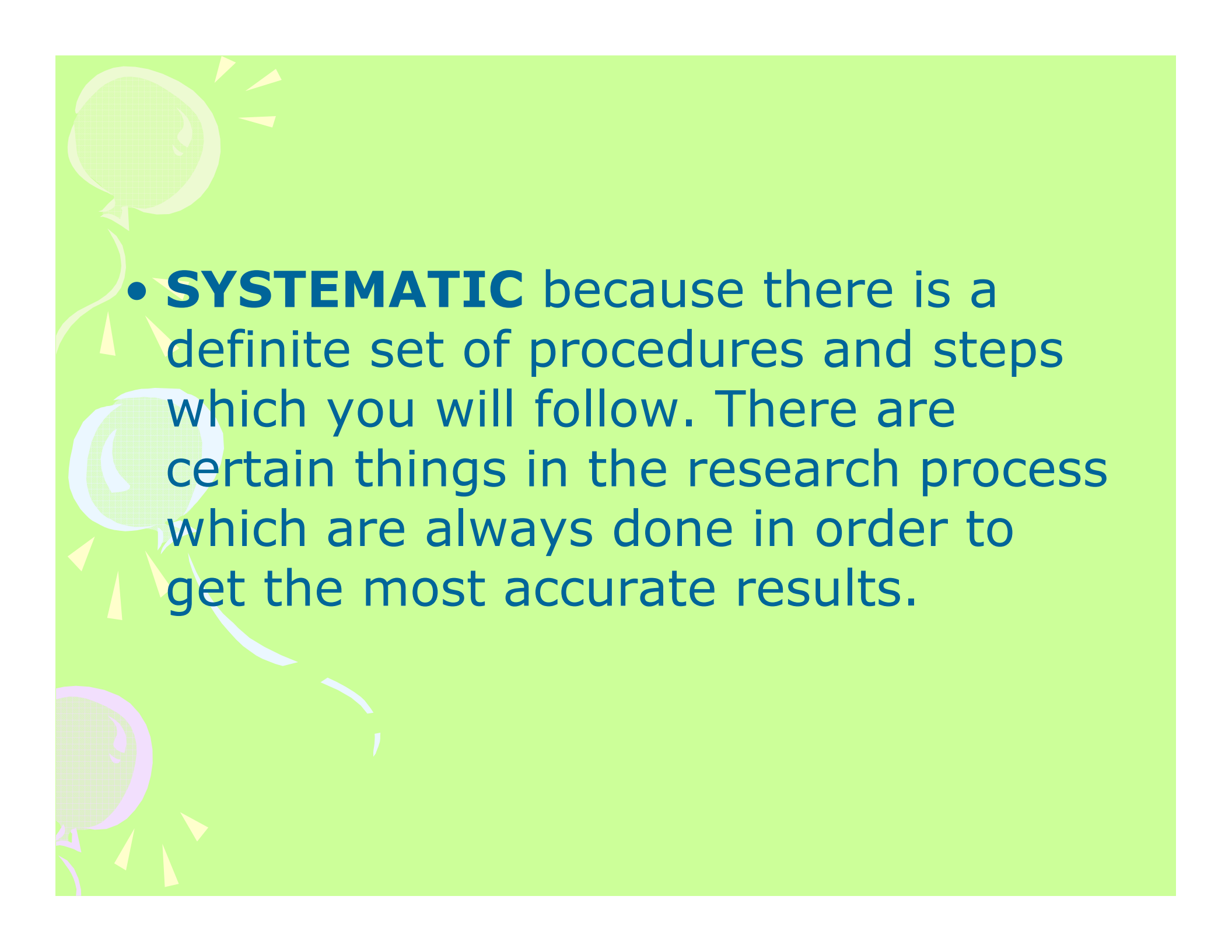
The objectives of this paper shall be:

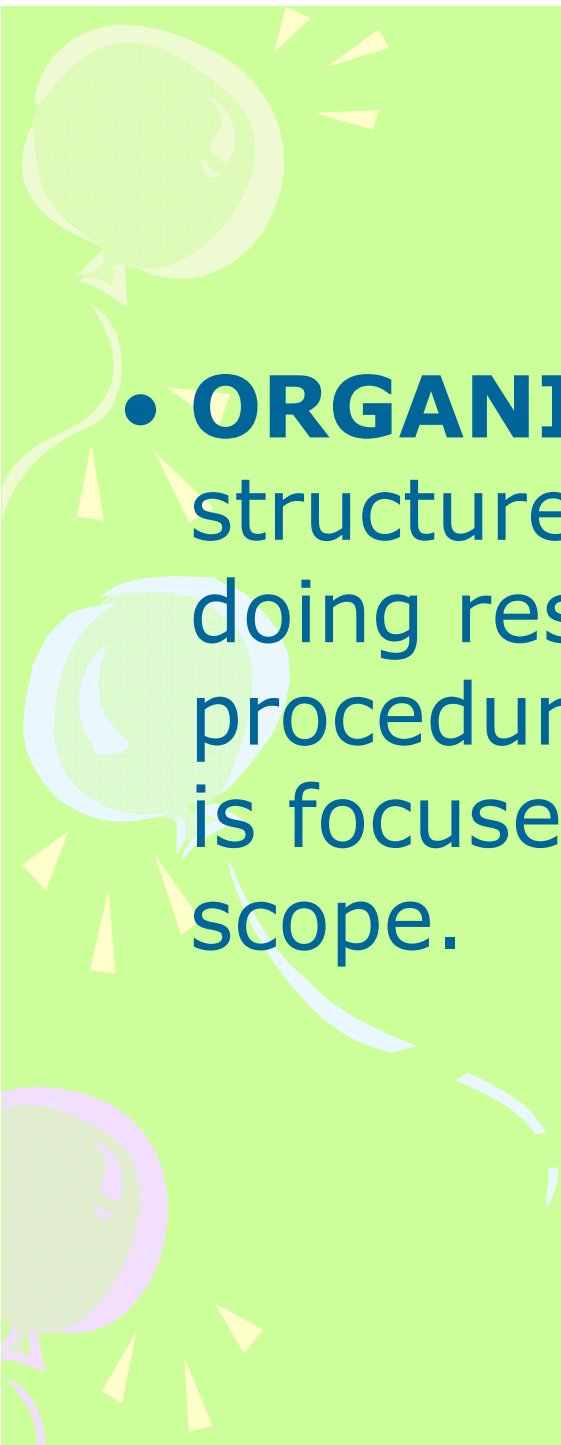
1. To understand what is research and realize its needs in halal discipline.
2. To view some of the advancement in science and technology and its relationship to halal status. An example of work; to view current development in halal food research at USIM.
3. To suggest ways to go forward in ensuring halal food distribution.

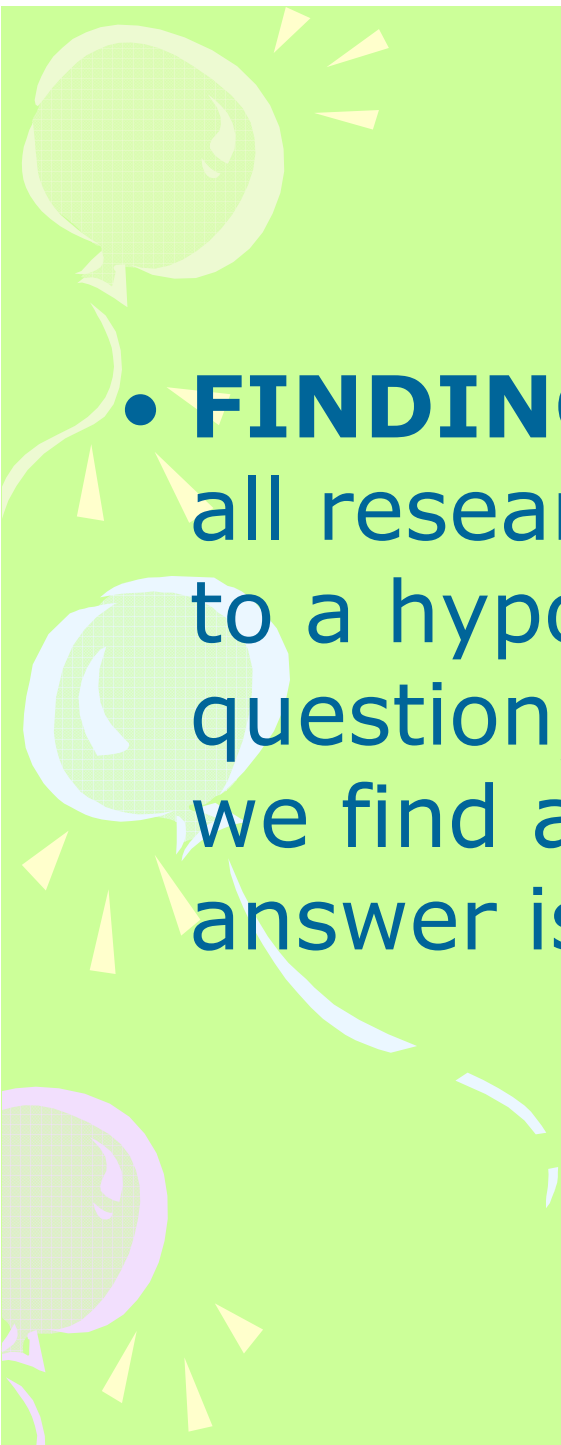


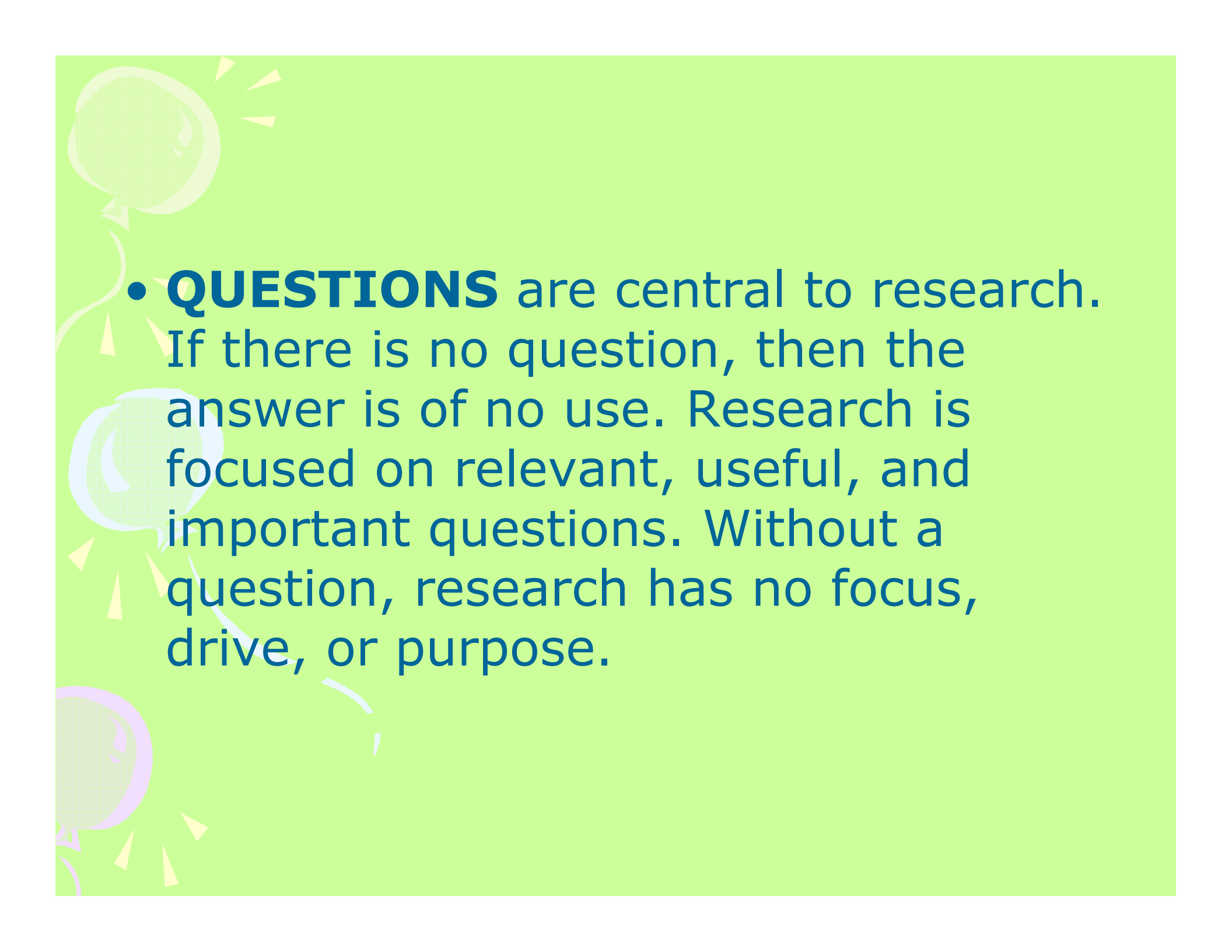
Definition of research


Research is an **ORGANIZED** and **SYSTEMATIC** way of **FINDING ANSWERS** to **QUESTIONS**.

- 
- **SYSTEMATIC** because there is a definite set of procedures and steps which you will follow. There are certain things in the research process which are always done in order to get the most accurate results.


- 
- **ORGANIZED** in that there is a structure or method in going about doing research. It is a planned procedure, not a spontaneous one. It is focused and limited to a specific scope.

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- **FINDING ANSWERS** is the end of all research. Whether it is the answer to a hypothesis or even a simple question, research is successful when we find answers. Sometimes the answer is no, but it is still an answer.

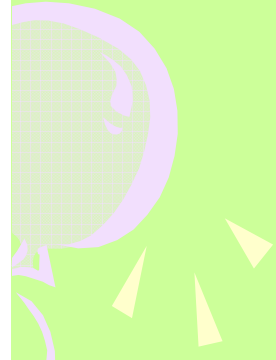
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- **QUESTIONS** are central to research.
If there is no question, then the answer is of no use. Research is focused on relevant, useful, and important questions. Without a question, research has no focus, drive, or purpose.




- Research is the cornerstone of knowledge and advancement.



- Current advances in science has brought about unprecedented growth in food manufacture.



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- We marvel at the virtues of technological development, the reality is we are left behind by the advancing wave of development.
 - Resulted in unparalleled advancement in Halal research.

Reasons

- Poor participation in teams
- Poor goal definition
- Poor alignment of actions to goals
- Poor monitoring of results
- Poor communication and access to information



**Achievements
through
science
&
The need for
research**

Run through some of the products:

- **Milk** – is almost a complete food. It provides nourishment, minerals, vitamins, fat and proteins. Many products prepared from it e.g. fresh milk, cream, sauces, dressing and desserts.



Problem: Liquid milk often fortified with vit. A & D. To make them stable emulsifiers such as polysorbates are used. They are fatty chemicals which can be made from animals fats or vegetable oil. If use animal fats, are they from halal sources?





Flavoured milk: Gelatin often used to thicken the milk. Is it from halal source?

Cultured milk, sour cream, yoghurt and ice cream:

Gelatin, emulsifiers, flavours, stabilizers, colours are added. Are they from halal sources?



- **Cream and butter:** mono and diglycerides are used to prevent separation of fat and water phases.
Are they from halal sources?



Cheese: Cottage cheese is halal; acid is used to curdle the milk.

- Monzzarella, cheddar and colby cheese are produced by using enzyme or bacterial cultures. Are they from halal sources?
- Shredded cheese are added with anti caking agent called stearate. Must be from halal source.



- **Breads:** may contain questionable minor ingredients like mono and diglycerides, sodium stearyl lactylate (SSL), and flavourings. Another major concern is the pan grease or release agents used in the utensils.



- **Cakes, cookies, pastries and doughnuts:** Minor ingredients used include mono and diglycerides, gelatine, SSL, polysorbates, flavours containing alcohol, L-cystine, etc.



Enzymes – examples of uses

- Used in food to improve taste, colour and texture (bread production).
- Speed up process, reduce cost of production (protein hydrolysis for preparation of meat extract).
- Increase yield, improve colour and aroma in juice production.



- Advantages of using enzymes


- Fast
- Reaction is specific
- Produce little byproducts.
- Cost saving.

Amino Acids

- Natural sources & synthetic raw materials
 - Natural – extracts from animal sources
 - Synthetic- starting materials of plant origins

Amino Acids

- Questionable amino acids
 - L-cysteine
 - L-glutamine
 - Monosodium glutamate (Ajinomoto?)



Use of L-cysteine

- In Food

- Used in pizza crust, donuts, batters, breadings, breadcrumbs

- Natural sources

- Derivatives of human hair- animal hair
 - Duck feathers

Alcohol

- Fried products, batter, coated batters, fries, onion rings.

- Alcohols flashed out during frying.

- Fish & chips batter

(5 parts water + 2 parts Anchor beer + 3 parts Blue key low protein flour)

Alcohol retained in food prepared by different methods

Cooking methods	% alcohol left in food after cooking treatments
1. Baked for 2.5 hrs	5%
2. Baked for 1 hr	25%
3. Simmer 30 mins	35%
4. Cooked over flame	75%
5. Added w/o heat, stored overnight (www.dietician.com/alcohol)	70%

Packaging material

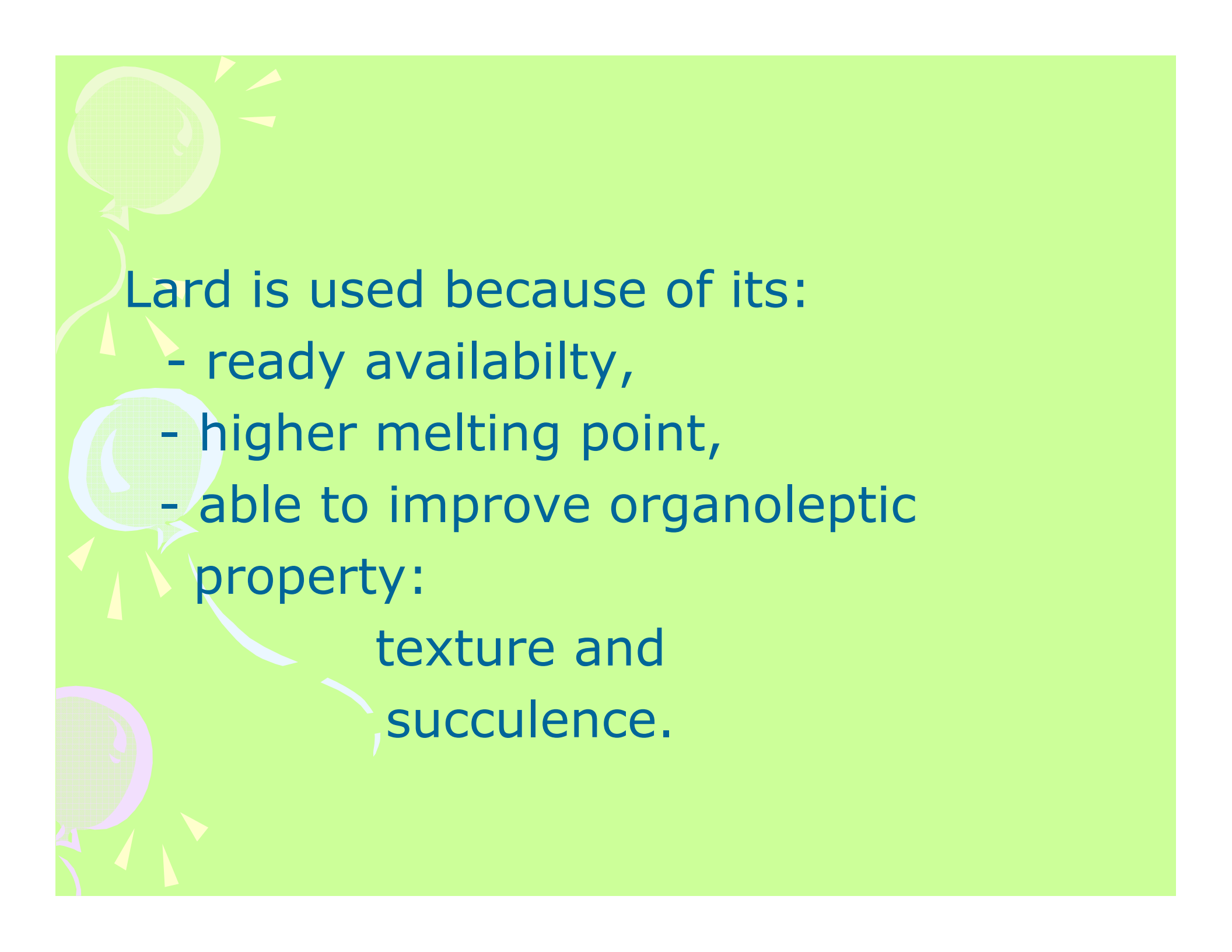
- How can the packaging materials and containers of food interfere with the 'Halalness' of the food?
 - Waxes & lipid coatings applied on styrofoam cups/plated/plastic may be from animal fats (hot annealing process)
 - New development in edible films and coatings; source of material is questionable.
 - Labels and printing: Label should state in detail minor ingredients included. Edible printing dyes used directly on foods, edible inks (seem trivial) are to be concerned.

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- examples of food ingredients that may not be Halal

- **Anticaking agents** : Calcium oleate, Calcium palmitate, Calcium laurate, Calcium stearate
- Fat salts from animal sources

Fats

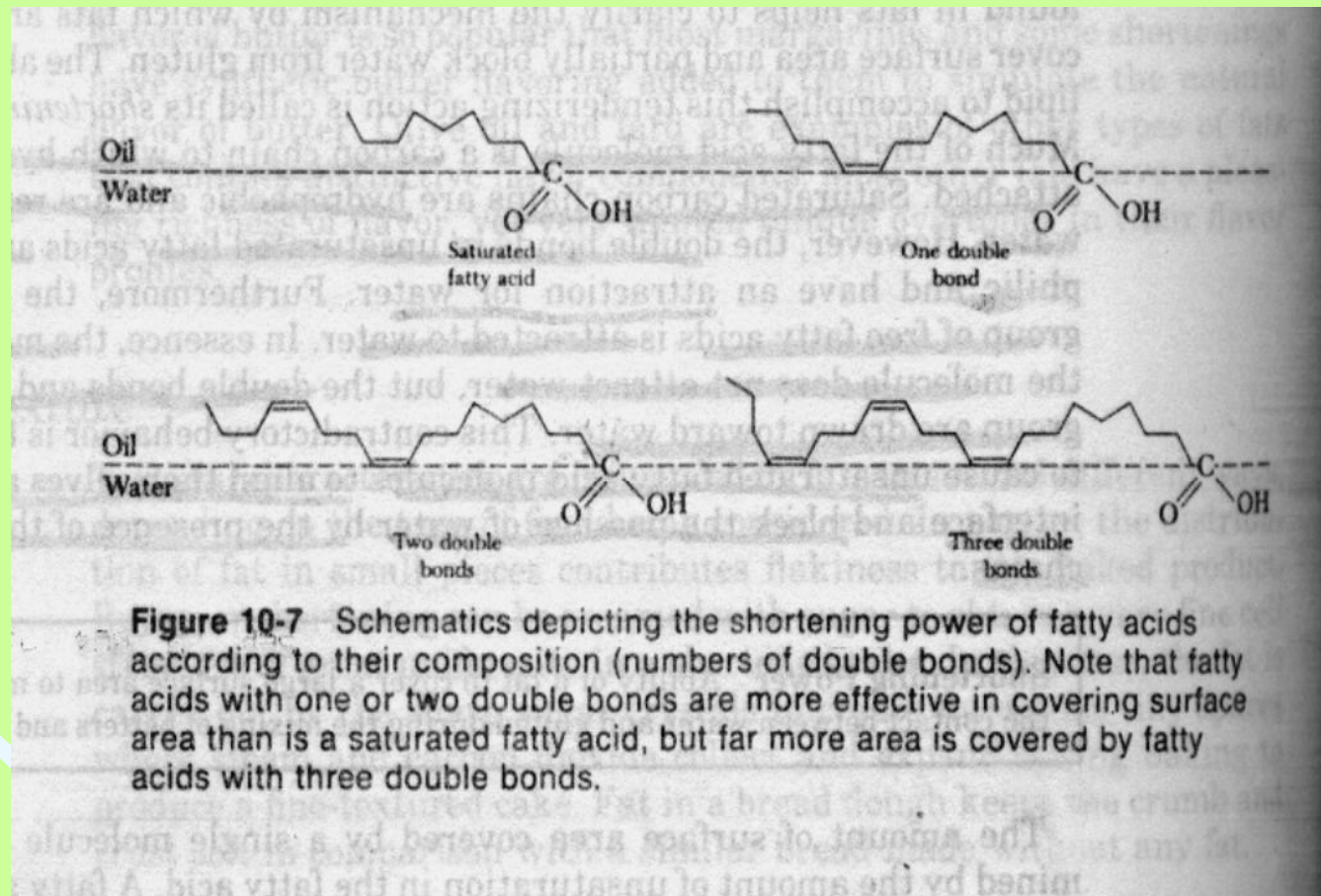
- Adulteration of food material with lard or pork is a sensitive issue among Muslims.
- Similarly with other items like medicine, cosmetic and toiletries.



Lard is used because of its:

- ready availability,
- higher melting point,
- able to improve organoleptic property:

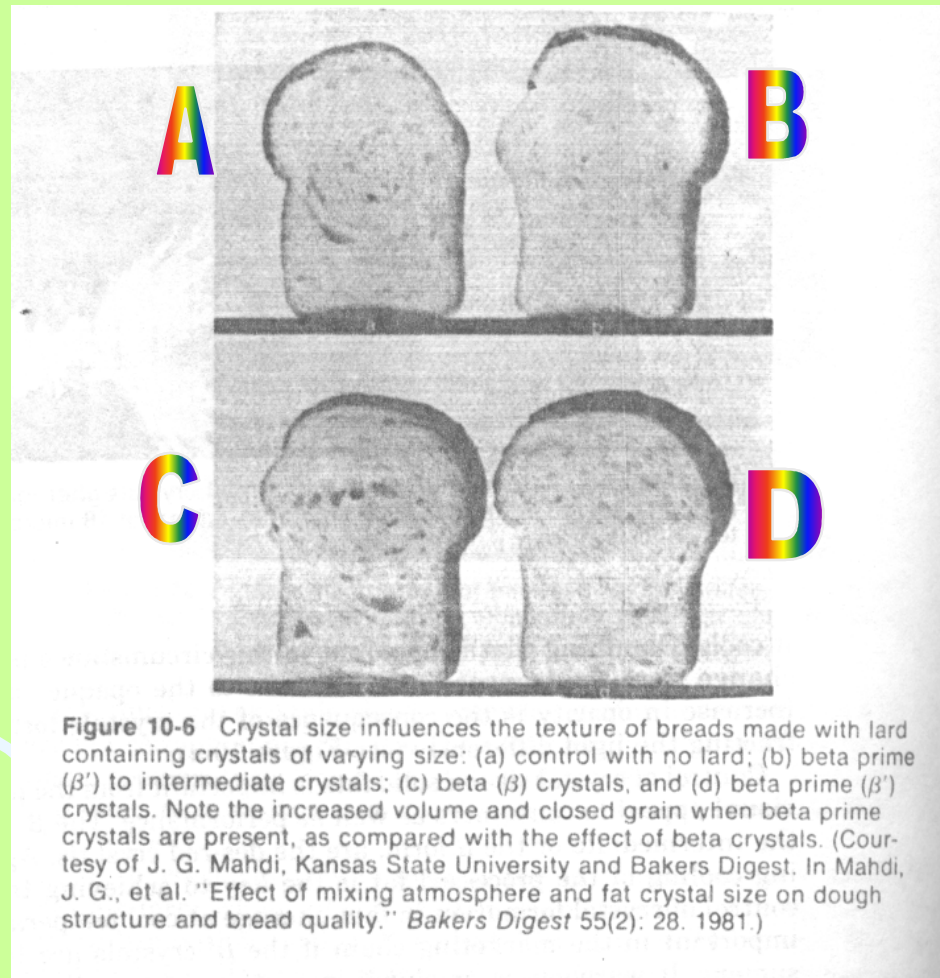
texture and
succulence.

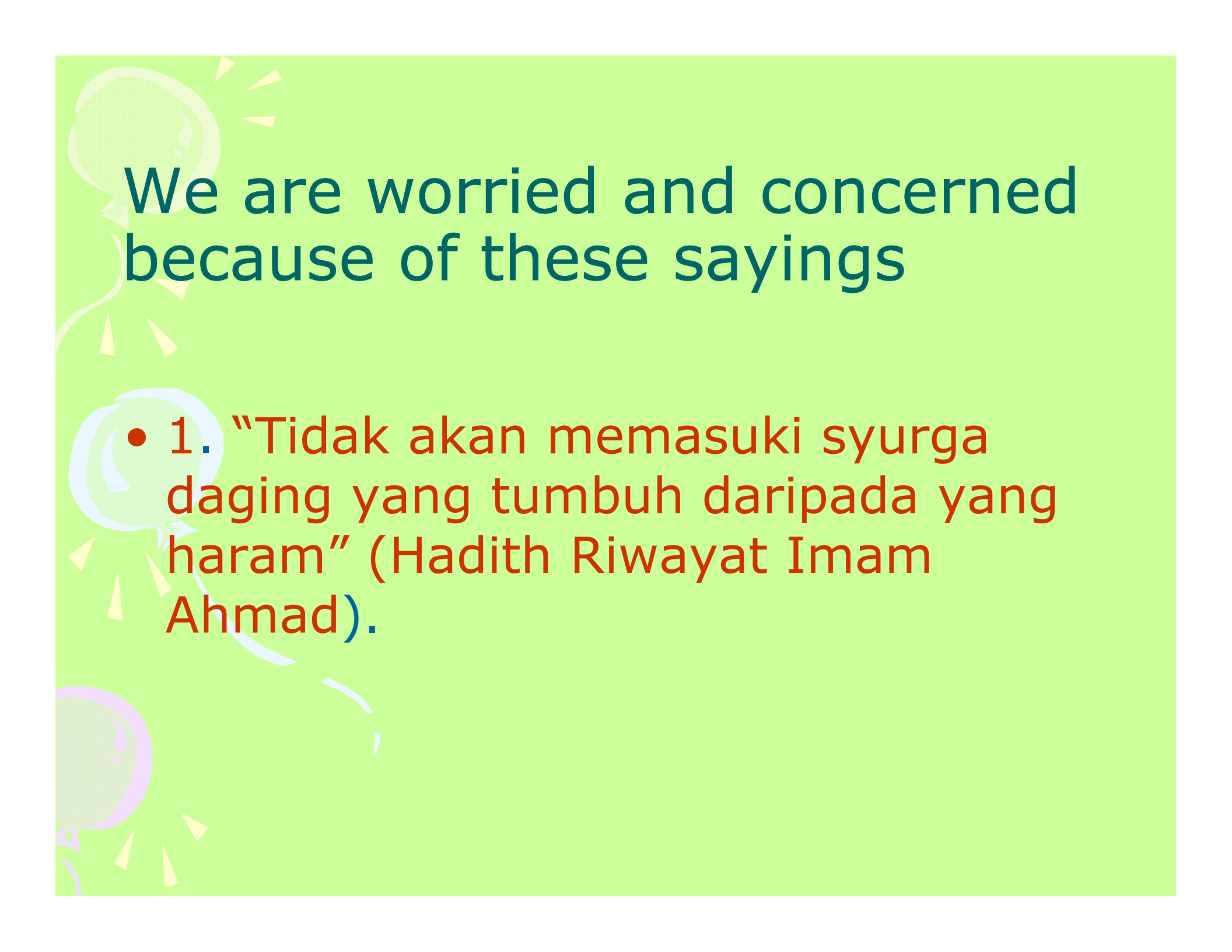


Behaviour of soft shortenings and lards used in batter and dough making.

Examples of functional property of food ingredients that may not be Halal

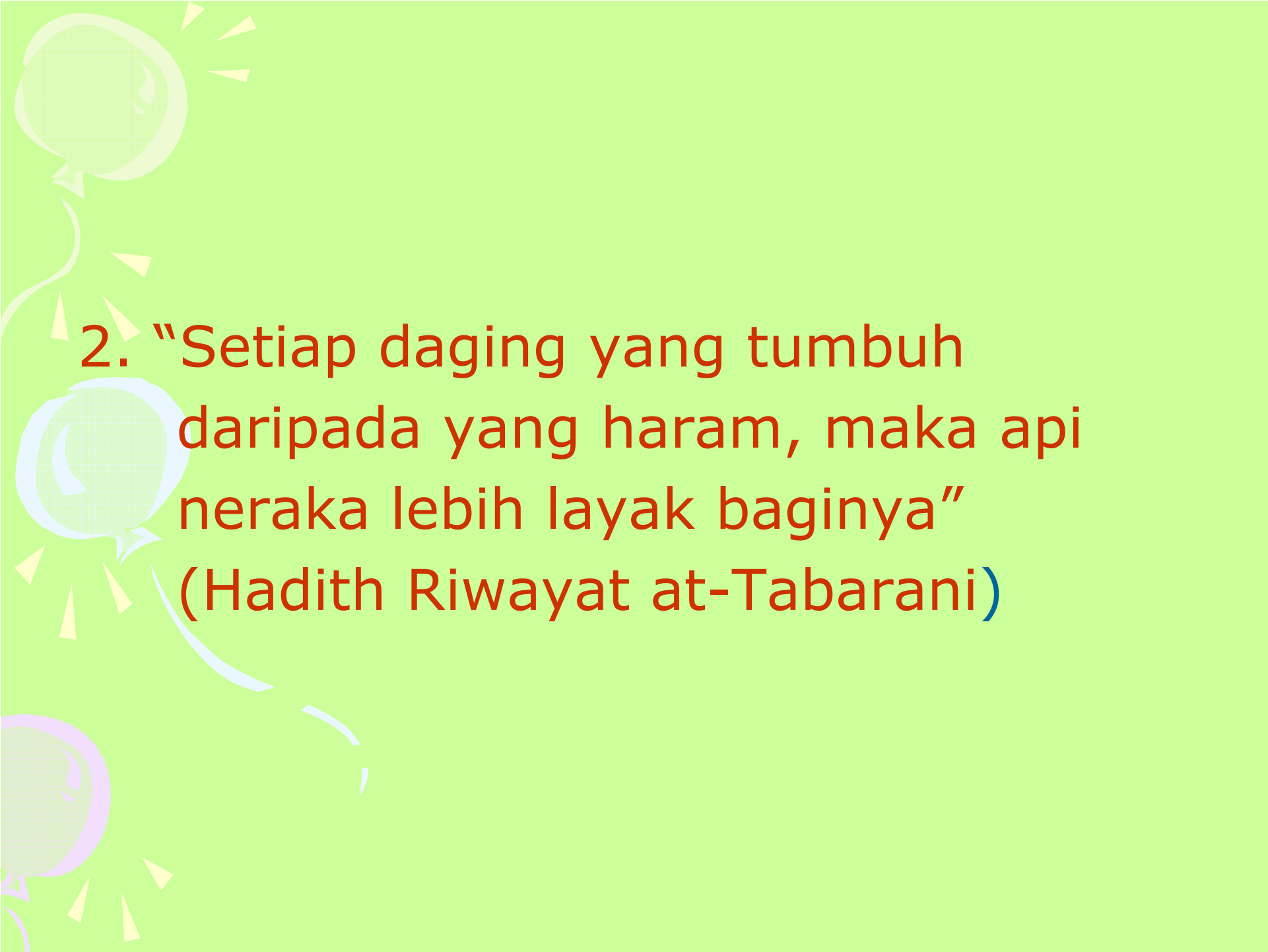
Emulsifiers : in bakery products





We are worried and concerned
because of these sayings

- 1. “Tidak akan memasuki syurga daging yang tumbuh daripada yang haram” (Hadith Riwayat Imam Ahmad).



2. “Setiap daging yang tumbuh
daripada yang haram, maka api
neraka lebih layak baginya”
(Hadith Riwayat at-Tabarani)




The Way Forward:

A. Educate the Muslim consumers at large.

- Make them aware of the “deception” – many ways.
- Establishment of Malaysian database on Halal/non halal food ingredients.
- Circulate, make known to Muslim the list of non halal food ingredients.

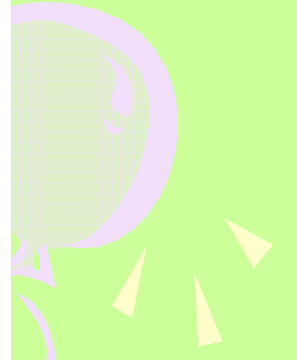


B. Intensify research by universities and research institutions.



– Look for new ingredients as substitute for non halal items.

– Develop new rapid techniques for screening of non halal components in food.



Example: Work done in USIM

- On surimi

Twelve samples of surimi products were analysed for content of non halal component.



MATERIALS & METHOD

- Twelve samples of surimi based products were collected from shopping complexes in Nilai and Putrajaya.
- Analysis steps involved:
 1. Purification/extraction of non halal protein (transglutaminase).
 2. Detection of the component using sandwich ELISA technique.

What is surimi?

- Surimi is the largest source of protein, obtained from mechanically de-boned fish flesh which is washed with water and blended with cryoprotectant.
- It is used for producing many kinds of value added seafood products (Shaviklo, 2000).

Surimi-based products...



Fish Ball

Fish cake



Fish Burger



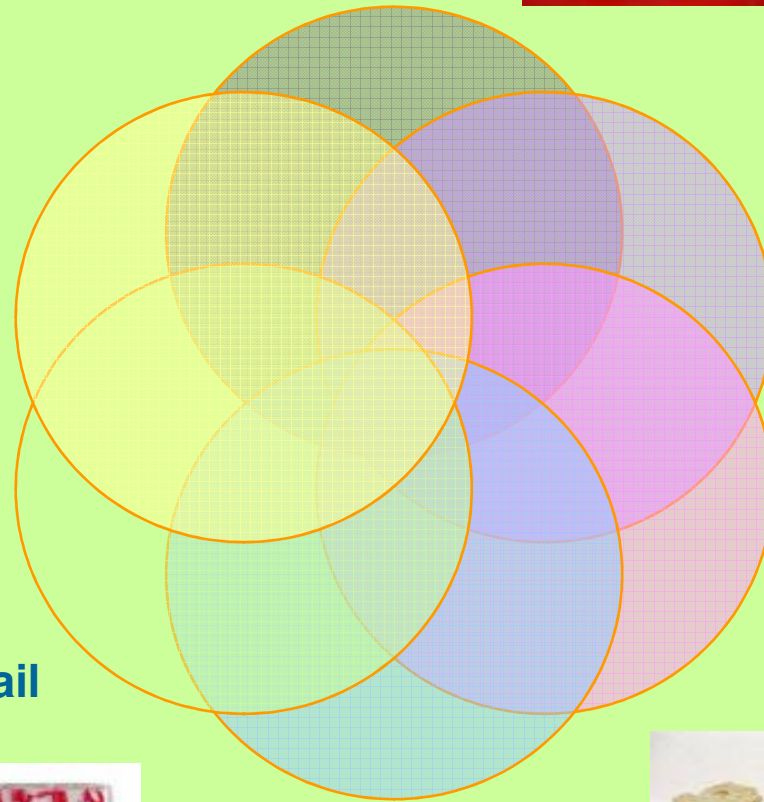
Imitation shrimp tail



Imitation crab stick



Fish sausages



(Park *et al.* 2005)

Whole fish



Heading and gutting



Meat separation (mincing)



Washing (leaching)



Dewatering (straining)



Mixing with cryo-protectants



Forming into blocks and freezing



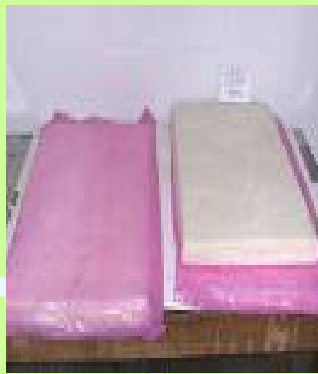
Packaging into cardboard box



Cold storage



Molded surimi



Blocks of Surimi



Figure 1: Surimi processing.

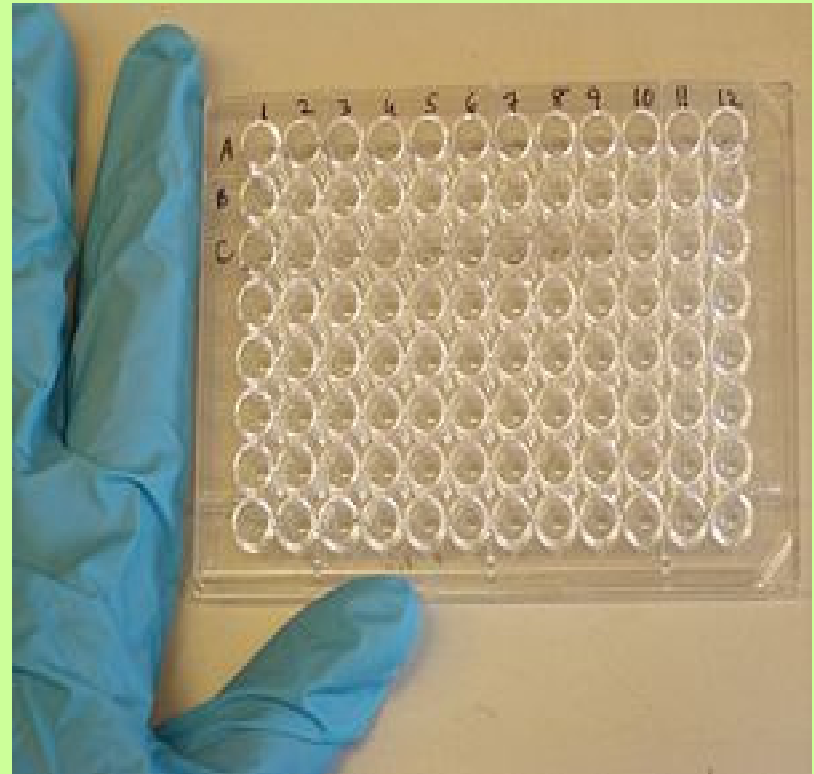
(Source: Shaviklo,2000)



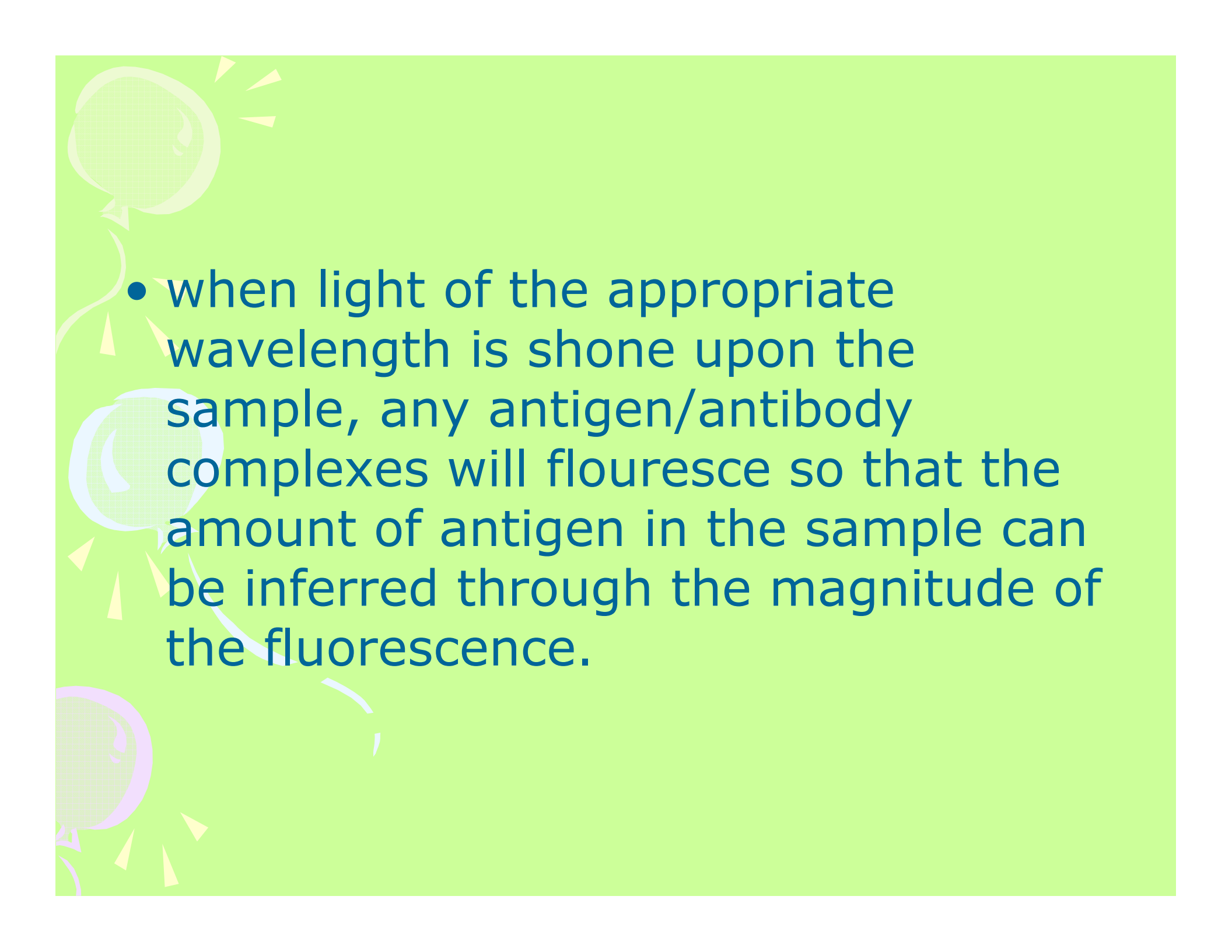
- **ELISA**

- is a biochemical technique used mainly in immunology to detect the presence of an antibody or antigen in a sample.
- The ELISA has been used as a diagnostic tool in medicine and plant pathology as well as a quality control check in various industries.
- It has also found applications in the food industry in detecting potential food allergens such as milk, peanuts, walnuts, almonds and eggs.

- in ELISA an unknown amount of antigen is affixed to a surface, and then a specific antibody is washed over the surface so that it can bind to the antigen.
- This antibody is linked to an enzyme
- In the final step a substance is added that the enzyme can convert to some detectable signal.



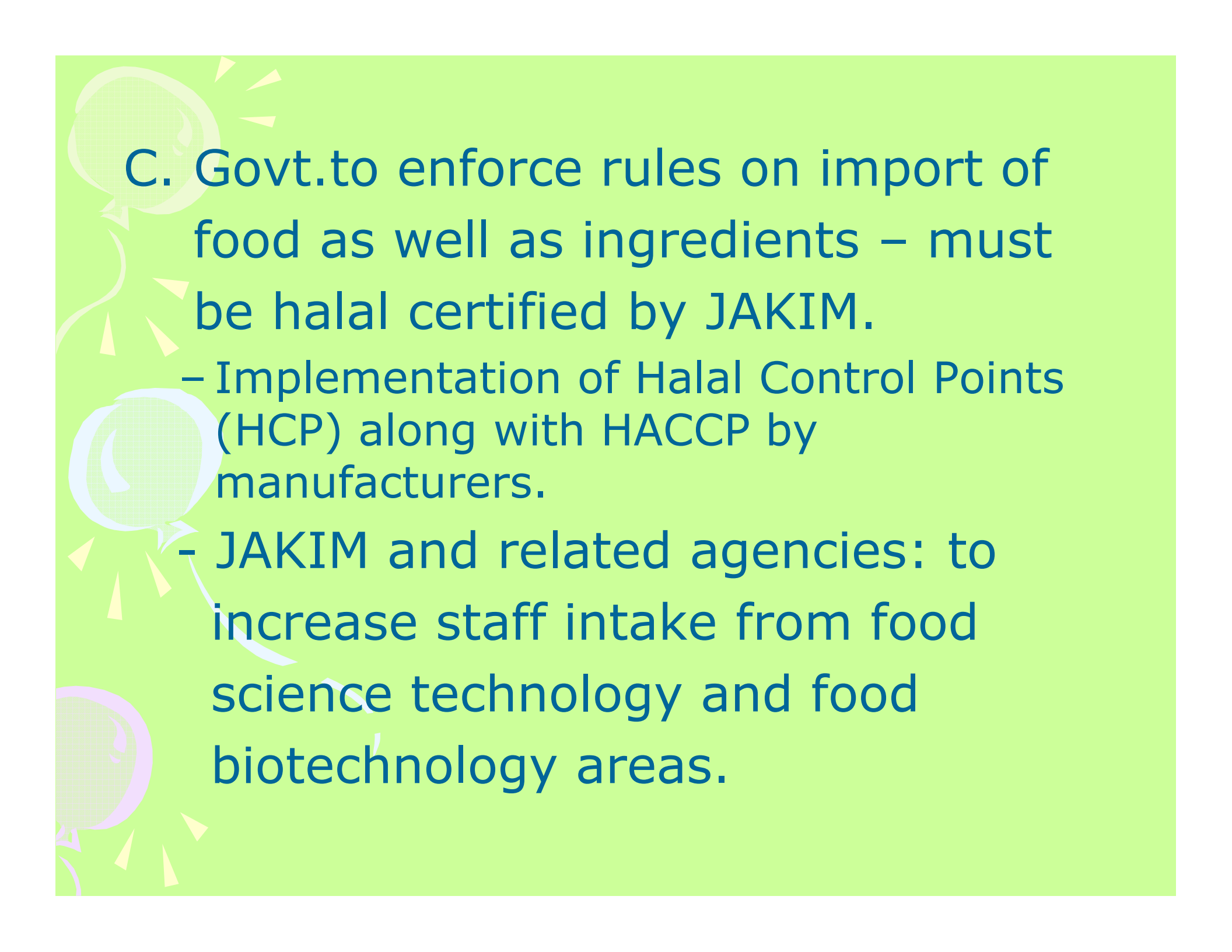
A 96-WELL MICROTITER PLATE USED FOR ELISA

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- when light of the appropriate wavelength is shone upon the sample, any antigen/antibody complexes will fluoresce so that the amount of antigen in the sample can be inferred through the magnitude of the fluorescence.



• Results

- 5 out of 12 samples were positive for bovine plasma.
- 2 out of 12 for avian plasma.
- 2 out of 12 for porcine plasma.



C. Govt. to enforce rules on import of food as well as ingredients – must be halal certified by JAKIM.

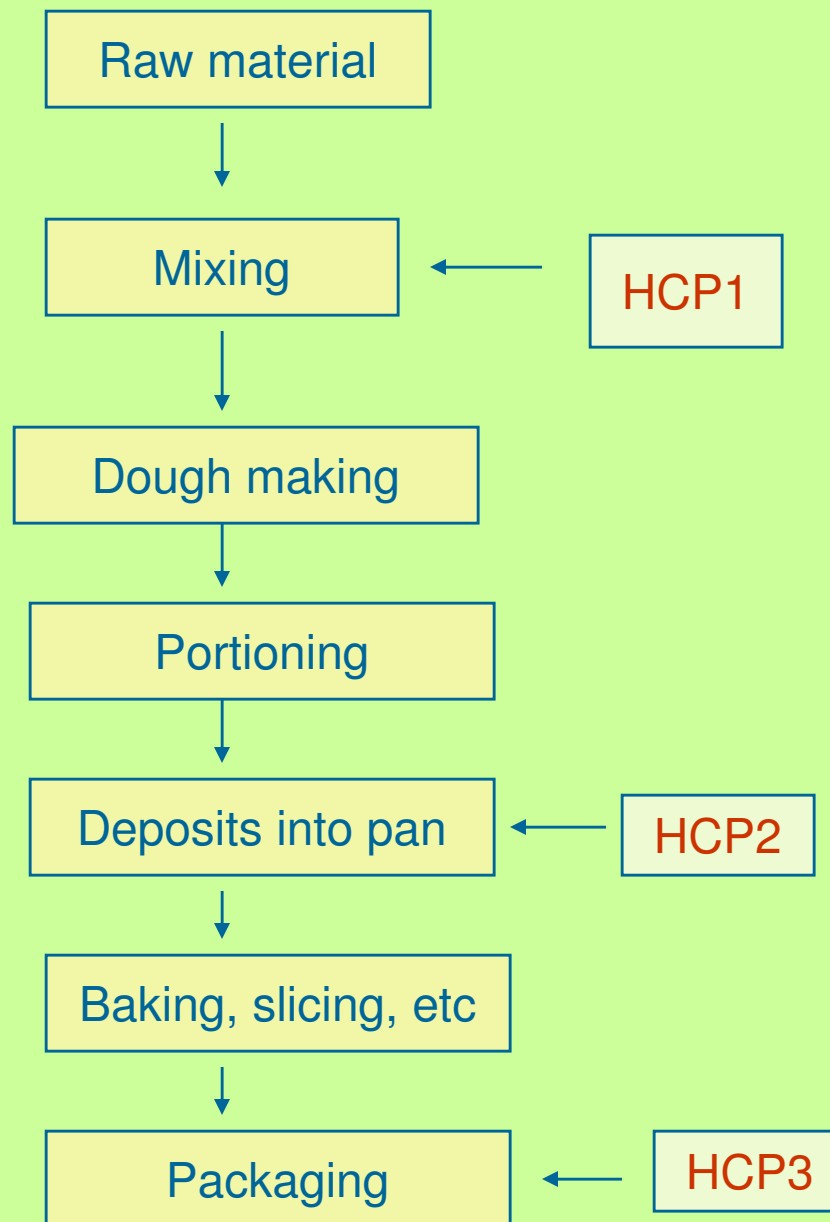
- Implementation of Halal Control Points (HCP) along with HACCP by manufacturers.

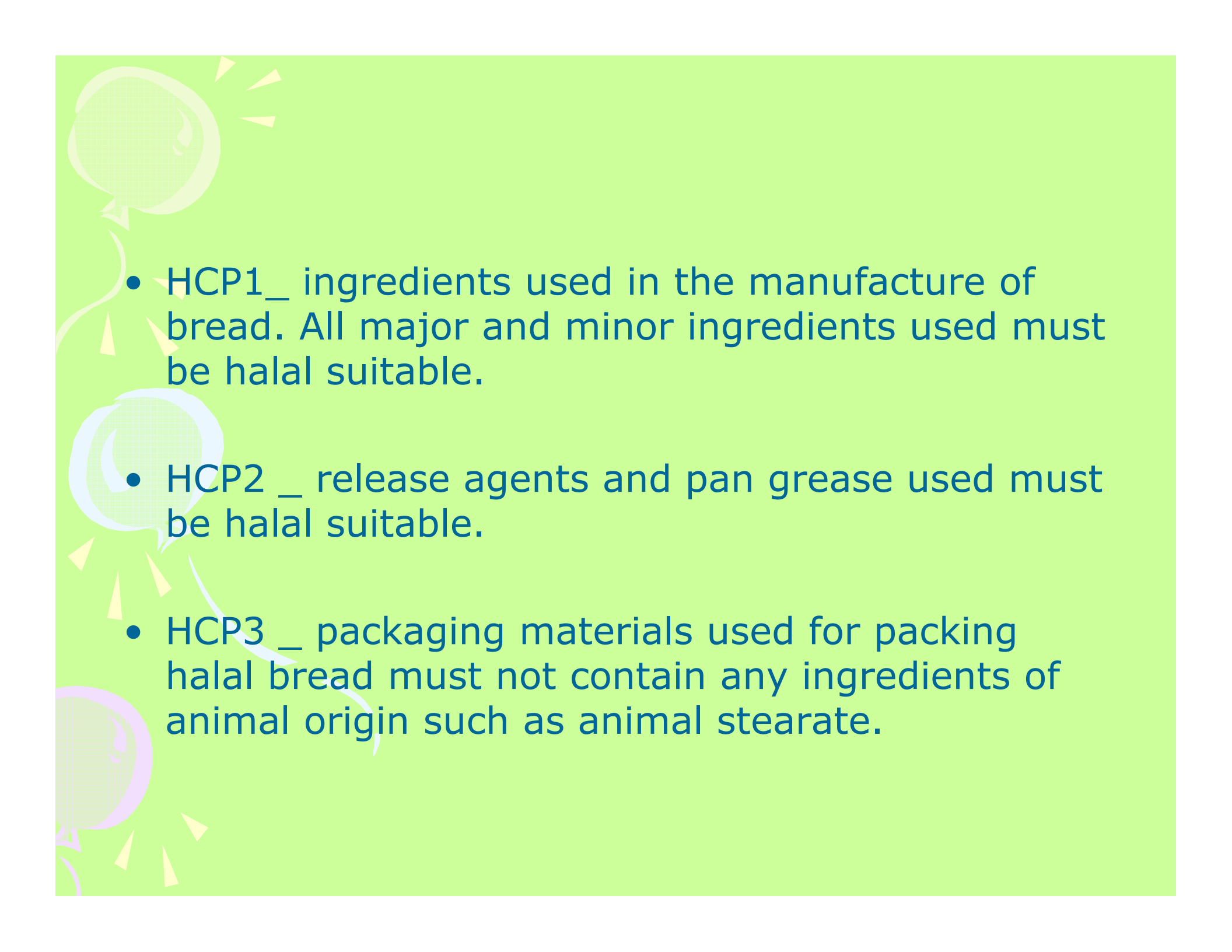
- JAKIM and related agencies: to increase staff intake from food science technology and food biotechnology areas.

Control measure:

- Introduce Halal Control Points in food processing.
 - To ensure halal conformance at the various check points.
 - First need to identify the points.
 - Example given is for breadmaking.

Halal Control Points
in Breadmaking.



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- HCP1_ ingredients used in the manufacture of bread. All major and minor ingredients used must be halal suitable.
 - HCP2 _ release agents and pan grease used must be halal suitable.
 - HCP3 _ packaging materials used for packing halal bread must not contain any ingredients of animal origin such as animal stearate.



Thank you