Review

ELECTRIC STUNNING OF CATTLE FOR SLAUGHTERING AND SECURING THE BEEF FROM MICROORGANISM

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ABSTRACT

Stunning electricity current of 1.0 A, 200 – 300 V were caused the destruction of cattle's central nerve. This is very important to drain blood as much as possible from the whole body. This causes its beef not become a media of unexpected microorganism to develop theirself.In the modern age right now, electricity is needed much for living on the earth or outer space. In other words, live is much depend on it. Indonesia is a tropical and agricultural country with high humidity. These are good media for microorganism to develop theirself i.e. in aerobic condition such as *Pseudomonas, Achromobacter* (induce rancidity in), *Strepcococcus, Leuconostoc, Bacillus* (causes mucus on beef surface), *Lactobaccillus* (causes the changes of beef colour from red to greenish), *Photobacterium* (causes phosphorescent). anaerobic codition *Achromobacter* and *Proteus* cause sour taste. The beef or other food stuff become spoiled fast if they are not preserved in low temperatureIt is necessary to control the room temperature. The objectives of this study were to know and open insight about physiological works of electricity in order to provide healthy beef as a source of animal protein to form a bright nation. The beef can be preserved more than 30 days without decreasing its hygiene level in the temperature of 5 – 7^{o}C. At these low temperatures the microorganism mentioned above can delayed their growth and development.

Keywords: electricity, microorganism, temperature, beef.

INTRODUCTION

In modern time right now, electricity is one of the needs for living in the world or outer space. It means, electricity ensured better live (happy and healthy) in the earth or the outer space. It can be imaged how astronauts can live in the outer space without electricity. Globalization, particularly on electrical aspect has affected political, economical, and cultural. Right now those effects (politics communication), transaction in some businesses, speaking about some affection of cultures) already spread out all over the world (nations and countries) and it can not be neglected.. For example, the electricity in which out of order for one hour or more particularly at various cities would affects livelihood. The longer the electricity out of order, the harder the life. This is due to the human life use to be very dependent on electricity. Indonesia is a tropical and agricultural country with high humidity. These are good condition for growth and development of microorganism. Beef or other food stuff are perishable food and become spoiled if they are not preserved in a room with low temperature.. Control room temperature is very important. Therefore it can be said that the electricity is the necessity for human being to fulfill his/her needs in life..Physiological works mechanism of

electricity is describe in this paper in order to support availability of life needs i.e. food particularly healthy beef for consumption. The objectives of the study were to know and open insight about physiological works mechanism of electricity in order to provide healthy beef as a source of animal protein to form a bright nations as the result of the healthy beef consumption.

DISCUSSION

Electricity and It Usefulness

Electricity is a form of energy occurs in certain fundamental particles of all matter, as electrons (negative changes) and protons or positrons (positive changes) (Krebs, 1987). In daily life the electricity works can be functioned as: 1. Lighting. 2. Heating (cooking food stuff, water, metal liquidize). 3. Cooling room (to increase depository capacity of food stuff). 4. Ignite various industry machines (food, cloth, housing, etc.). 5. Therapy (cancer, physiological therapy, and others). 6. Indirect slaughter of animal (cattle, buffalo, and pig). 7. Controls environment temperature.

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Mechanism of Electricity in Slaughter House

Ante Mortem

Electricity current for 1.0 A, 200 – 300 V can be run to cattle brain for few seconds before the animal is slaughtered. It objective is to make the animal becomes unconscious. In this condition the animal becomes stiff for about one minute due to the destruction of it central nerve by using the electric current (Prof. N. M. Tulloh, pers. com., 1988). Its heart is still contracting as usual, because the contraction is not under control (the heart contracts self). This is very important to drain blood as much as possible from the whole body. Hoping the rest of the blood left in the beef as minimum as possible (Gregory, 1998), therefore the beef is not becomes a media of unexpected microorganism to develop theirself. So, the beef is safe to consume. Electrical stimulation tools with low (200-300 V) or high voltage (above 1000 V) right now are used widely in Europe, Australia, North America, and England depend on type of slaughter house (small, medium, and large) (Anonymous, 1982). Tenderness of beef which is produced by slaughter house used low or high voltages electricity are similar (Johnson, 1983). Revering to slaughter processes, Suryanto (2012) said that animal welfare must be considered universally and not personal or group wishes. There are 5 considerations i.e.: 1). Free of thirsty, hungry, and lack of nutrient, 2). Free of stress or fear, 3). Good shelter and environment, 4).Prevention to injury, illness, parasites 5). Enough for doing behavioral capacity of the animal. Furthermore, it can be said that the nerve of the animal does not function., It would be no pain and saver at slaughtering time. The animal welfare must be conducted properly. Various aspects such as economy, social, culture, religion, of the use of electricity in animal slaughter can be analysed further. In this case, Sukanata (2012) reported that in the future the results of those studies could be more useful in consideration for taking decision in animal slaughter and not rising conflict in social life.

Post Mortem

Slaughtering the animal can be conducted using direct or indirect methods. The direct method is conducted through cut off carotid artery, jugular

vein, and esophagus. Each of them causes animal feel pain. While the indirect method using electricity resulted in some advantages i.e. easy to slaughter, the animal is not tortured and away from rude actions, better skin and carcass quality, and healthier beef than the others. Few minutes after post mortem, the animal is skinned, the beef changes psychochemistry. In this case, although its muscle is still tender, but its ATP is getting less. In this condition the energy of low voltage can be flowed for about 2 minutes (Yupardhi, 2012) on its carcasses to stimulate and for contracting the muscles up to perfect level and to accelerate the end process of glycogenelisis to produce tender and healthy beef, and ready to consume after cook. This strategy can give better expectation on financial advantages in order to complete self wish (Ashari, 2010). At slaughter house of Melbourne, Australia, 8 – 12 hours after the animals were slaughtered (post mortem), their beef were in *rigor* This occurs for 15 – 20 hours, but Abustaman and Ali (2012) reported that it was for 10.5 hours. After that (post *rigor* the beef becomes tender. It needs to be known that during the beef is *regor* its muscle is stiff. To reduce the stiff, it needs withered process in a chilly room with temperature for 2 – 4^{o}C. In these temperatures the beef can be preserved maximum for 30 days because *Streptococcus lactus* could be prevented its develop (Suarsana et al, (2001). Low temperature causes the development of microorganism are inhibited. It means, to control the temperature as mentioned above, electricity is needed. So that, how important the electricity in the live is. In aerobic condition, various types of bacteria i.e. *Pseudomonas*, *Achromobacter* (causes fat becomes rancid), *Streptococcus, Leucomostoc*, *Bacillus* (causes mucus on the beef surface), *Lactobaccillus* (causes the beef colour changes from red to greenish), *Photobacterium* growth rate (causes phosphorescent) can be inhibited. On the other hand, in anaerobic condition, *Achromobacter* and *Proteus* caused sour taste. In the condition of *regor* (actin and myosin formed actomyosin) the glycogen reserve of muscles as a source of ATP can be used for contracting (actin + myosin →actomyosin + ATP). But, in anaerobic condition the result is lactic acid. All of those are biochemistry changed that occur in the beef. In this case, the electricity stimulates the muscle for stronger contracting. It consequences are the beef pH is reduced quickly, ultimate pH for 5.3 – 5.5 will be reach within 3 hours *post mortem*. The results are the wrinkle of muscles can be prevented and the beef tenderness can be increased. It needs to be known too that the beef pH affects it structure. The beef pH = 7 shows it structure closed (it fiber is not clear, dark colour, the beef surface is dry because of its water retention is high). While on the pH 4.5 – 5.4 it structure is open (its fiber is clear and its water retention is low). Furthermore, Rodrigue and Craig (2009) suggested that to protect the original product of the beef from slaughter house or cold storage to market or places for selling the beef, it needs a proper transportation such as chilly box mobile with temperature for 4 – 5^{o}C to make sure unexpected microorganism are inhibited, oxidation of the beef surface is not occur (to prevent the beef surface colour becomes dark or dark red, quality decreases, consumer refuses to bay it).

According to Hankins et al. (1965 in Techniques and Procedures in Animal Production Research) that colour of lean tissue is generally regarded as a characteristic of beef. These are used as a guide by Federal meat graders and are helpfull not only respect to colour but to other characteristics of the carcass.This will ensure the quality of the beef (Anonymous, 2008). From the experimental of Arif at al. (2008) was reported that a good quality of beef has basic character as probiotic which is produced antimicrobial compound. If this does not work or implemented properly, the beef becomes tainted soon because of its preservation capacity is low and tainted bacteria develop freely (Stenkrans, 1983).There are many flies perch on the tainted beef and they will worsen its quality. The consequences is the beef becomes unhealthy and not good to consume. The tainted beef only invite many flies as sources of many diseases due to various microorganism (www.homatheraphy.org/con-tent/effect-agnihotra-areal-micro-flora).

CONCLUSIONS AND SUGGESTIONS

Conclusions

From the explanation above could be concluded that physiological works mechanism of electricity is truly important on providing and increasing food tolerance particularly the beef. To obtain the healthy beef without decreasing its hygiene level for being consumed, it may preserve in a chilly room (low temperature).

Suggestions

The main factor which must pay more intention is safety in use of electricity, because the electricity is look like a knife with *double eyes* One side it gives various easiness and advantages in this live if it is used properly. But, on the other side it causes injury if it is used wrongly. So, be careful in using the electricity for any activity particularly in providing healthy meat. Safety is the first priority.

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