



## **Do "Fat Burners" Work?**

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The purpose of this presentation is to provide an overview of products sold under the generic name of "fat burners," to provide information on their proposed modes of action, their potential usefulness for physically active people, and safety issues that arise from their use and/or abuse. There is a wide spectrum of products in the marketplace with numerous commercial names that are referred to as "fat burners." In virtually all of these products the active ingredient is "ephedra," which is the general name for herbal supplements that contain ephedrine alkaloids. Product labels may include any number of names for these ephedrine alkaloids, including Ma Huang, ephedrine, Chinese ephedra, ephedrin, pseudoephedrine, norephedrine, and norpseudoephedrine. As ephedra receives more negative attention in the media because of well-publicized deaths in athletes and others, companies are beginning to produce non-ephedra "fat burners" (still relatively few in number) or are masking the ephedra with new names. Given that the International Olympic Committee, the NCAA, and the National Football League have all banned sympathomimetic alkaloids (including the entire category of OTC drugs and supplements that include ephedrine and pseudoephedrine), athletes should be particularly cautious about using supplement products that have vague content labels or make claims about fat burning.

There are two proposed modes of action for ephedra-containing "fat burners." First, ephedrine mimics actions of the sympathetic nervous system that stimulate brain function to increase metabolic rate, thereby causing weight loss. Second, its direct alpha- and beta-agonistic properties and catecholamine-releasing actions stimulate the central nervous system; and its purportedly lipolytic effects increases fat utilization and spares glycogen in endurance exercise. The stimulation of the central nervous system is likely to be responsible for the increase in metabolic rate (with resultant weight loss) that has been reported in several studies, but there is little evidence that ephedra-containing "fat burners" are capable of preferentially targeting fats rather than carbohydrates and proteins in metabolic reactions.



## **Do "Fat Burners" Work? (continued)**

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To some degree, weight loss is often associated with improved athletic performance because of an enhanced capacity to overcome the resistance associated with sport. Therefore, it is difficult to discern whether any positive effects of "fat burners" directly enhance performance through improved metabolic processes or whether performance improvement is simply the result of more optimal body weight.

Studies assessing the impact of ephedra compounds on aerobic performance have mixed results. In the few studies reporting benefits, subjects consumed a level of ephedra that greatly exceeds the maximum amount (24 mg/day) recommended by the FDA. In addition, benefits may be associated with the combined intake of ephedra and caffeine, making it difficult to know the independent effect of ephedra. Studies of anaerobic performance are also mixed, but tend to show a more consistent improvement in performance after consuming ephedra or ephedra plus caffeine. Again, the amounts of ephedra necessary to produce positive performance outcomes greatly exceed the FDA maximum recommendation.

There are numerous studies that demonstrate the weight-loss stimulating properties of ephedra. However, these studies and those that have assessed athletic performance have documented numerous safety concerns that involve the cardiovascular, thermoregulatory, and nervous systems. These safety concerns suggest that ephedra-containing products should not be freely available over the counter and should be used only with medical supervision.