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Effectiveness of black pepper (*Piper nigrum*) and clove (*Eugenia caryophyllus*) extract in preventing rancidity in butter fat

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ABSTRACT

Rancidity due to hydrolysis and oxidation is a very common cause of spoilage among edible fats. At commercial level, many synthetic antioxidants are added to increase the shelf-life of fats, but they may be harmful to health in long term. Polyphenol extract of two very common spices black pepper and clove was used in 5%, 10%, 15% concentration to see their effectiveness in preventing the development of rancidity in butterfat as compared to BHA (0.02%). Samples were kept in accelerated laboratory conditions at 80°C in the presence of copper catalyst. Onset of rancidity was checked by performing qualitative tests every hour and quantification of rancidity was done by estimating the acid value and peroxide value of samples after every five days. It was found that 5% conc. was not sufficient to prevent the deterioration of fats when compared to the standard. While 10% and 15% conc. were more effective than the standard. Black pepper extract was found to be more effective in preventing oxidative rancidity and clove extract was more effective to resist hydrolytic rancidity.

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Key words : BHA, Rancidity, Polyphenols

INTRODUCTION

Fat or oils are the most concentrated source of energy in the diet. Generally about thirty per cent of human energy requirements are met by fats (Manay and Shadashoraswamy, 1998). Fat and other lipids also contribute essential fatty acids and act as solvent for fat soluble vitamins (Meyer, 1987). Chemically fat and oils are glycerides of fatty acids. They are susceptible for spoilage due to the unsaturated fatty acids and enzymes found in them (Ajmani *et al.*, 1993). This spoilage is known as rancidity and it adversely affects the nutritional and sensory qualities of edible fats/oils. Generally, two types of rancidity are very commonly observed, oxidative and hydrolytic. Oxidative rancidity develops due to the oxidation of unsaturated fatty acids while hydrolytic rancidity is the result of hydrolysis of triglycerides and formation of free fatty acids. (Swaminathan, 1985). Butter fat or ghee is almost anhydrous milk fat having pleasing and appetizing aroma. Although it is not very rich in unsaturated fatty acid but is very prone to oxidative

damage. At commercial level, a number of synthetic antioxidants like BHA and BHT (0.02%) are allowed in fatty foods but they may be teratogenic, carcinogenic and mutagenic (Hathway, 1966). Therefore, the present study was done to critically appraise the effectiveness of polyphenols derived from black pepper (*Piper nigrum*) and clove (*Eugenia caryophyllus*) in preventing rancidity in butterfat.

MATERIALS AND METHODS

Selection of the samples:

Butter fat used in study was prepared in the laboratory by traditional method. Black pepper and clove were purchased from the whole seller of spices.

Pre-testing of samples:

Iodine value of fresh fat samples was estimated (Sharma, 2007). Polyphenols extraction was done from the spices by using in ethanol solvent in Soxhlet apparatus and polyphenols concentration in extracts was estimated