very-low-density lipoprotein particle clearance, binding, internalization, and catabolism of lipoprotein particles, triglyceride metabolism, gluconeogenesis (liver, kidney) and lipid synthesis (adipose tissue, liver, brain) glycolysis and cell respiration, coagulation and antioxidant defense. Most of the proteins that exhibited a fold change in response to squalene feeding exerted a direct influence on lipid metabolism.

Conclusions

Our study employed proteomic approaches and the results confirm that squalene feeding caused significant ($p<0.001$) alterations in proteins of lipid metabolic pathways that are likely to have profound effects on serum and liver lipid content. These proteins may function as potential targets to develop therapeutic strategies against lipid-related disorders.

Table Change in fold expression of select proteins/enzymes related to lipid metabolism. Here the changes in enzyme levels in liver of rats fed high fat diet (SQ2--HFD) is compared to enzyme levels in livers of rats fed with high fat diet and squalene (SQ3--HFD+Sq) are shown.

Fucoidan and its application in baked food products

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Brown seaweeds are rich source of bioactive sulphated polysaccharides. Fucoidan is one of the polysaccharides possessing diverse health benefits. This fucose-rich-sulphated polysaccharide is found largely in brown seaweeds. In terms of health benefit, fucoidan has been found to possess varied bioactivities such as anti-cancer, anti-thrombotic, anti-virus, antioxidant, anti-inflammatory, anti-diabetic, and neuro-protective. Hence, fucoidan has emerged as potential functional ingredients in food products. Fucoidan was extracted from the brown seaweed *Sargassum wightii*. The extracted crude fucoidan was used for developing new fucoidan supplemented biscuit.

Biscuits are the popularly consumed bakery items in India and other parts of the world. Their wide popularity is due to their ready to eat (RTE) nature, affordable cost, nutrition, easy availability and high shelf life. The effect of fucoidan enrichment on the physical, biochemical, and sensory characteristics of biscuits was evaluated. The diameter

Fig.1. Fucoidan extracted from Sargassum wightii

and thickness of the biscuits ranges from 47.62-48.33 mm and 4.11-4.65 mm, respectively. Fucoidan supplementation reduced the breaking strength of the biscuit from 43.25 to 19.55 N. Water activity-the measure of free water in the product-of the biscuits varied from 0.25 to 0. 33. The different descriptive sensorial attributes viz. color, appearance, flavour, odour, texture, taste and overall acceptability of both the biscuits varied from “Like moderately (7)” to “Like

Fig.2. Fucoidan enriched biscuit (left); control biscuit (right)

extremely (9)" on the 9-point hedonic scale.

Thus, crude fucoidan was successfully extracted and supplemented in biscuits without adversely affecting the sensorial attributes of the biscuits. Biscuits may serve as the carrier to deliver the bioactive compound to the human nutrition as biscuit is widely consumption throughout the world.

Influence of hydrocolloids on oil absorption of fried tuna kebab

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The recent trend in adopting healthier lifestyle has led to the development of low-fat products by reducing the fat content in fried foods using batter formulations with specific ingredients. Hydrocolloids, which have been widely using in food products, are known for reducing the oil uptake of fried foods. In the present study, hydrocolloids, guar gum (GG) and tragacanth gum (TG) were selected for adding into the batter to act as oil barriers and an attempt was done to prepare a low fat tuna kebab. The oil uptake and other quality characteristics of kebab were further evaluated. Kebab is a Middle Eastern dish, originally based on grilled meat and the traditionally used meat is mutton. But, depending on local taste and other preferences, kebab has been modified and now different varieties are available with other meats such as beef, goat, chicken, fish/seafood, or more rarely, pork. Mostly, kebabs are grilled on skewers or cooked in tandoor after marinating in special spices and it is even fried, especially in many places in India.

For preparing tuna kebab, ground tuna meat was mixed with minced onion, ginger-garlic paste, green chilly, coriander powder, chilly powder, turmeric powder, cumin powder, garam masala powder and salt. The final mixture was divided into two batches. Minced beetroot was added to one batch and the second batch was without beetroot. Further, it was formed into the shape of a kebab with the beetroot added mixture inside and the first batch of mixture outside. Thus, when the kebab is cut open, the cross-section will reveal two different colours. In this study, after battering and breading, the tuna meat based kebab was deep fried in oil instead of being grilled. Both GG and TG were added separately at 1% into the simple egg batter. The control tuna kebab was coated with only egg white. Values of the colour parameters, L* (lightness), a* (redness) b* (yellowness) of cross-section of kebab were 34.07±0.32, 26.10±0.10, and 18.19±0.16 for control and 34.17±0.52, 25.56±0.15, and 19.42±0.48 for TG sample. Fat content of control sample was