

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

رَبِّ اشْرَحْ لِي صَدْرِي 0 وَيَسِّرْ لِي أَمْرِي 0
وَاحْلُلْ عُقْدَةً مِّنْ لِّسَانِي 0 يَفْقَهُوا قَوْلِي 0

اے میرے رب! میرا سینہ کھول دے اور میرے لیے میرا کام آسان کر دے اور
میری زبان کی گرہ کھول دے تاکہ لوگ میری بات سمجھ سکیں

رَبِّ زِدْنِي عِلْمًا

MY LORD! INCREASE ME IN KNOWLEDGE.

FST-311. FOOD BIOCHEMISTRY 3(3-0)

L # 42 - 43. RENDERING

B. Sc. (Hons). Food Science and Technology
Semester-V (R+SS)
Fall -2020

Dr. Shahid Mahmood Rana
Associate Professor



INSTITUTE OF FOOD SCIENCE AND NUTRITION (IFSN)
UNIVERSITY OF SARGODHA, SARGODHA-PAKISTAN



RENDERING

“RENDERING IS A PROCESS THAT CONVERTS WASTE ANIMAL TISSUE INTO STABLE, VALUE-ADDED MATERIALS”.

“RENDERING CAN REFER TO ANY **PROCESSING OF ANIMAL PRODUCTS** INTO MORE USEFUL MATERIALS, OR MORE NARROWLY TO THE RENDERING OF WHOLE **ANIMAL FATTY TISSUE** INTO **PURIFIED FATS** LIKE **LARD** OR **TALLOW**”.

RENDERING: CARRY OUT

- RENDERING CAN BE CARRIED OUT ON AN **INDUSTRIAL, FARM, OR KITCHEN** SCALE
- THE MAJORITY OF TISSUE PROCESSED COMES FROM **SLAUGHTER HOUSES**, BUT ALSO INCLUDES **RESTAURANT GREASE** AND **BUTCHER SHOP TRIMMINGS**, **EXPIRED MEAT** FROM GROCERY STORES, AND THE **CARCASSES** OF **EUTHANIZED** AND **DEAD** ANIMALS FROM ANIMAL **SHELTERS**, **ZOOS** AND **VETERINARIANS**

RENDERING: CARRY OUT

- THIS MATERIAL CAN INCLUDE THE **FATTY TISSUE**, **BONES**, AND **OFFAL**, AS WELL AS ENTIRE **CARCASSES** OF ANIMALS CONDEMNED AT SLAUGHTERHOUSES, AND THOSE THAT HAVE DIED ON FARMS, IN TRANSIT, etc.
- THE MOST COMMON ANIMAL **SOURCES** ARE **BEEF, PORK, SHEEP**, AND **POULTRY**
- THE RENDERING PROCESS SIMULTANEOUSLY **DRIES** THE MATERIAL AND **SEPARATES** THE FAT FROM THE BONE AND PROTEIN

RENDERING: YIELDS

FAT COMMODITY

- YELLOW GREASE
- CHOICE WHITE GREASE
- BLEACHABLE FANCY TALLOW

PROTEIN MEAL

- MEAT
- BONE MEAL
- POULTRY BY PRODUCT MEAL

RENDERING: PLANT'S HANDLES

RENDERING PLANTS OFTEN ALSO HANDLE OTHER MATERIALS (BUT DO SO USING PROCESSES DISTINCT FROM TRUE RENDERING)

- **SLAUGHTER HOUSE BLOOD**
- **FEATHERS**
- **HAIR**

RENDERING: VARIATIONS

- WHETHER THE **END PRODUCTS** ARE TO BE USED AS **HUMAN FOOD** IS BASED ON THE TYPE OF RAW MATERIAL AND THE PROCESSING METHODS
- WHETHER THE END PRODUCTS ARE TO BE USED AS **ANIMAL** OR **PET** FOOD
- THE MATERIAL MAY BE PROCESSED **WET** OR **DRY**
 - IN WET PROCESSING, EITHER **BOILING WATER** OR **STEAM** IS ADDED TO THE MATERIAL, CAUSING FAT TO RISE TO THE SURFACE
 - IN DRY PROCESSING, FAT IS RELEASED BY **DEHYDRATING** THE RAW MATERIAL

RENDERING: VARIATIONS

- THE TEMPERATURE RANGE USED, WHETHER **HIGH** OR **LOW**
- PROCESSING MAY BE EITHER IN DISCRETE **BATCHES** OR IN A **CONTINUOUS** PROCESS
- THE PROCESSING PLANT MAY BE OPERATED BY AN INDEPENDENT COMPANY THAT COLLECTS THE MATERIAL ON THE OPEN MARKET, OR BY THE PACKING PLANT THAT PRODUCED THE MATERIAL

RENDERING: EDIBLE PRODUCTS

- EDIBLE RENDERING PROCESSES ARE BASICALLY **MEAT PROCESSING OPERATIONS** AND **PRODUCE**
 - **LARD**
 - EDIBLE **TALLOW** (FOR USE IN FOOD PRODUCTS)
- EDIBLE RENDERING IS GENERALLY CARRIED OUT IN A **CONTINUOUS** PROCESS AT **LOW TEMPERATURE** (LESS THAN THE BOILING POINT OF WATER)
- THE PROCESS USUALLY CONSISTS OF FINELY **CHOPPING** THE EDIBLE FAT MATERIALS (GENERALLY FAT **TRIMMINGS** FROM MEAT CUTS), **HEATING** THEM WITH OR WITHOUT ADDED **STEAM**, AND THEN CARRYING OUT **TWO** OR MORE STAGES OF **CENTRIFUGAL SEPARATION**

RENDERING: EDIBLE PRODUCTS

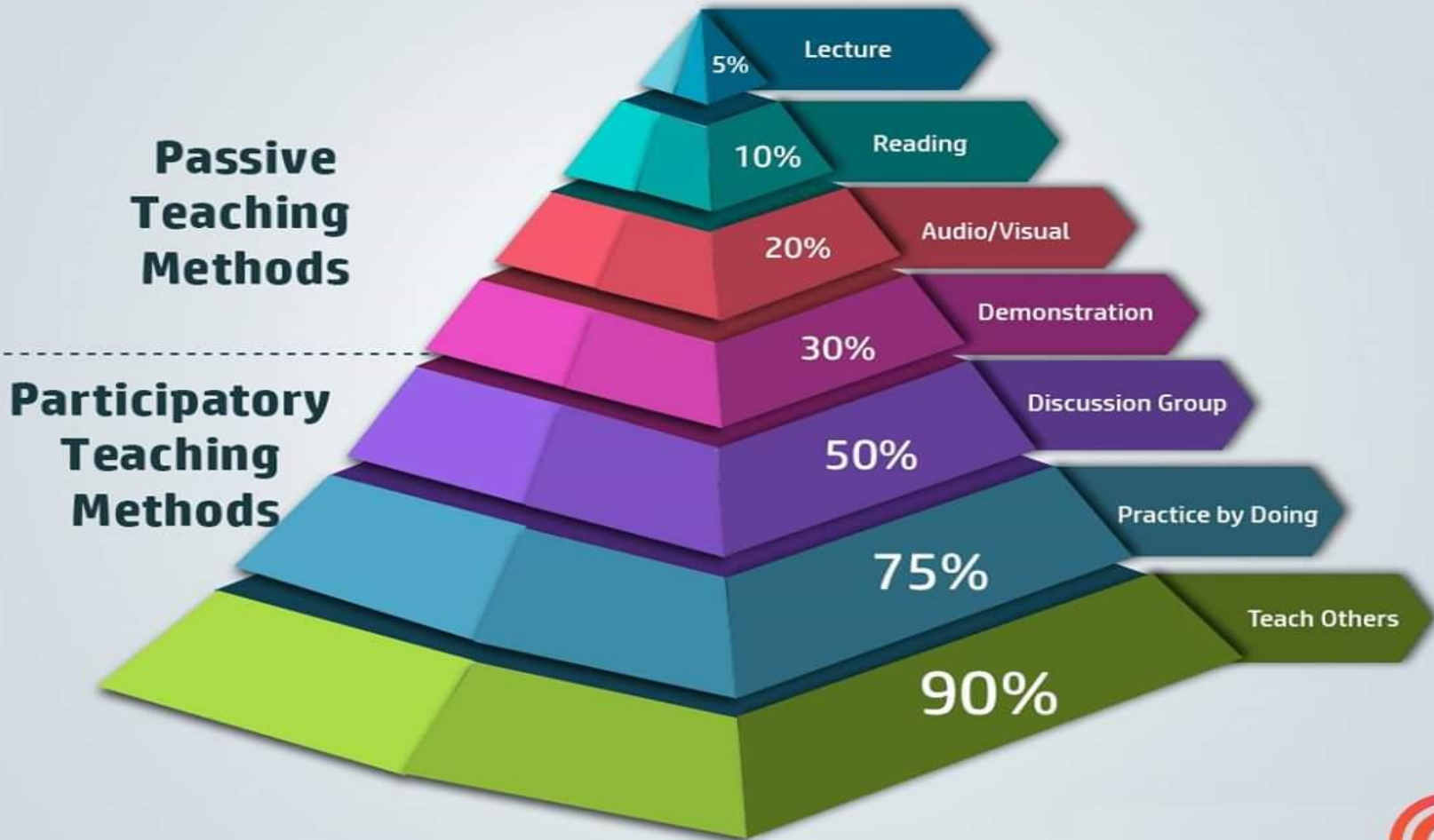
- THE FIRST STAGE SEPARATES THE **LIQUID WATER** AND **FAT MIXTURE** FROM THE **SOLIDS**
- THE SECOND STAGE FURTHER SEPARATES THE **FAT** FROM THE **WATER**
- THE SOLIDS MAY BE USED IN FOOD PRODUCTS, **PET FOODS**, etc., DEPENDING ON THE ORIGINAL MATERIALS.
- THE SEPARATED FAT MAY BE USED IN FOOD PRODUCTS, OR IF IN SURPLUS, IT MAY BE DIVERTED TO **SOAP** MAKING OPERATIONS
- MOST EDIBLE RENDERING IS DONE BY MEAT PACKING OR PROCESSING COMPANIES

RENDERING: EDIBLE PRODUCTS

- ONE EDIBLE PRODUCT IS **GREAVES**, WHICH IS UNMELT ABLE RESIDUE LEFT AFTER ANIMAL FAT HAS BEEN RENDERED
- AN ALTERNATIVE PROCESS **COOKS SLAUGHTER HOUSE** OFFAL TO PRODUCE A THICK, LUMPY "**STEW**" WHICH IS THEN SOLD TO THE **PET** FOOD INDUSTRY TO BE USED PRINCIPALLY AS **CAT** AND **DOG** FOODS
- SUCH PLANTS ARE NOTABLE FOR THE **OFFENSIVE ODOUR** THAT THEY CAN PRODUCE AND ARE OFTEN LOCATED WELL AWAY FROM HUMAN HABITATION

THE LEARNING PYRAMID

KNOWLEDGE RETENTION RATES



Adapted from National Training Laboratories, Maine

