CLAIMS

1. A method of controlling radiofrequency (RF) power delivered from a bipolar electrosurgical instrument (100) into a biological tissue at the distal end of the electrosurgical instrument (100), the method comprising:

generating an RF waveform;

delivering the RF waveform along an RF channel to the electrosurgical instrument (100);

controlling the profile of the RF waveform by:

setting a maximum voltage limit for a voltage applied across the bipolar electrosurgical instrument;

sampling current and voltage on the RF channel; and

calculating a tissue resistance from the sampled current and voltage, the calculating step including a correction for an impedance associated with the RF channel;

determining an objective tissue current limit from the calculated tissue resistance and a predetermined power dissipation target; and

dynamically adjusting the current limit based on the determined objective tissue current limit.

2. A method according to claim 1, wherein the RF waveform comprises a plurality of RF signal pulses.

3. A method according to claim 1 or 2 including calculating the maximum current limit I_{limit} as

$$I_{limit} = \sqrt{(V_{out}/X_c)^2 + {I_t}^2},$$

where V_{out} is the sampled voltage, I_t is the objective tissue current, and X_c represents a lumped shunt capacitance associated with the RF channel.

4. A method according to any preceding claim, wherein the RF channel has a length of 3 m or more.

5. A method according to any preceding claim, wherein the RF waveform has a frequency in the range 100 kHz to 5 MHz.

6. A method according to claim 5, wherein the RF waveform has a frequency in the range 300 kHz to 600 kHz.

7. A method according to any preceding claim, wherein the steps are executed by a microprocessor having an RF control interval in the range 50 µs to 20 ms.

8. A method according to claim 7, wherein the RF control interval is in the range 100 µs to 2 ms.

9. Electrosurgical apparatus for treating biological tissue with radiofrequency (RF) energy, the apparatus comprising:

a radiofrequency (RF) signal generator (4) for generating an RF waveform;

a probe (6) arranged to deliver the RF waveform from a distal end thereof;

a feed structure (9) for conveying the RF waveform to the probe along an RF channel;

an RF signal detector (14) for sampling current and voltage on the RF channel and generating therefrom a RF detection signal indicative of the current and voltage; and

a controller (16) in communication with the RF signal detector to receive the RF detection signal,

wherein the controller is arranged to:

set a maximum voltage limit for a voltage applied across the bipolar electrosurgical instrument; and

calculate a tissue resistance based on the RF detection signal, the calculated tissue resistance including a correction for ~~and~~ an impedance associated with the RF channel;

determine an objective tissue current limit from the calculated tissue resistance and a predetermined power dissipation target; and

dynamically adjust the current limit of the RF signal generator based on the determined objective tissue current limit.