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PHENOLIC CONTENT OF SOME MEAL TO RATIONS MIX

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Abstract

In this study, the phenolic content of sunflower seed meal, cotton seed meal and soybean meal which are added in rations, has been identified. The meals drogs that gathered from 7 different feed factories in Konya, were purified from their fats by extraction with petrolium ether. The extracts prepared from the fat extracted drogs by using 70% aqueous methanol in the agitated water bath at 40 ° C, were used for determination of phenolic compound.
Total phenolic compound of obtained extracts were appointed with spectrophotometer in 750 nm terms of gallic acid as per Folin-Ciocalteu's phenol reactions. The identified phenolic compound of meals was compared with each other. As a result, the sunflower seed meal was identified as the most phenolic compound contained meal.

Key words*: phenolic content, meal.*

INTRODUCTION

Phenolic compounds impart the distinctive acrid flavor and color of the food. As for that, some phenolic compounds play a role in forming the bitter taste. As a component of nutrients, phenolic compounds are important for their functions on human health, effects on generating flavor and odor and contribution to color formation and changes. They also have antimicrobial and antioxidative effects, function on enzyme inhibition and they are determinants of purity control for various foods.

Phenolic compounds cause some unfavorable color changes in foods. The most important of them is enzymatic browning. The enzymes which catalyze reactions that induce phenolic compounds' oxidation are named as poliphenol oxidase enzymes (PPO).

The lipid oxidation that occurs during pulp storage gives animal feeds a bitter taste. Oxidation mechanism develops subsequent to spoilage due to layover. Lipid oxidation products may affect the absorption of some other food substances like proteins (Shahidi et al., 1995). Since oxidized lipids have unfavorable effects on the organism, the importance of inhibiting the lipid oxidation products in the foods has been rising. Consumers usually prefer natural antioxidants rather than synthetic ones (Namiki, 1990). Phenolic substances constitute the most important groups of natural antioxidants (Shahidi et al., 1992). Those are the poliphenolic components that exist in all parts of the plants and the most common herbal phenolic antioxidants are flavonoids, cinnamic acid derivatives, coumarines, tocopherols and phenolic acids. The products that contain phenolic substances are sources of catechin, epicatechin 3-O-gallate, trimeric, tetrameric procyanidins, antimutagenic and antiviral agents (Saito et al., 1998). Phenols also inhibit LDL oxidation (Frankel et al., 1995).

The raw materials of animal feed are the products that can be salvaged by various methods. Fats are one of the important components of animal feed. The residual fat-free part subsequent to fat extraction is important for determining the antioxidant agents from the point of determining the utility of the animal feed. Until today, phenolic substance quantities of some of the fat-free

animal feed raw materials have been calculated via various methods. However, phenolic substance quantities of the pulps added to the rations haven't been compared with each other.

MATERIALS AND METHODS

Sunflower seed meal mixed with rations, cotton seed meal and soybean meal were collected around Konya from seven different feed companies. Feed raw materials around Konya from, Kuzucu, Balci, Tarpas, Seltav and Ozbey company were obtained. The collected samples were placed in one kilogram bags.

In this study we used diethyl ether, methanol, ethanol, chloroform, sulphuric acid, acetone, benzene, folin reagent and gallic acid. Reflux, 250 ml flask, and 100 ml. separatory funnel. Also, beakers, pipettes, flasks, the extractor, Milivial, feed mill, spectrophotometer, Soxhlet, deep-freeze, vortex is used.

Provided meals, with a feed mill, of Selcuk University Faculty of Veterinary Medicine 'in the located 1 mm. Sieve like milled.

Crude analysis of the pulp used AOAC (1990) according to the method, Selcuk University, Faculty of Veterinary Medicine Department of Animal Nutrition and Nutritional Diseases ' s belonging to the Feed Analysis Laboratory, was built in Soxhlet device. Diethyl ether solvent is used in the extraction.

Folin-Ciocalteu method was used for determining the total phenolic substance quantity. Pulp samples and the Gallic acid that would be used as a standard are prepared in 70% methanol. 40 µl from each of the pulp samples were abstracted and 2400 µl of water, 200 µl of undiluted Folin reactive and 600 µl of 20% sodium carbonate were added to the samples. After 2 hours of incubation in room temperature and dark, the absorbance of the reaction admixture was measured versus methanol at 765 nm. Total phenolic content was detected by graphing Gallic acid (0-1 mg/ml) standard curve. The results were indicated as mg of Gallic acid in one gram of microalgae (Singleton et al., 1965).

First of all, mean values of the results of the samples and arithmetic means of seven samples were calculated. Then, standard deviations and standard errors were calculated for each of the mean values. Minimum and maximum values of the samples were determined (Duzgunes, 1987).

RESULTS AND DISCUSSIONS

Phenolic compounds are used to determine the quality factors of animal feed such as flavor, odor and color. They are also helpful in taxonomic studies that aim to differentiate the strains and types and studies on growth, development, rooting and graft incompatibility mechanisms. They are responsible for color and flavor perversion that occurs during animal feed storage. The phenolic substances that are present in herbal structure are very important for plant growth and productivity. In addition, it is known that they play role in many physiological mechanisms of the plants such as cold tolerance and disease resistance mechanisms. For this reason, it is very important to analyze the quantity of phenolic compounds in animal feed raw materials.

Phenolic substances prevent oxidation of LDL-lipoproteins, platelet coagulation and red cell damage by their antioxidant properties. In addition, they are also effective as metal binders, antimutagenic and anticarcinogenic agents (Minussi et al., 2003). They also play a role in cardiac health (Ahn et al., 2002).

Phenolic compounds have an important role in plants' growth and development processes with their complicated chemical structures and various derivatives and they form the second most common constituent of the plant structure after carbohydrates.

Phenolic compounds include many compounds that have an aromatic ring which contains at least one hydroxyl group and are important for their features regarding flavor, aroma, color, quality, nutritive value, storage characteristics, pharmacological and toxic effects. In addition, these compounds are also used in taxonomic studies to identify species and strains. Many plant studies showed that phenolic compounds are mostly present in plastids of cells, while they are found in endoplasmic reticulum during the period after fruit set and dispersed intracellularly during the following stages (Kalalb et al., 1993). Many studies that have been conducted until today suggested that many technical and cultural processes such as plant species and strain, plant and shoot age, hormone

and carbohydrate (saccharose and nitrate) contents of tissues, pruning with ecological factors, ring budding, irrigation, fertilization, use of substances regulating external growth and agricultural struggle modify the synthesis of phenolic compounds (Artik et al., 1997).
In this study, fat contents were 1.62% for sunflower seed pulp, 2.76% for cotton seed pulp and 2.12% for soybean pulp. In addition, productivities of each sample were calculated. These productivity values were 98.39% for sunflower seed pulp, 97.25% for cotton seed pulp and 97.88% for soybean pulp.

CONCLUSIONS

Our analysis showed that calculated phenolic substance content of sunflower seed pulp indicated as equivalent gallic acid was 140.08 g/mg. It was 14.61 g/mg for cotton seed pulp and 2.83 g/mg for soybean pulp. According to these results, the most significant antioxidative effect was in sunflower seed pulp, which means that the sample with the most significant antioxidant capacity was the one which was richest in phenolic substance.

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