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Evaluation of calcium, magnesium and fluoride content in drinking water samples from Jazan province and their impact on dental caries

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Objective: The minerals in the drinking water play an important role in human nutrition. Apart from their systemic effects, they also affect the mineralised tissue of the teeth. Since there is an apparent increase in the usage of bottled water in this geographic region, they should provide the optimal amount of these minerals to impart dental health. The concentration of minerals calcium, magnesium and fluoride in the oral environment is critical for tooth remineralisation. The purpose of this study is to investigate the quantity of minerals such as calcium, magnesium and fluoride of most widely distributed domestic and imported brands of bottled water and also the natural sources of drinking water available in Jazan. It also compares the estimated values with those printed on their labels. The study further discusses whether the mineral composition in the drinking water creates the right environment in the oral cavity for promoting the repair of demineralised teeth.

Method: The concentration of Ca, Mg and F was determined for 12 brands of local bottled water, 3 brands of imported bottled water and 8 samples of natural source drinking water. Their concentrations were determined on the basis of analytical ion chromatography using a Dionex ICS 5000 ion chromatography system at Food and Drug authority (FDA) laboratory, Saudi Arabia.

Result: The local brand of bottled water had lower concentration of calcium and magnesium than the recommended level but optimal fluoride content. The imported brand of bottled water has maintained the optimal calcium level whereas their magnesium and fluoride levels are comparatively lower than recommended. On the other hand, the natural source of drinking water had quite a good amount of calcium and magnesium but their fluoride level is negligible. Both negative and positive types of variations were noticed in the concentration of these minerals compared to their labelled values.

Conclusion: Wide variation was observed in the mineral content of both commercially available bottled waters and natural source of drinking water with majority of them having suboptimal Ca and Mg. As mineral-rich drinking waters provide substantial contributions to total intake of these nutrients, the manufacturers should ensure the quality of bottled water by supplementing it with the recommended quantity of these minerals. Drinking water with the recommended concentration of Ca, Mg and F create a positive environment in the oral cavity for promoting regeneration processes of the mineralised tissue in tooth carious process. Knowledge of the mineral content of the drinking water and their health significance is essential to both public and health care professionals. Further studies correlating the levels of these minerals in drinking water and the prevalence of dental caries in this geographic region are recommended.

Surface marker detection of adipose- derived stem cells using flow cytometry

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Recent evidence has shown that adipose tissue is the robust and most accessible source of mesenchymal stem cells. In this study ADSCs of intra scapular subcutaneous adipose tissue of rabbit had derived and cultured and the surface markers were detected via flow cytometry. In this study adipose tissue of intra scapular region of 12 male New Zealand rabbits was harvested during the direct surgery or liposuction. After stem cell preparation, they were evaluated in third passage for detecting the surface markers by flow cytometry. The results showed that ADSCs displayed identical level of 99.7%, 99.4%, 65.7% and 96.7% for CD 45, CD 90, CD 73 and CD44, respectively. Our results confirmed the possibility of obtaining ADSC from adipose tissue which is a very available tissue in the body which can be a great source for getting stem cells for regeneration applications in a near future.

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